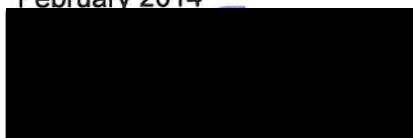


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Xylanase from *Bacillus licheniformis*

An application to amend the *Australia New Zealand Food Standards Code* with a xylanase preparation produced by a genetically modified *Bacillus licheniformis*

Novozymes A/S
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Regulatory Affairs



Novozymes A/S
Krogshøjvej 36
DK-2880 Bagsværd
Denmark

Telephone:
+45 4446 0000
Telefax:
+45 4446 4647

E-mail:
phva@novozymes.com
Internet:
www.novozymes.com

CVR number:
10 00 71 27

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EXECUTIVE SUMMARY

The present application seeks to amend Standard 1.3.3. - Processing Aids of the Australia New Zealand Food Standards Code (the Code) to approve a xylanase enzyme preparation produced by Novozymes A/S.

Proposed change to Standard 1.3.3 - Processing Aids

The table to clause 17, Permitted enzymes of Microbial Origin, is proposed to be amended to include a genetically modified strain of *Bacillus licheniformis* as permitted source for endo-1,4- β -xylanase.

The application is applied for assessment by the general procedure.

Description of enzyme preparation

The enzyme is a xylanase (EC 3.2.1.8), which hydrolyses xylosidic linkages in the arabinoxylan backbone resulting in a depolymerisation of the arabinoxylans into smaller oligosaccharides.

The enzyme is produced by submerged fermentation of a *Bacillus licheniformis* microorganism expressing a xylanase variant from *Bacillus licheniformis*.

The commercial enzyme product, Panzea, is a granulated enzyme preparation and complies with the JECFA recommended purity specifications for food-grade enzymes.

The producing micro-organism, *Bacillus licheniformis*, is absent from the commercial enzyme product.

Use of the enzyme

The enzyme preparation is to be used in the baking industry as a processing aid. The active enzyme is a xylanase (EC 3.2.1.8) which catalyzes the endo-hydrolysis of 1,4- β -D-xylosidic linkages in xylans. The xylanase preparation is used to modify the arabinoxylans in cereals such as wheat, barley, and oats, thereby improving the dough handling and characteristics of the final bread.

Benefits

The xylanase preparation is technologically justified. The enzyme adds value to the bread manufacturing process by facilitating the dough handling and improving the characteristics of the final bread.

Safety evaluation

The safety of the strain has been thoroughly assessed:

- the production organism has a long history of safe use as production strain for food grade enzyme preparations and is known not to produce any toxic metabolites.
- the recombinant DNA in the production organism is considered to be stable and unlikely to pose a safety concern.
- the enzyme preparation complies with international specifications
- there is no evidence of toxicity in the 90-day toxicity study in rats; and
- the enzyme preparation produced no evidence of genotoxic potential in *in vitro* assays.

Furthermore, the safety of the xylanase preparation was confirmed or is under consideration by external expert groups, as follows:

- Denmark: The enzyme preparation was safety assessed according to the Guidelines for the evaluation of food enzymes (the Scientific Committee for Food, Commission of the European Communities, 1992¹). This resulted in the authorisation of the enzyme product by the Danish authorities.
- USA: A GRAS determination was done and notified to the US FDA in May 2013 (GRN000472). In the reply letter from FDA dated January 10th, 2014, the agency has no questions regarding Novozymes' determination that the xylanase enzyme preparation is GRAS for its intended use.
- Brazil: Dossier was submitted in March 2013 and positively evaluated by ANVISA, however the amendment to the positive list is awaiting the next official update, expected beginning of 2014.
- Canada: Dossier was submitted in May 2013 and is currently being reviewed by Health Canada.

Conclusion

Based on the Novozymes safety evaluation (confirmed by the above-mentioned bodies), we respectfully request the inclusion of this enzyme in the Table to clause 17 of Standard 1.3.3.; Permitted enzymes of Microbial origin.

INTRODUCTION

The present dossier describes a xylanase enzyme preparation produced by submerged fermentation of a *Bacillus licheniformis* microorganism expressing a xylanase variant from *Bacillus licheniformis*. The Novozymes A/S trade name used for the xylanase enzyme preparation is Panzea.

The enzyme preparation is to be used in the baking industry as a processing aid. The active enzyme is a xylanase (EC 3.2.1.8) which catalyzes the endo-hydrolysis of 1,4- β -D-xylosidic linkages in xylans. The xylanase preparation is used to modify the arabinoxylans in cereals such as wheat, barley, and oats, thereby improving the dough handling and characteristics of the final bread.

The following sections describe in detail the construction of the genetically modified *Bacillus licheniformis* used as the production organism, the production process, the product specification, the application of the enzyme preparation and finally the safety evaluation of the product including the toxicology program, which has been carried out confirming the safety of the product for its intended use.

The documentation has been elaborated according to the Application Handbook from Food Standards Australia New Zealand as of September 1st 2013, applied as relevant for an enzyme application, i.e. outlining the following section:

- SECTION 3.1 – GENERAL REQUIREMENTS
- SECTION 3.3.2 – PROCESSING AIDS, subsections A, C, D, E, F.

NB! When reading this document it should be noticed that in some reports, the xylanase enzyme preparation is described by its commercial name, Panzea or by the internal production batch code PPQ 33502.

SECTION 3.1, GENERAL REQUIREMENTS

3.1.1 Executive Summary

An Executive Summary is provided as a separate copy together with this application.

3.1.2 Applicant details

- (a) ***Applicant's name/s***
[REDACTED]
- (b) ***Company/organisation name***
Novozymes Australia Pty Ltd
- (c) ***Address (street and postal)***
3/22 Loyalty Road PO Box 4942
2151 NORTH ROCKS NSW, Australia
- (d) ***Telephone number***
[REDACTED]
- (e) ***Email address***
[REDACTED]
- (f) ***Nature of applicant's business***
Biotechnology
- (g) ***Details of other individuals, companies or organisations associated with the application.***
Dossier prepared by:
[REDACTED]
Senior Science Manager
Regulatory Affairs
Krogshoejvej 36
2880 Bagsvaerd Denmark
[REDACTED]
E-mail: [REDACTED]

3.1.3 Purpose of the application

This application is submitted to provide for amendment of the Australia New Zealand Food Standards Code - Standard 1.3.3 - Processing Aids, Table to clause 17 to include a genetically modified strain of *Bacillus licheniformis* as permitted source for endo-1,4- β -xylanase.

3.1.4 Justification for the application

The need for the proposed change

The Table to clause 17 of Standard 1.3.3 contains a list of permitted enzymes of microbial origin. There are a number of approved sources of the enzyme, xylanase EC 3.2.1.8, but not from the source *Bacillus licheniformis*.

Bacillus licheniformis is an approved host and production strain for a number of enzymes in the Standard 1.3.3, i.e. α -Amylase, Glycerophospholipid cholesterol acyltransferase, Maltotetrahydrolase, Pullulanase, and Serine proteinase.

The advantages of the proposed change over the status quo

The xylanase preparation is technologically justified as a processing aid to improve production processes in the baking industry. The enzyme adds value to the bread manufacturing process by facilitating the dough handling and improving the characteristics of the final bread. The xylanase preparation represents the latest development in the baking xylanase segment and it has been tried with a number of local customers with positive outcome as evidenced by the customer support letter attached as Appendix 1.1.

As a response to international customer interests, registration activities have been done or are in progress or planned, globally. The xylanase preparation is approved in Denmark under the commercial name, Panzea. Also, the xylanase is the subject of a GRAS determination and notification to US FDA as well as applications submitted in Brazil and Canada.

A. Regulatory impact information

The application is not likely to place costs or regulatory restrictions on industry or consumers. Inclusion of the xylanase enzyme in Standard 1.3.3 will provide the baking industry with an option to improve the baking process and the characteristics of the final bread. For government, the burden is limited to necessary activities for a variation of Standard 1.3.3.

3.1.5 Information to support the application

Public health and safety issues related to the proposed change

No public health and safety issues related to the proposed change are foreseen. As outlined in sections D, E, F, the xylanase is produced by submerged fermentation of a genetically modified *Bacillus licheniformis* strain.

- the production organism has a long history of safe use as production strain for food-grade enzyme preparations and is known not to produce any toxic metabolites.
- the introduced DNA is well characterized, it is stably integrated in the production organism and it is unlikely to pose a safety concern
- the enzyme preparation complies with international specifications
- there is no evidence of toxicity in the 90-day toxicity study in rats; and
- the enzyme preparation produced no evidence of genotoxic potential in *in vitro* assays

Consumer choice issues related to the proposed change

No consumer choice issues related to the proposed change are foreseen. The enzyme is to be used in the baking industry as a processing aid to provide for more efficient production processes by facilitating the dough handling in the bread manufacturing process.

Evidence that the food industry generally or other specific companies have an interest in, or support, the proposed change to the Code.

The support letter from an Australian customer is attached as Appendix 1.1.

3.1.6 Assessment procedure

Because the application is for a new source organism for an existing enzyme in the Code, it is considered appropriate that the assessment procedure is characterized as “General Procedure, Level 1”.

3.1.7 Confidential commercial information (CCI)

Detailed information on the construction and characteristics of the genetically modified production strain is provided in the confidential Appendix 6. A summary of this information is given in section E. The formal request for treatment of Appendix 6 as confidential commercial information (CCI) is included as Appendix 1.2.

3.1.8 Exclusive capturable commercial benefit (ECCB)

This application is not expected to confer an Exclusive Capturable Commercial Benefit.

3.1.9 International and other national standards

A. International Standards

Use of enzymes as processing aids for bread production is not restricted by any Codex Alimentarius Commission (Codex) Standards.

B. Other national standards or regulations

With few exceptions on national, traditional bread/baking products (e.g. French traditional bread), use of enzymes as processing aids for bread production is in general not restricted by standards or regulations in other countries.

3.1.10 Statutory declaration

The Statutory Declaration is included as Appendix 1.3.

3.1.11 Checklist

This application concerns an enzyme product intended to be used as a processing aid. Therefore, the relevant documentation according to the Application Handbook from Food Standards Australia New Zealand as of September 1st 2013, are the following sections:

- SECTION 3.1 – GENERAL REQUIREMENTS
- SECTION 3.3.2 – PROCESSING AIDS, subsections A, C, D, E, F

Accordingly, the checklist for General Requirements as well as the Processing Aids part of the checklist for Standards related to Substances added to Food was used and is included as Appendix 1.4 and 1.5.

SECTION 3.3, STANDARDS RELATED TO SUBSTANCES ADDED TO FOOD

3.3.2 PROCESSING AIDS

The xylanase enzyme preparation described in this application is representative of the commercial food enzyme product, Panzea, on which approval is sought.

A. Technical information on the processing aid

A.1. Information on the type of processing aid

Panzea belongs to the category of processing aids described in Clause 17 of Standard 1.3.3., Enzymes of microbial origin.

Panzea is to be used in the baking industry as a processing aid. The active enzyme is a xylanase which is used to modify the arabinoxylans in cereals thereby improving the dough handling and characteristics of the final bread. Examples of the benefits when applying Panzea in the baking industry is provided in the Panzea Benefit Sheet, see Appendix 2.1.

A.2. Information on the identity of the processing aid

A.2.1. Enzyme

Generic name:	Xylanase
IUB nomenclature:	endo-1,4- β -xylanase
IUB No.:	EC 3.2.1.8
CAS No.:	9025-57-4

A.2.2. Enzyme preparation

Commercial name: Panzea

The xylanase enzyme preparation is available under the commercial name Panzea as a single enzyme formulation in 2 product strengths, Panzea BG and Panzea 10X BG.

The Product Data Sheets for Panzea BG and Panzea 10X BG are enclosed as Appendix 2.2 and 2.3. The typical compositions of Panzea BG and Panzea 10X BG are shown below:

	<u>Panzea BG</u>	<u>Panzea 10X BG</u>
Enzyme solids (TOS ^a)	approx. 0.4 %	approx. 4 %
Sodium chloride	approx. 0.6 %	approx. 6 %
Wheat flour	approx. 99 %	approx. 90 %

^a TOS = Total Organic Solids, defined as: 100% - water - ash - diluents

Panzea BG is standardized in xylanase units to an activity of 235 NXU/g and Panzea 10X BG is standardized to 2350 NXU/g. The Novozymes method used to determine the NXU activity is enclosed in Appendix 3.1.

Xylanases hydrolyze wheat arabinoxylan to release reducing carbohydrate. The reaction is stopped by an alkaline reagent containing PAHBAH and bismuth which forms complexes with reducing sugar, producing color detected at 405 nm. The produced color is proportional to the xylanase activity.

A.2.3. Host organism

The host strain is a modified (non-sporulating, protease deficient) *Bacillus licheniformis* strain derived from a natural isolate of *B. licheniformis*, ATCC 9789.

The following comprises the taxonomy of the host strain:

Name: *Bacillus licheniformis*
Class: Bacilli
Order: *Bacillales*
Genus: *Bacillus*
Species: *licheniformis*

For a more detailed description of the host organism and the genetic modifications, please see section E.

A.2.4. Donor organism

The xylanase gene is chemically synthesized based on sequence data from a public database which based on homology is concluded to be *Bacillus*. The xylanase is a protein engineered variant with a single amino acid residue difference compared to the wild type sequence. The change resulting from the protein engineering could occur naturally because it is insignificant compared to the variation of native xylanases from strains within the *Bacillus licheniformis* species and because there is evidence that the specific change occurs in nature.

For a more detailed description of the donor and the donor gene, please see section E.

A.3. **Information on the chemical and physical properties of the processing aid**

The active enzyme is a xylanase (EC 3.2.1.8) which catalyzes the endo-hydrolysis of 1,4- β -D-xylosidic linkages in xylans. The xylanase preparation is used to modify the arabinoxylans in cereals such as wheat, barley, and oats, thereby improving the dough handling and characteristics of the final bread.

No reaction products, which could not be considered normal constituents of the diet, are formed during the production or storage of the enzyme treated food.

Panzea BG and Panzea 10X BG are available as granulates which ease their blending with flour and other baking ingredients. They are off-white granulates, standardized with wheat flour.

Panzea is added to the flour or the liquid and is readily dissolved in the water present in the dough. The enzyme is active during the dough preparation and the leavening of the unbaked bread. During the baking process the high temperatures in the oven cause an inactivation of the enzyme activity.

A.4. Manufacturing process

The manufacturing process is composed of a fermentation process, a purification process, a formulation process and finally a quality control of the finished product, as outlined by Aunstrup et al. 1979². This section describes the processes used in manufacturing of the xylanase enzyme product.

The enzyme preparation is manufactured in accordance with current Good Manufacturing Practices, Food. The quality management system used in the manufacturing process complies with ISO 9001:2008 (Appendix 4).

The raw materials are Food Grade Quality and have been subjected to appropriate analysis to ensure their conformity with the specifications.

A.4.1. Fermentation

The xylanase is produced by submerged fed-batch pure culture fermentation of the genetically modified strain of *Bacillus licheniformis*, described in section E.

A.4.1.1. Raw materials for fermentation

The production strain is grown in a medium consisting of compounds providing an adequate supply of carbon and nitrogen plus minerals and vitamins necessary for growth. The choice of raw materials used in the fermentation process (the feed, the seed fermenter, the main fermenter and dosing) is listed below.

Carbohydrates (e.g. sucrose, glucose, maltose, starch hydrolysates)
Vegetable protein (e.g. potato protein, soy bean meal, corn steep liquor)
Yeast extract
Citric acid
Ammonia
Urea
Salts (e.g. K_2HPO_4 , $(NH_4)_2SO_4$, $CaCO_3$, $MgSO_4$, Na_2HPO_4)
Vitamins (e.g. vitamin B complex)
Trace metals (e.g. $MnSO_4$, $FeSO_4$, $CuSO_4$, $ZnSO_4$)
Alkali and acid for pH adjustments (e.g. Acetic acid, H_3PO_4 , NH_3 , $NaOH$)
Antifoaming agents (if necessary, e.g. P2000 and Clerol FBA 3003^b)
Potable water

^b **P2000** is a polypropyleneglycol, which in USA is permitted for use in processing of beet sugar and yeast (21 CFR § 173.340 (a)(3)).

Clerol FBA 3003 is a polyalkoxyether which is permitted in France in the production of crystalized sugar.

A.4.1.2. *Hygienic precautions*

All equipment is designed and constructed to prevent contamination by foreign micro-organisms.

All valves and connections not in use for the fermentation are sealed by steam at more than 120°C.

After sterilization a positive pressure of more than 0.2 atmosphere is maintained in the fermentation tank.

The air used for aeration is sterilized by passing a sterile filter.

The inside of each fermentation tank is cleaned between fermentations by means of a high-pressure water jet and inspected after the cleaning procedures have been completed.

A.4.1.3. *Preparation of the inoculum*

The inoculum flask containing the prepared medium is autoclaved and checked. Only approved flasks are used for inoculation.

The stock culture suspension is injected aseptically into the inoculum flask and spread onto the medium in the flask. Once growth has taken place in the inoculum flask (typically after a few days at 30°C), the following operations are performed:

- Strain identity and traceability: ampoule number is registered
- Microbial purity: a sample from the inoculum flask is controlled microscopically for absence of microbial contaminants.

When sufficient amount of biomass is obtained and when the microbiological analyses are approved, the inoculum flask can be used for inoculating the seed fermentor.

A.4.1.4. *The seed fermentation*

The raw materials for the fermentation medium are mixed with water in a mixing tank. The medium is transferred to the seed fermenter and heat sterilized (e.g. 120°C / 60 min).

The seed fermentation tank is inoculated by transferring aseptically a suspension of cells from the inoculum flask.

The seed fermentation is run aerobically (sterile airflow), under agitation. The overpressure is kept above 0.2 atmosphere at all times, to prevent contamination.

Once a sufficient amount of biomass has developed, microbiological analyses are performed to ensure absence of contamination. The seed fermentation can then be transferred to the main fermentation tank.

A.4.1.5. *The main fermentation*

The raw materials for the medium are mixed with water in a mixing tank. The medium is transferred to the main fermenter and heat sterilized (e.g. 120°C / 60 min). If necessary, the pH is adjusted after sterilization, with sterile pH adjustment solutions.

The fermentation in the main tank is run as normal submerged fed-batch fermentation.

The main fermentation is run aerobically (sterile airflow), under vigorous agitation. The overpressure is kept above 0.2 atmosphere at all times, to prevent contamination. The fermentation is run at a well-defined temperature.

Fresh medium is added aseptically when the pH increases above its set point, and the dissolved oxygen concentration rises. The feed rate is adjusted so that there is no accumulation of carbohydrates.

Other parameters are measured at regular intervals

- Refractive index
- Enzyme productivity
- Residual glucose
- Residual ammonia.

Samples are also taken at regular intervals to check absence of microbial contamination.

A.4.2. Recovery

The recovery process is a multi-step operation designed to separate the enzyme from the microbial biomass and partially purify, concentrate, and stabilize the food enzyme.

The steps of this process involve a series of typical unit operations:

- Pre-treatment
- Primary separation
- Concentration
- Pre and germ filtration
- Preservation and stabilization
- Pre and germ filtration (if needed)

A.4.2.1. Raw materials for recovery

The raw materials typically used in the recovery process are as follows:

Diatomite or Perlite

Acids and bases for pH adjustment

Flocculants (e.g. Calcium chloride, poly-aluminium chloride, Superfloc C591^c, Superfloc A130^d)

A.4.2.2. Pre-treatment

To facilitate the separation, flocculants (calcium chloride, aluminate and/or Superfloc C521 & A 130) are used in a pH-controlled process.

^c Superfloc C591 is a dimethyl diallyl ammonium chloride polymer

^d Superfloc A130 is an acrylate acrylamide copolymer

A.4.2.3. *Primary separation*

The cell mass and other solids are separated from the broth by well-established techniques such as pre-coat vacuum drum filtration or centrifugation. The precoat used in the filter and the filter aid used in the process is diatomaceous earth (diatomite or perlite).

The primary separation is performed at well-defined pH and temperature range.

A.4.2.4. *Concentration*

Ultrafiltration and/or evaporation are applied for concentration and further purification. The ultrafiltration is applied to fractionate high molecular weight components from low molecular weight impurities and is used to increase the activity/dry matter ratio. Evaporation is used to increase the activity while maintaining the activity/dry matter ratio.

The pH and temperature are controlled during the concentration step, which is performed until the desired activity and activity/dry matter ratio has been obtained.

A.4.2.5. *Pre and germ filtration*

For removal of residual cells of the production strain and as a general precaution against microbial degradation, filtration on dedicated germ filtration media is applied. Pre-filtration is included when needed.

The filtrations are performed at well-defined pH and temperature intervals, and result in an enzyme concentrate solution free of the production strain and insoluble substrate components from the fermentation.

A.4.2.6. *Preservation and stabilization*

For enzymatic, physical and microbial stabilization sodium chloride is added to the enzyme concentrate.

A.4.2.7. *Final concentration*

In case the concentration is too low to reach the target yield for the final product, a further concentration may be carried out by evaporation and/or ultra filtration.

A.4.2.8. *Process control*

Apart from the process controls performed during the various fermentation steps and described above, the following microbial controls are also performed.

Samples are withdrawn from both the seed fermenter and the main fermenter:

- a) before inoculation
- b) at regular interval during cultivation
- c) before transfer/harvest

The samples during all steps are examined by:

- a) microscopy
- b) plating culture broth on a nutrient agar and incubating for 24-48 hours.

Growth characteristics are observed macroscopically and microscopically.

During the microbiological control steps, the number of foreign micro-organisms should be insignificant. The fermentation parameters, i.e. enzyme activity, temperature and oxygen as well as pH are also monitored closely. A deviation from the normal course of the fermentation may signal a contamination.

If a significant contamination develops, the fermentation is terminated. The fermentation is regarded as “significantly contaminated” if two independent samples show presence of contaminating organisms after growth on nutrient agar.

Any contaminated fermentation is rejected for enzyme preparations to be used in a food grade application.

A.5. Specification for identity and purity

The xylanase enzyme product complies with the purity criteria recommended for Enzyme Preparations in Food, Food Chemical Codex, 8th edition, 2012.

In addition to this, the xylanase enzyme product also conforms to the General Specifications for Enzyme Preparations Used in Food Processing as proposed by the Joint FAO/WHO Expert Committee on Food Additives in Compendium of Food Additive Specifications, available online at: <http://www.fao.org/ag/agn/jecfa-additives/search.html?lang=en>

Analytical data for an unstandardized, representative batch of the xylanase enzyme product is shown in the table below. These data show compliance with the purity criteria of the specification.

Control parameter	Unit	Specification	Batch PPQ33502
Xylanase enzyme activity	NXU/g		1670
Heavy Metals ^a	ppm	Max 30	3.5
Pb	ppm	Max 5	<0.5
As	ppm	Max 3	0.12
Cd	ppm	Max 0.5	<0.05
Hg	ppm	Max 0.5	<0.03
Total viable count	/g	Not more than 50000	<100
Total coliforms	/g	Not more than 30	<4
Enteropathogenic E. coli	/25g	Not detected	ND ^b
Salmonella	/25g	Not detected	ND
Antibiotic activity		Not detected	ND
Production strain	/g	Not detected	ND

a) Heavy Metals = Σ of Ag, As, Bi, Cd, Cu, Hg, Mo, Ni, Pb, Sb, Sn

b) ND = Not Detected

The methods of analysis used to determine compliance with the specifications are enclosed (Appendix 3).

The xylanase enzyme preparation is available under the commercial name Panzea in 2 product strengths, Panzea BG and Panzea 10X BG.

The Product Data Sheets for Panzea BG and Panzea 10X BG are enclosed in Appendix 2. The typical compositions of Panzea BG and Panzea 10X BG are shown below:

	<u>Panzea BG</u>	<u>Panzea 10X BG</u>
Enzyme solids (TOS [°])	approx. 0.4 %	approx. 4 %
Sodium chloride	approx. 0.6 %	approx. 6 %
Wheat flour	approx. 99 %	approx. 90 %

Panzea BG is standardized in xylanase units to an activity of 235 NXU/g and Panzea 10X BG is standardized to 2350 NXU/g. The Novozymes method used to determine the NXU activity is enclosed as Appendix 3.1.

Panzea BG and Panzea 10X BG are available as off-white granulates which ease their blending with flour and other baking ingredients. Panzea is added to the flour or the liquid and is readily dissolved in the water present in the dough. The enzyme is active during the dough preparation and the leavening of the unbaked bread. During the baking process the high temperatures in the oven cause an inactivation of the enzyme activity. Therefore, Panzea is not present as particulate matter in the final food.

Panzea is standardized to its intended product strength with wheat flour. Apart from wheat, Panzea does not contain known food allergens as detailed in the Product Data Sheets (Appendix 2).

A.6. Analytical method for detection

The xylanase enzyme preparation is to be used in the baking industry as a processing aid. This information is not required in the case of an enzymatic processing aid.

B. Information related to the safety of a chemical processing aid

Not applicable - this application does not concern a chemical processing aid.

[°] TOS = Total Organic Solids, defined as: 100% - water - ash - diluents

C. Information related to the safety of an enzyme processing aid

C.1. General information on the use of the enzyme as a food processing aid in other countries

Panzea is used as a processing aid in the baking industry in a range of countries globally. Country specific dossiers have been submitted and already approved or under consideration in relevant countries, e.g.:

- Denmark: The enzyme preparation was safety assessed according to the Guidelines for the evaluation of food enzymes (the Scientific Committee for Food, Commission of the European Communities, 1992¹). This resulted in the authorisation of Panzea by the Danish authorities.
- USA: A GRAS determination was done and notified to the US FDA in May 2013 (GRN000472). In the reply letter from FDA dated January 10th, 2014, the agency has no questions regarding Novozymes' determination that the xylanase enzyme preparation is GRAS for its intended use, cf. <http://www.accessdata.fda.gov/scripts/fcn/fcnDetailNavigation.cfm?rpt=grasListing&id=472>).
- Brazil: Dossier was submitted in March 2013 and positively evaluated by ANVISA, however the amendment to the positive list is awaiting the next official update, expected beginning of 2014.
- Canada: Dossier was submitted in May 2013 and is currently being reviewed by Health Canada.

C.2. Information on the potential toxicity of the enzyme processing aid

- (a) *Information on the enzyme's prior history of human consumption and/or its similarity to proteins with a history of safe human consumption*

A wide variety of enzymes, including xylanases, are used in food processing and have a long history of safe use in food (Pariza and Foster, 1983³; Pariza and Johnson, 2001⁴). Xylanases have been used extensively for more than 25 years in various industrial food applications such as starch processing, manufacturing of alcohol, brewing and baking products (Beg *et al*, 2001⁵). Xylanases from various micro-organisms are widely accepted by authorities to be used as processing aids in various food applications.

- (b) *Information on any significant similarity between the amino acid sequence of the enzyme and that of known protein toxins*

Based on the amino acid sequence of the xylanase enzyme (provided in the confidential Appendix 6), a homology assessment of the xylanase enzyme to known toxins and allergens was conducted (Appendix 5.1). No homologies to toxins or allergens were found.

Furthermore, safety studies as described below were performed on a test-batch (Xylanase, PPQ33502) that was produced according to the description given in section A.4, omitting stabilization and standardization.

The following studies were performed:

- Ames Test. Test for mutagenic activity with strains of *S. typhimorium* and *E.coli*
- In vitro micronucleus test
- Subchronic (90 days) oral toxicity study in rats

The main conclusions of the safety studies can be summarized as follows:

- Xylanase, PPQ33502 did not induce gene mutations in the Ames test, neither in the presence or absence of S-9 mix.
- Xylanase, PPQ33502 did not show any clastogenic activity, neither in the presence or absence of S-9 mix, when tested in the in vitro micronucleus assay.
- In a 13 weeks oral toxicity study in rats Xylanase, PPQ33502 was well tolerated and did not cause any toxicologically significant changes at any dose level. In conclusion, 90/91-days of daily oral (gavage) treatment of rats with Xylanase, PPQ33502, at dose levels of up to 1020 mg TOS/kg bw/day or 38608 GH8XU/kg bw/day administered in a dose volume of 10 mL/kg bw/day did not cause any test item related changes. The NOAEL (No Observed Adverse Effect Level) for both females and males for Xylanase, PPQ33502, was 1020 mg TOS/kg bw/day corresponding to 38608 GH8XU/kg bw/day.

Based on the present toxicity data it can be concluded that the xylanase enzyme preparation, represented by batch PPQ33502, exhibits no toxicological effects under the experimental conditions described. A summary of the safety studies is enclosed in Appendix 5.2.

C.3. Information on the potential allergenicity of the enzyme processing aid

(a) Information of the source of the enzyme processing aid

The xylanase enzyme is produced by a *Bacillus licheniformis* microorganism expressing a xylanase variant from *Bacillus licheniformis*. *Bacillus licheniformis* is a soil and plant living saprophyte, recognized as non-pathogenic species for humans, animals and plants (see Section D).

(b) Analysis of similarity between the amino acid sequence of the enzyme and that of known allergens

Enzymes have a long history of safe use in food, with no indication of adverse effects or reactions. Moreover a wide variety of enzyme classes (and structures) are naturally present in food.

The allergenicity potential of enzymes was studied by Bindslev-Jensen et al (2006⁶) and reported in the publication: "Investigation on possible allergenicity of 19 different commercial enzymes used in the food industry". The investigation comprised enzymes produced by wild-type and genetically modified strains as well as wild-type enzymes and protein engineered variants and comprised 400 patients with a diagnosed allergy to inhalation allergens, food allergens, bee or wasp. It was concluded from this study that ingestion of food enzymes in general is not likely to be a concern with regard to food allergy.

Additionally, food enzyme are used in small amounts during food processing resulting in very small amounts of the enzyme protein in the final food. A high concentration generally equals a higher risk of sensitization, whereas a low level in the final food equals a lower risk (Goodman et al, 2008⁷).

Based on the amino acid sequence of the xylanase enzyme (provided in the confidential Appendix 6), a homology assessment of the xylanase enzyme to known toxins and allergens was conducted (Appendix 5.1). No homologies to toxins or allergens were found.

Consequently, oral intake of the xylanase is not anticipated to pose any food allergenic concern.

C.4. Safety assessment reports prepared by international agencies or other national government agencies, if available

A document certifying approval of Panzea by the Danish authorities following their safety evaluation according to the Guidelines for food enzymes by the Scientific Committee for Food is enclosed as Appendix 2.4 and 2.5.

In addition, the US FDA did not question the conclusion that the xylanase enzyme preparation object of the present dossier is GRAS for its intended use, cf.

<http://www.accessdata.fda.gov/scripts/fcn/fcnDetailNavigation.cfm?rpt=grasListing&id=472>).

D. Additional information related to the safety of an enzyme processing aid derived from a microorganism

D.1. Information on the source microorganism

The xylanase enzyme is produced by a *Bacillus licheniformis* microorganism expressing a xylanase variant from *Bacillus licheniformis*. The host strain is a modified (non-sporulating, protease deficient) *Bacillus licheniformis* strain derived from a natural isolate of *B. licheniformis*, ATCC 9789.

D.2. Information on the pathogenicity and toxicity of the source microorganism

Bacillus licheniformis is a soil and plant living saprophyte, recognized as non-pathogenic species for humans, animals and plants (Priest FG, 1993⁸, de Boer AS *et al*, 1994⁹, EPA, 1997¹⁰). *B. licheniformis* is also common in foods including natural agricultural products such as cereals.

B. licheniformis is classified as a group 1 microorganism according to EU Directive 2000/54/EC of the European Parliament and of the Council of 18 September 2000 on the protection of workers from risks related to exposure to biological agents at work. A group 1 biological agent means one that is unlikely to cause human disease.

The recipient strain is sporulation deficient due to a deletion in the *spoIIAC* gene.

Industrial strains belonging to the *B. licheniformis* species have a long history of safe use in food enzyme manufacturing. They have been used for decades in the production of enzymes, and in more than a decade as recombinant organisms for the production of a

variety of bio-industrial products like food grade enzymes, vitamins, antibiotics, and additives (Schallmey M *et al*, 2004¹¹).

The Food and Drug Administration has affirmed that mixed carbohydrase and protease enzyme products derived from *B. licheniformis* are generally recognized as safe (GRAS) in the production of certain foods including nutritive sweeteners, see 21CFR §184.1027. In the supplementary information to the final rule in the Federal Register, FDA emphasized that "Published scientific literature as well as standard books on food microbiology demonstrate that *B. licheniformis* is widely recognized as a common contaminant found in many foods. None of these references report any toxicity or pathogenicity associated with the presence of this organism in food."

In addition, the FDA did not question the conclusion that various other food enzymes obtained from genetically modified *B. licheniformis* strains are GRAS under the intended conditions of use (GRN no. 22, GRN no. 24, GRN no. 72, GRN no. 79, GRN no. 265, GRN no. 277).

JECFA has evaluated enzymes derived from *B. licheniformis*, including a genetically modified strain, and concluded that these food enzymes do not constitute a toxicological hazard.

The non-pathogenicity and non-toxicity of *B. licheniformis* is thus strongly supported by the historic record of this organism.

D.3. Information on the genetic stability of the source organism

The inserted recombinant DNA is genetically stable during fermentation, as the inserted DNA is integrated into the chromosome.

The genetic stability of the production strain was tested at large-scale fermentation. The strain stability during fermentation was analyzed by Southern blotting. No instability of the strain was observed.

For a more detailed description of the strain construction and characteristics, please see section E.

E. Additional information related to the safety of an enzyme processing aid derived from a genetically-modified microorganism

E.1. Information on the methods used in the genetic modification of the source organism

This section contains summarized information on the modifications of the host strain, on the content and nature of the introduced DNA and on the construction of the final production strain, as well as the stability of the inserted gene. The detailed information is provided in the confidential Appendix 6.

E.1.1. Host organism

The host strain, designated *B. licheniformis* BW302, was derived from a natural isolate of *B. licheniformis*, ATCC 9789. The following comprises the taxonomy of the host strain:

Name: *Bacillus licheniformis*
Class: Bacilli
Order: *Bacillales*
Genus: *Bacillus*
Species: *licheniformis*

The recipient strain used in the construction of the xylanase production strain, was modified at several chromosomal loci to cause deletion of genes encoding a number of proteases. Also a gene essential for sporulation was deleted, eliminating the ability to sporulate, together with three additional genes encoding unwanted peptides. The lack of these peptides and proteins represents improvements in product safety and stability.

E.1.2. Introduced DNA

The expression plasmid, pBW120, used to transform the *B. licheniformis* host strain, BW302, is based on the well-known *Bacillus* vector pE194 from *Staphylococcus aureus* and a standard *E. coli* vector. No elements of these vectors are left in the production strain. The plasmid contains the expression cassette consisting of a fragment of a hybrid *Bacillus* promoter with promoter elements from *B. licheniformis*, *B. amyloliquefaciens* and *B. thuringiensis*, the xylanase coding sequence and a *B. licheniformis* terminator. Following the terminator, an integration fragment is inserted that enables site specific integration on the genome of the recipient strain. Only the expression cassette with elements between the promoter fragment and the integration fragment are present in the final production strain.

The xylanase coding sequence is chemically synthesized based on sequence data from a public database. According to Yoon *et. al.*, 1998¹², the gene is derived from a thermophilic soil bacterium *Bacillus sp. KK-1* and codes for a GH8 xylanase (Kim *et al*, 1995¹³). Based on homology assessment of the GH8 xylanase to public databases showing 98.5% homology to another xylanase from *Bacillus licheniformis*, it is concluded that the strain *Bacillus sp. KK-1* is belonging to the same species, *Bacillus licheniformis*. The xylanase variant, xyl264, is a genetically engineered variant of the GH8 xylanase gene with a single amino acid residue difference compared to the wild type sequence. This has been confirmed by Southern blot analysis and PCR analysis followed by DNA sequencing.

The change resulting from the protein engineering could occur naturally because it is insignificant compared to the variation of native xylanases from strains within the *Bacillus licheniformis* species and because there is evidence that the specific change occurs in nature. Detailed information is provided in the confidential Appendix 6.

E.1.3. Construction of the Recombinant Microorganism

The production strain, *B. licheniformis* HyGe329, was constructed from BW302 through the following steps:

- 1) A conjugation donor strain harboring pBW120 was used to mobilize pBW120 into the recipient strain BW302.
- 2) Plasmid pBW120 was integrated into two specific loci in strain BW302 by targeted homologous recombination to these loci using a two-step integration approach. Integration of the expression cassette at these loci allows the expression of the *xyl264* gene from the hybrid promoter and the transcriptional terminator.
- 3) The resulting two-copy *xyl264* strain was named HyGe329.

Sequence confirmation of the inserted expression cassettes and the flanking regions at both of the integration loci was performed in the production strain.

E.1.4. Antibiotic Resistance Gene

No functional antibiotic resistance genes were left in the strain as a result of the genetic modifications. The absence of these genes was verified by Southern blot analysis using the relevant antibiotic resistance gene probes.

E.1.5. Stability of the Introduced Genetic Sequences

The presence of the introduced DNA sequences was also determined by Southern hybridization to assess the stability and potential for transfer of genetic material as a component of the safety evaluation of the production microorganism. The transforming DNA is stably integrated into the *B. licheniformis* chromosome and, as such, is poorly mobilizable for genetic transfer to other organisms and is mitotically stable.

F. Information related to the dietary exposure to the processing aid

F.1. A list of foods or food groups likely to contain the processing aid or its metabolites

The xylanase enzyme is used as processing aid in the baking industry, where addition in the baking process improves the dough handling and stability and results in a more uniform crumb structure and slightly increased volume.

F.2. The levels of residues of the processing aid or its metabolites for each food or food group

The xylanase enzyme preparation is used at minimum levels necessary to achieve the desired effect and according to requirements for normal production following cGMP.

The enzyme is added to the flour or the liquid and is active during the dough preparation and the leavening of the unbaked bread. During the baking process the high temperatures in the oven cause an inactivation of the enzyme activity. No reaction products, which could not be considered normal constituents of the diet, are formed during the production or storage of the enzyme treated food.

F.2.1. Estimates of human consumption

In to provide an estimate for human consumption, an exaggerated “worst case” calculation is made assuming that all organic matter originating from the enzyme is retained in the final baking product.

For the baking applications, the recommended dosage of the xylanase is up to 11.75 NXU/kg flour. This corresponds e.g. to 0.5 g of Panzea 10X BG per 100 kg flour. Panzea 10X has an activity of 2350 NXU/g and an approximate content of 4% TOS (Total Organic Substances from the fermentation, mainly protein and carbohydrate components).

The average human intake of bread is estimated using well-established statistics from various countries:

- UK: The Ministry of Agriculture, Fisheries and Food: 1987 Annual Report of the National Food Survey Committee, Household Food Consumption and Expenditure: Consumption of bread, cakes and biscuits per person per day is 158 g.
- DK: “Levnedsmiddelstyrelsen”: Development of Food Consumption in Denmark, 1955-1990, Description of the Danish Diet based on food statistics and nutrition calculated data: Consumption of bread, flutes, pita-bread, cakes, and rye bread per person per day is 123 g.
- US: Industrial Outlook 1992 (Food Beverages): Consumption of bread and related products per person per day is 109 g.

In order to demonstrate a worst case calculation, an exaggerated human intake is estimated using the following assumptions:

- a) The calculation is made assuming that all TOS remains in the baking product. Panzea 10X contains 4 % TOS.
- b) It is assumed that all baking products are produced using Panzea as a processing aid, used at the highest recommended dosage.

The maximum recommended dosage of Panzea is up to 11.75 NXU/kg flour, corresponding to 0.5 g of Panzea 10X per 100 kg flour. Panzea 10X contains 4 % TOS. Using a standard recipe, 100 kg flour results in 140 kg bread, giving a theoretical content of 0.143 mg TOS/kg bread.

Based on the highest average daily intake of baking products (158 g), the daily intake per person of Panzea corresponds to $0.143 \times 0.158 = 0.023$ mg TOS per day.

For an average person weighing 60 kg this corresponds to 0.376×10^{-3} mg / kg body weight per day.

F.2.2. Safety Margin Calculation

The safety margin is calculated as dose level with no adverse effect (NOAEL) divided by the estimated human consumption. The NOAEL dose level in the 13 weeks oral toxicity study in rats was 10 ml/kg/day corresponding to 1020 mg TOS/kg/day.

The estimated human consumption is 0.376×10^{-3} mg TOS/kg/day

The safety margin can thus be calculated to be: $1020 / 37.6 \times 10^{-3} = 2.7 \times 10^6$

F.3. For foods or food groups not currently listed in the most recent Australian or New Zealand National Nutrition Surveys (NNSs), information on the likely level of consumption

Not relevant – bread is likely included in National Nutrition Surveys (NNSs).

F.4. The percentage of the food group in which the processing aid is likely to be found or the percentage of the market likely to use the processing aid

In the estimate on human consumption given in F.2.1 above, it is assumed that all baking products are produced using Panzea as a processing aid, used at the highest recommended dosage.

F.5. Information relating to the levels of residues in foods in other countries

For the estimate on human consumption given in F.2.1 above, consumption data from UK, DK and US were used.

F.6. For foods where consumption has changed in recent years, information on likely current food consumption

No significant change in bread consumption is observed in recent years

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- ¹² Yoon, K.H. Yun, H.N. Jung, K.H.; Molecular cloning of a Bacillus sp. KK-1 xylanase gene and characterization of the gene product.; Biochem Mol Biol Int 45:337-347, 1998
- ¹³ Kim, D.-J., Shin, H.-J., Min, B.-H., and Yoon, K.-H. Isolation of a thermophilic *Bacillus* sp. Production the thermostable cellulase-free xylanase, and properties of the enzyme. Kor. J. Appl. Microbiol. Biotechnol. 23, 304-310, 1995

List of Appendices

- 1) General Requirements
- 2) Product information
- 3) Methods of analysis used to determine compliance with the specifications
- 4) Documentation regarding the manufacturing process
- 5) Safety documentation
- 6) Documentation regarding the production microorganism

Appendix 1

General Requirements


1. Evidence that the food industry generally or other specific companies have an interest in, or support, the proposed change to the Code
2. Formal request for treatment of confidential commercial information (CCI)
3. Statutory declaration
4. Checklist for GENERAL REQUIREMENT
5. Checklist for Standards related to Substances added to Food

Mauri Yeast Australia Pty Ltd
15 Grand Avenue, Camellia NSW 2142
PO Box 22, Granville NSW 2142, Australia
ABN 68 003 853 656

tel +61 (2)9684 8600
fax +61 (2)9638 5186


Novozymes Australia Pty Ltd.
3/22 Loyalty Road,
North Rocks 2151.

8 August 2013


Following a series of test bakery trials conducted in our laboratory using your new Panzea range of Xylanase enzymes, we would like to advise that the products perform very well and on a like for like usage rate basis, they appear to outperform many other xylanase we have used.

Using Panzea, we have been able to obtain excellent dough stability and produce bread having very good volume, crumb texture and softness.

We see this product as being advantageous for a number of bakery applications and would support any application seeking FSANZ approval for use in Australia. Please let us know if we can be of assistance in this process and keep us informed of your progress.

Regards


Technical Director
AB Mauri ANZ

Appendix 1.2

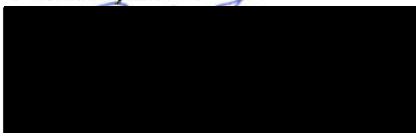
Formal request for treatment of confidential commercial information (CCI)

Novozymes respectfully request that Appendix 6 in its entirety is treated as confidential commercial information (CCI).

All documents in Appendix 6 contain detailed description of the construction of the genetically modified production strain and the introduced DNA. While individual steps in the DNA construction might be well known or publicly available information, the exact steps and sequence of those constitutes information that represent the state-of-the-art of one of Novozymes' core technologies, which has been obtained as a result of substantial investment in research and development within rDNA technology. Therefore, the information in Appendix 6 is claimed confidential for an unlimited period of time.

Furthermore, the sequence for xylanase provides an unambiguous possibility for our competitors to link a certain xylanase to a specific commercial product which would make it extremely easy for our competitors to copy it or benchmark their product against ours.

February 2014



Senior Science Manager
Regulatory Affairs
Novozymes A/S

STATUTORY DECLARATION

I, [REDACTED], MANAGING DIRECTOR, NOVOLYMES AUSTRALIA PTY LTD (Full Name)
of [REDACTED] (Address)
in the State/Territory of NEW SOUTH WALES

do solemnly and sincerely declare that:

RE: APPLICATION FOR REGISTRATION ON NEW BAKING XYLANASE ENZYME

1. THE INFORMATION PROVIDED IN THIS APPLICATION FULLY SETS OUT THE MATTERS REQUIRED
2. THE INFORMATION PROVIDED IN THIS APPLICATION IS TRUE TO THE BEST OF MY KNOWLEDGE AND BELIEF
3. NO INFORMATION HAS BEEN WITHHELD THAT MIGHT PRESUDICE THIS APPLICATION TO THE BEST OF MY KNOWLEDGE AND BELIEF.

I UNDERSTAND THAT A PERSON WHO INTENTIONALLY MAKES A FALSE STATEMENT IN A STATUTORY DECLARATION IS GUILTY OF AN OFFENCE UNDER SECTION 11 OF THE STATUTORY DECLARATIONS ACT, 1959. AND I BELIEVE THAT THE STATEMENTS IN THIS DECLARATION ARE TRUE IN EVERY PARTICULAR.

ABG

(Place your initials in the box beside the State or Territory in which your Statutory Declaration is being made – this direction is not part of your Statutory Declaration).

☒ **NSW** - And I make this solemn declaration, conscientiously believing the same to be true and by virtue of the provisions of the Oaths Act 1900. Also note, the certification at the bottom of this page is required in NSW.

☐ **VIC** - I acknowledge that this declaration is true and correct and I make it in the belief that a person making a false declaration is liable to the penalties of perjury.

☐ **QLD** - And I make this solemn declaration conscientiously believing the same to be true, and by virtue of the provisions of the Oaths Act 1867.

☐ **SA** - And I make this solemn declaration conscientiously believing the same to be true and by virtue of the provisions of the Oaths Act 1936.

☐ **WA** - This declaration is true and I know that it is an offence to make a declaration knowing that it is false in a material particular.

This declaration is made under the Oaths, Affidavits and Statutory Declarations Act 2005.

☐ **NT** - And I make this solemn declaration by the virtue of the Oaths Act 1939 and conscientiously believing the statements contained in this declaration to be true in every particular.

Note: A person willfully making a false statement in a statutory declaration is liable to a penalty of 17 penalty units or imprisonment for 12 months, or both.

☐ **TAS** - I make this solemn declaration under the Oaths Act 2001.

Declared at NORTH ROCKS [place] on 3RD [day]
of DECEMBER [month] 2013 [year]

[Redacted Signature] [Signature of Declarant]

Before me [Redacted Signature] [Signature of Witness]

Kathleen Patricia Williamson [Full Name]

NSW JP No. 148940 [Address]

355 North Rocks Road [Address]

North Rocks NSW 2151 [Qualification]

CERTIFICATION REQUIRED FOR NSW ONLY

I, the above mentioned witness, certify the following matters concerning the making of this statutory declaration by the person who made it: [** please cross out any text that does not apply*]

1. ~~*I saw the face of the person OR *I did not see the face of the person because the person was wearing a face covering, but I am satisfied that the person had a special justification for not removing the covering, and~~

2. ~~*I have known the person for at least 12 months OR *I have not known the person for at least 12 months, but I have confirmed the person's identity using an identification document and the document I relied on was~~

[Redacted Signature] [describe identification document relied on]

[Redacted Signature] [signature of authorised witness]

3. 12. 2013

[date]

Appendix 1.4

Checklist for GENERAL REQUIREMENTS

General requirements (3.1)	
<input checked="" type="checkbox"/> 3.1.1 Form of application <input checked="" type="checkbox"/> <i>Application, abstracts and other key documents in English</i> <input checked="" type="checkbox"/> <i>Executive Summary (separated from main application electronically and in hard copy)</i> <input checked="" type="checkbox"/> <i>Relevant sections of Part 3 clearly identified</i> <input checked="" type="checkbox"/> <i>Pages sequentially numbered</i> <input checked="" type="checkbox"/> <i>Electronic copy (searchable)</i> <input checked="" type="checkbox"/> <i>1 hard copy</i> <input checked="" type="checkbox"/> <i>Electronic and hard copy identical</i> <input checked="" type="checkbox"/> <i>Hard copy capable of being laid flat</i> <input checked="" type="checkbox"/> <i>All references provided (in electronic and hard copy)</i>	<input checked="" type="checkbox"/> 3.1.6 Assessment procedure <input checked="" type="checkbox"/> <i>General</i> <input type="checkbox"/> <i>Major</i> <input type="checkbox"/> <i>Minor</i> <input type="checkbox"/> <i>High level health claim variation</i> <input checked="" type="checkbox"/> 3.1.7 Confidential Commercial Information <input checked="" type="checkbox"/> <i>Confidential material separated in both electronic and hard copy</i> <input checked="" type="checkbox"/> <i>Formal request including reasons</i> <input checked="" type="checkbox"/> <i>Non-confidential summary provided</i>
<input checked="" type="checkbox"/> 3.1.2 Applicant details	<input type="checkbox"/> 3.1.8 Exclusive Capturable Commercial Benefit <input type="checkbox"/> <i>Justification provided</i>
<input checked="" type="checkbox"/> 3.1.3 Purpose of the application	<input checked="" type="checkbox"/> 3.1.9 International and other national standards <input checked="" type="checkbox"/> <i>International standards</i> <input checked="" type="checkbox"/> <i>Other national standards</i>
<input checked="" type="checkbox"/> 3.1.4 Justification for the application <input checked="" type="checkbox"/> <i>Regulatory impact information</i> <input checked="" type="checkbox"/> <i>Impact on international trade</i>	<input checked="" type="checkbox"/> 3.1.10 Statutory Declaration
<input checked="" type="checkbox"/> 3.1.5 Information to support the application <input checked="" type="checkbox"/> <i>Data requirements</i>	<input checked="" type="checkbox"/> 3.1.11 Checklist/s provided with application <input checked="" type="checkbox"/> <i>3.1 Checklist</i> <input checked="" type="checkbox"/> <i>Any other relevant checklists for Parts 3.2-3.7</i>

Appendix 1.5

Checklist for Standards related to Substances added to Food

Processing Aids (3.3.2)	
<input checked="" type="checkbox"/> A.1 Type of processing aid	<input checked="" type="checkbox"/> C.3. Allergenicity information of enzyme (enzyme only)
<input checked="" type="checkbox"/> A.2 Identification information	<input checked="" type="checkbox"/> C.4. Overseas safety Assessment Reports
<input checked="" type="checkbox"/> A.3 Chemical and physical properties	<input checked="" type="checkbox"/> D.1 Information on source organism (enzyme from microorganism only)
<input checked="" type="checkbox"/> A.4 Manufacturing process	<input checked="" type="checkbox"/> D.2 Pathogenicity and toxicity of source microorganism (enzyme from microorganism only)
<input checked="" type="checkbox"/> A.5 Specification information	<input checked="" type="checkbox"/> D.3 Genetic stability of source organism (enzyme from microorganism only)
<input type="checkbox"/> A.6 Analytical method for detection	<input checked="" type="checkbox"/> E.1 Nature of genetic modification of source organism (enzyme from GM source microorganism)
<input type="checkbox"/> B.1 Industrial use information (chemical only)	<input checked="" type="checkbox"/> F.1 List of foods likely to contain the processing aid
<input type="checkbox"/> B.2 Information on use in other countries (chemical only)	<input checked="" type="checkbox"/> F.2 Anticipated residue levels in foods
<input type="checkbox"/> B.3 Toxicokinetics and metabolism information (chemical only)	<input type="checkbox"/> F.3 Information on likely level of consumption
<input type="checkbox"/> B.4 Toxicity information (chemical only)	<input checked="" type="checkbox"/> F.4 Percentage of food group to use processing aid
<input type="checkbox"/> B.5 Safety assessments from international agencies (chemical only)	<input checked="" type="checkbox"/> F.5 Information on residues in foods in other countries (if available)
<input checked="" type="checkbox"/> C.1 Information on enzyme use on other countries (enzyme only)	<input checked="" type="checkbox"/> F.6 Where consumption has changed, information on likely consumption
<input checked="" type="checkbox"/> C.2 Toxicity information of enzyme (enzyme only)	

Appendix 2

Product information

1. Panzea Benefit Sheet
2. Product Data Sheets for Panzea BG
3. Product Data Sheets for Panzea 10X BG
4. Certificate of approval of Panzea by the Danish authorities
5. Statement from the Danish authorities regarding safety evaluation of new enzymes

novozymes®

Food & Beverages



NOVOZYMES PANZEA®

ONLY ONE XYLANASE BUILDS YOUR BUSINESS IN SO MANY DIFFERENT WAYS

Different xylanases have traditionally been required to cover different baking needs. But by providing more of what the industry wants in a single, efficient product, Panzea stacks up strong against the competition.

Whether you use xylanases for specialization of bread improver products or for flour standardization, Panzea gives you efficient, versatile performance across a broad range of bread products, baking conditions and flour types. Panzea represents a new generation of xylanases. And it's part of Novozymes' state-of-the-art baking enzyme portfolio, designed to help your business grow on a solid foundation.

Key benefits

- Superior volume of baked goods
- Bread appearance and texture consumers want
- Dry, stable dough
- High tolerance towards flour and process variations
- Easy formulation into flour, improvers and premixes

A highly efficient building block

New-generation Panzea combines superior volume performance and desired texture and look with a dry, balanced dough – all in a single, efficient product.

Panzea is produced in *Bacillus Licheniformis*. Unlike most xylanases, Panzea is naturally un-inhibited by xylanase inhibitors commonly found in wheat. As a result, it enables robust performance at very low dosages across flour types.

Compared to the existing xylanases on the market, it is typically possible to lower the dosage with Panzea and still match or exceed the desired baking result.

Three product versions

Available in three different versions, all Panzea products come in a wheat flour-based baking granulate (BG) form, making it easy to formulate into flour, improvers and premixes. The Panzea family includes:

- Panzea BG: standardized to 235 NXU/g
- Panzea 10X BG: standardized to 2,350 NXU/g
- Panzea Dual BG: standardized to 235 NXU/g and 500 FAU/g

Panzea BG and Panzea 10X BG are both pure xylanases, but in different product strengths. Panzea Dual is a combination of bacterial xylanase and fungal alpha amylase.

Innovating around the globe

When you choose Novozymes as your supplier, you gain access to the latest innovations from the largest enzyme R&D group in the world. Our baking experts and bakery resources are available to support you wherever you are. It's quite simple: no matter your baking enzyme needs, Novozymes offers convenient sourcing of the industry's leading enzyme solutions.

State-of-the-art bread enzyme portfolio

- For increased color and loaf volume – Novozymes Fungamyl®
- For loaf volume, crumb texture, appearance and dough handling – Novozymes Panzea®
- For stronger dough – Novozymes Lipopan®
- For stronger gluten – Novozymes Gluzyme®
- For bread freshness – Novozymes Novamyl®

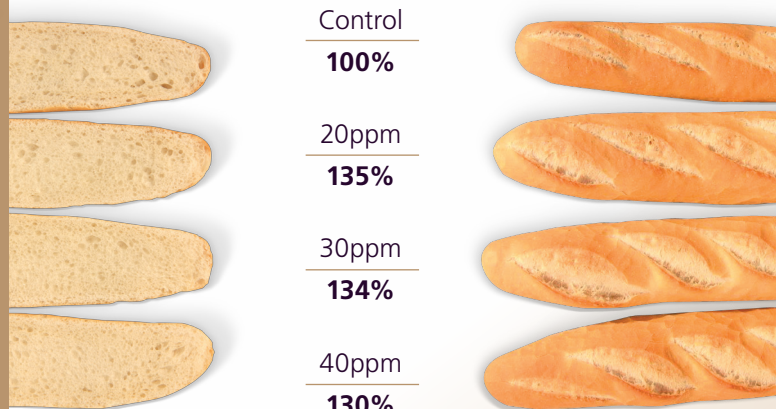
Superior performance across many parameters



CBP bread +11% volume

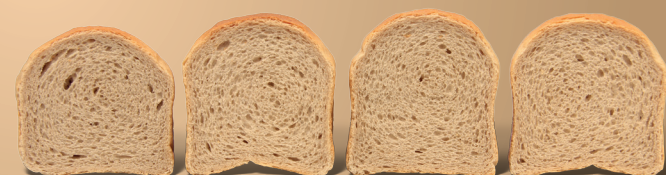
Control	20ppm	30ppm	40ppm
100%	109%	111%	111%

In high-speed CBP bread, the addition of Panzea results in 11% more volume, appealing crust color, fine, silky and regular crumb structure and easy dough handling.



French baguettes +35% volume

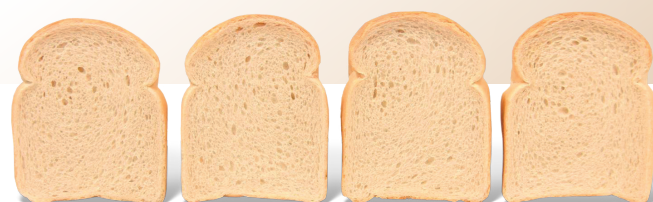
In French baguettes, the addition of Panzea results in 35% more volume, appealing bloom, improved crust crispiness and excellent dough stability and proofing tolerance.



Mixed wheat/rye bread +16% volume

Control	20ppm	30ppm	40ppm
100%	115%	115%	116%

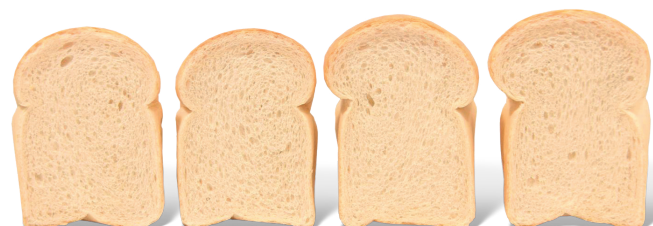
In mixed wheat/rye bread, the addition of Panzea results in 16% more volume, appealing crumb structure, easy dough handling and excellent dough stability.



Control	20ppm	30ppm	40ppm
100%	104%	105%	107%

High tolerance towards fermentation time

Extended fermentation (90 min, below) shows the same performance with Panzea as normal fermentation (60 min, top) with European flour type 550.



Control	20ppm	30ppm	40ppm
100%	106%	108%	110%



Novozymes is the world leader in bioinnovation. Together with customers across a broad array of industries we create tomorrow's industrial biosolutions, improving our customers' business and the use of our planet's resources.

Novozymes Switzerland AG · Neumattweg 16 · 4243 Dittingen · Switzerland
Tel. +41 61 765 6111 · Fax +41 61 765 6333 · food@novozymes.com
Novozymes A/S · Krogshøjvej 36 · 2880 Bagsværd · Denmark
Tel. +45 4446 0000 · Fax +45 4446 9999 · www.novozymes.com

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Panzea BG

In this product the key enzyme activity is provided by
xylanase that hydrolyzes (1,4)-beta-D-xylosidic linkages in xylans

PRODUCT CHARACTERISTICS/PROPERTIES

Declared enzyme	Xylanase (endo-1,4-)
Declared activity	235 NXU/g
Color	Off-white
Physical form	Granulate

PRODUCT SPECIFICATION

	Lower Limit	Upper Limit	Unit
New xylanase NXU	235		/g
Total viable count	-	50000	/g
Coliform bacteria	-	30	/g
E.coli	Not Detected		/25 g
Salmonella	Not Detected		/25 g
Heavy metals		Max 30	mg/kg
Lead		Max 5	mg/kg
Arsenic		Max 3	mg/kg
Cadmium		Max 0.5	mg/kg
Mercury		Max 0.5	mg/kg

The enzyme analytical method is available from the Customer Center or sales representative.

COMPOSITION

Ingredients	Appr. % (w/w)
Wheat flour, CAS no. 130498-22-5	99
Sodium chloride, CAS no. 7647-14-5	0.60
Xylanase (endo-1,4-), CAS no. 9025-57-4*	0.40

*Defined as enzyme conc. (dry matter basis)

ALLERGEN

Allergen	Substance contained ¹	Allergen	Substance contained ¹
Beef	no	Lactose	no
Carrot	no	Legumes	no
Celery	no	Lupin	no
Cereals containing gluten ²	yes	Milk	no
Chicken meat	no	Molluscs	no
Cocoa	no	Mustard	no
Coriander	no	Nuts ³	no
Corn/maize	no	Peanuts	no
Crustaceans	no	Pork	no
Egg	no	Sesame	no
Fish	no	Soy	no
Glutamate	no	Sulphur dioxide/sulphites, more than 10 mg per kg or l	no

¹Definition of substances according to LeDa/ALBA and EU Directives 2000/13/EC and 2007/68/EC, as amended

²i.e. wheat, rye, barley, oats, spelt, kamut

³i.e. almond, hazelnut, walnut, cashew, pecan nut, Brazil nut, pistachio nut, macadamia nut and Queensland nut

NUTRITIONAL VALUES

The product has a typical nutritional value of approximately 1587 kJ/100 g enzyme product.

• Protein	10 g/100 g
• Fat	2 g/100 g
• Carbohydrate	80 g/100 g
- Fiber	(4 g/100 g)
• Ash	1 g/100 g
- Sodium	(0.23 g/100 g)
• Moisture	8 g/100 g

PRODUCTION ORGANISM

Production organism *Bacillus licheniformis*

Produced by submerged fermentation of a genetically modified micro organism.
The enzyme protein, which is protein engineered, is separated and purified from the production organism.

Panzea BG

STORAGE CONDITION

Recommended storage: 0-25 °C (32-77 °F)

Packaging must be kept intact, dry, and away from sunlight. Please follow the recommendations and use the product before the best before date to avoid the need for a higher dosage.

Best before: You will find the best before date in the certificate of analysis or on the product label.

The product gives optimal performance when stored as recommended and used within 24 months of the production date.

Novozymes guarantees delivery at least 12 months prior to the best-before date.

SAFETY AND HANDLING PRECAUTIONS

Enzymes are proteins. Inhalation of dust or aerosols may induce sensitization and may cause allergic reactions in sensitized individuals. Some enzymes may irritate the skin, eyes, and mucous membranes upon prolonged contact. See the MSDS or Safety Manual for further information regarding safe handling of the product and spills.

COMPLIANCE

The product complies with the recommended purity specifications for food-grade enzymes given by the Joint FAO/WHO Expert Committee on Food Additives (JECFA) and the Food Chemical Codex (FCC).

Kosher and Halal certificates are available from the Customer Center or sales representative.

CERTIFICATIONS

Novozymes is a signatory to United Nations Global Compact, United Nations Convention on Biological Diversity and report on our sustainability performance through Global Reporting Initiative (GRI). See all our commitments under sustainability on www.novozymes.com.



FOOD SAFETY

Novozymes has carried out a hazard analysis and prepared an HACCP plan describing the critical control points (CCPs). The HACCP plan is supported by a comprehensive prerequisite program implemented in Novozymes' GMP practices.

The product is produced according to Novozymes' HACCP plan, GMP practices, and additional requirements controlled by Novozymes' Quality Management System.

The product complies with FAO/WHO JECFA- and FCC-recommended purity requirements regarding mycotoxins. The product complies with EU legislation regarding pesticides.

The product is produced under FSSC 22000 certification.



PACKAGING

The product is available in different types of packaging. Please contact the sales representative for more information.

Novozymes A/S
Krogshoejvej 36
2880 Bagsvaerd
Denmark

Tel. +45 4446 0000
Fax +45 4446 9999

For more information, or for more office addresses, visit www.novozymes.com

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Panzea 10X BG

In this product the key enzyme activity is provided by
xylanase that hydrolyzes (1,4)-beta-D-xylosidic linkages in xylans

PRODUCT CHARACTERISTICS/PROPERTIES

Declared enzyme	Xylanase (endo-1,4-)
Declared activity	2350 NXU/g
Color	Off-white
Physical form	Granulate
This product is standardized by Documented Addition in a process controlled by Novozymes ISO 9001 quality system. See Documented Addition Info Sheet for further information.	

PRODUCT SPECIFICATION

	Lower Limit	Upper Limit	Unit
New xylanase NXU	2350		/g
Total viable count	-	50000	/g
Coliform bacteria	-	30	/g
E.coli	Not Detected		/25 g
Salmonella	Not Detected		/25 g
Heavy metals		Max 30	mg/kg
Lead		Max 5	mg/kg
Arsenic		Max 3	mg/kg
Cadmium		Max 0.5	mg/kg
Mercury		Max 0.5	mg/kg

The enzyme analytical method is available from the Customer Center or sales representative.

COMPOSITION

Ingredients	Appr. % (w/w)
Wheat flour, CAS no. 130498-22-5	90
Sodium chloride, CAS no. 7647-14-5	6
Xylanase (endo-1,4-), CAS no. 9025-57-4*	4

*Defined as enzyme conc. (dry matter basis)

ALLERGEN

Allergen	Substance contained ¹	Allergen	Substance contained ¹
Beef	no	Lactose	no
Carrot	no	Legumes	no
Celery	no	Lupin	no
Cereals containing gluten ²	yes	Milk	no
Chicken meat	no	Molluscs	no
Cocoa	no	Mustard	no
Coriander	no	Nuts ³	no
Corn/maize	no	Peanuts	no
Crustaceans	no	Pork	no
Egg	no	Sesame	no
Fish	no	Soy	no
Glutamate	no	Sulphur dioxide/sulphites, more than 10 mg per kg or l	no

¹Definition of substances according to LeDa/ALBA and EU Directives 2000/13/EC and 2007/68/EC, as amended

²i.e. wheat, rye, barley, oats, spelt, kamut

³i.e. almond, hazelnut, walnut, cashew, pecan nut, Brazil nut, pistachio nut, macadamia nut and Queensland nut

NUTRITIONAL VALUES

The product has a typical nutritional value of approximately 1504 kJ/100 g enzyme product.

• Protein	13 g/100 g
• Fat	1 g/100 g
• Carbohydrate	73 g/100 g
- Fiber	(4 g/100 g)
• Ash	6 g/100 g
- Sodium	(2.34 g/100 g)
• Moisture	7 g/100 g

PRODUCTION ORGANISM

Production organism Bacillus licheniformis

Produced by submerged fermentation of a genetically modified micro organism. The enzyme protein, which is protein engineered, is separated and purified from the production organism.

Panzea 10X BG

STORAGE CONDITION

Recommended storage: 0-25 °C (32-77 °F)

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TO WHOM IT MAY CONCERN

DIVISION OF
FOOD QUALITY, TECHNOLOGY
AND MARKETING PRACTICES

11.09.2013

File: 2013-29-5406-00059

Panzea

The Danish Veterinary and Food Administration hereby certify having accepted in 2013 the enzyme product Panzea from Novozymes A/S. The product, produced by a *Bacillus licheniformis* expressing a xylanase from *Bacillus licheniformis*, has been accepted to be used for Baking applications up to a level of 11.75 NXU per kg flour.

The evaluation of the safety of Panzea has been made in accordance with the principles laid down in the Guidelines for the presentation of data on food enzymes, "cf. Reports of the Scientific Committee of Food, 27th Series, EUR 14181, 1992.

Yours faithfully





To whom it may concern

DIVISION OF
FOOD QUALITY, TECHNOLOGY
AND MARKETING PRACTICES

31.03.2008

The evaluation process for safety of new enzymes

The Danish Veterinary and Food Administration hereby certifies that the evaluation process of the safety of new enzymes is made in accordance with the principles laid down in the "Guidelines for the presentation of data on food enzymes" cf. Reports of the Scientific Committee of Food, 27th Series, EUR 14181, 1992.

In accordance with this information about the following is required and evaluated before acceptance of use of each new enzyme in food production in Denmark:

CONTEXT

ADMINISTRATIVE DATA

TECHNICAL DATA

- | | |
|-----|--|
| 1 | Active components |
| 1.1 | Primary enzyme activity |
| 1.2 | The activity of the enzyme preparation |
| 1.3 | Subsidiary enzymatic activities |
| 2 | Source materials |
| 2.1 | Animal sources |
| 2.2 | Plant sources |
| 2.3 | Microbial sources |
| 2.4 | Genetically modified organisms |
| 3 | Manufacturing Process |
| 3.1 | Fermentation |
| 3.2 | Purification |
| 4 | Carrier and other additives and ingredients |
| 4.1 | Formulation - Ingredients and additives |
| 4.2 | Immobilized enzyme preparation |
| 4.3 | TOS and composition |
| 5 | Usage |
| 5.1 | Technological function |
| 5.2 | Types of foodstuffs |
| 5.3 | Maximum dosage of the enzyme preparation |
| 6 | Stability and fate in the food |
| 6.1 | Amount of enzyme in the final food preparation |
| 6.2 | Main reaction products |

	6.3	Possible effects on nutrients
GENERAL REQUIREMENTS AND SPECIFICATIONS		
7	Hygiene	
	7.1	Good Manufacturing Practice (GMP)
	7.2	Influence on total microbial count in final foodstuff
8	Purity specifications/absence of contaminants	
	8.1	Heavy metals
	8.2	Microbiological contaminants
	8.3	Production organism
	8.4	Antibiotic activity
	8.5	Toxins
DOCUMENTATION FOR SAFETY IN USE		
9	Basic toxicological requirements	
	9.1	Enzymes derived from edible animals or plants
	9.2	Enzymes derived from micro-organisms
10	Exemptions from the basic toxicological requirements if relevant	
EVALUATION OF SAFETY IN USE		
	Estimate of human consumption	
	Safety margin	

LIST OF REFERENCES

The level of details required for the individual points are as given in the above mentioned guideline. For additional information regarding individual enzyme notifications, please contact the Danish Veterinary and Food Agency, Division of Food Quality, Technology and Marketing Practice.

Yours faithfully

[Redacted Signature]

Biochemist, PhD

[Redacted Contact Information]

Appendix 3

Methods of analysis used to determine compliance with the specifications

1. Enzyme activity, NXU/g	2012-05328
2. Total aerobic viable count	EB-SM-3001.02
3. Total coliforms	2011-18492
4. Escherichia coli (E. coli).	2011-27232
5. Salmonella	2011-28477
6. Antimicrobial activity	EB-SM-3018.02
7. Production strain	EB-SM-3000.02

Analysis of Heavy Metals, Lead, Arsenic, Cadmium, and Mercury are performed at an external laboratory, Technological Institute (TI), Denmark.

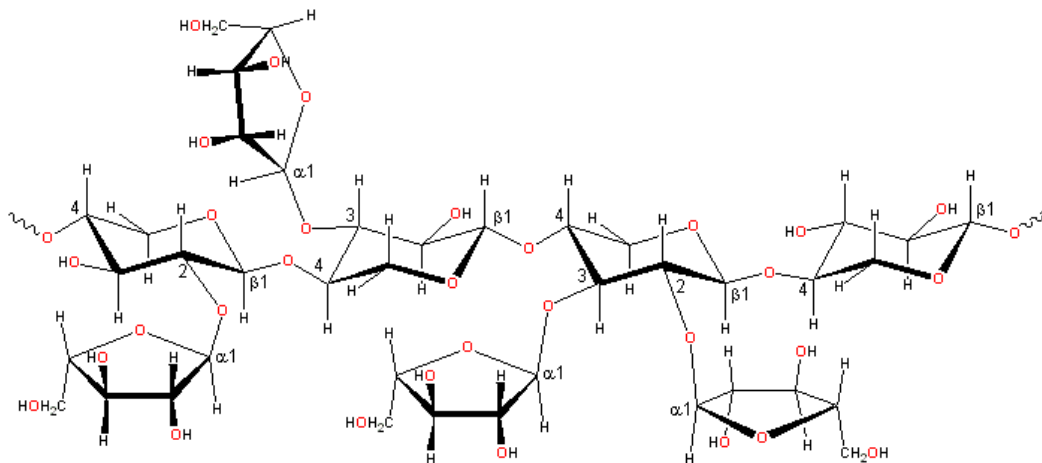
Analytical Method

Xylanase activity, colorimetric by Konelab analyzer (NXU)

Principle

Xylanases (e.g., 1,4-endoxylanase) hydrolyze wheat arabinoxylan to release reducing carbohydrate. The reaction is stopped by an alkaline reagent containing PAHBAH and bismuth which forms complexes with reducing sugar, producing color detected at 405 nm. The produced color is proportional to the xylanase activity. Enzymatic reaction and absorption measurement proceed automatically in the Konelab analyzer.

Enzyme reaction:



Wheat arabinoxylan (example of structure)



Xylanase (50 °C, pH 6.0)
Reducing carbohydrate

Detection reaction:

Reducing carbohydrate + PAHBAH + Bi³⁺ (alkaline pH, 50 °C) →
Reducing carbohydrate – PAHBAH – Bi³⁺ complex

Parameter	Enzyme reaction condition
Temperature	50 °C
pH	6.0
Substrate conc., wheat arabinoxylan	4.7 g/l
ACES buffer	7.7 mM
MES buffer	42 mM
BRIJ 35	35 mM
Enzyme conc. (conc. of high/low standard in reaction mixture)	0.04556-1.822 NXU /ml
Reaction time	400 s
Parameter	Enzyme blank reaction condition
Substrate conc.	0 g/l
Other parameters	As for enzyme reaction
Parameter	Detection reaction condition
Temperature	50 °C
pH	Alkaline
PAHBAH conc.	42 mM
Tartrate conc.	56 mM
Bi ³⁺ conc.	4.5 mM
NaOH conc.	146 mM
Reaction time	120 s
Wavelength	405 nm

Definition of unit

Endoxylanase activity is measured relative to an enzyme standard.

Method parameters

Intermediate precision

The intermediate precision (= CV% of a single determination) is 4 %.

Specificity

High sample background color absorbing at 405 nm or high sample reducing sugar in low-activity samples would make the results invalid; but this would dominate the true sample background signal and be noticed by a high absorbance Flag message from Konelab analyzer.

Range

The range is 0.09111-1.822 NXU/ml for the sample in the working solution.

Limit of determination

The limit of determination is 22.8 NXU/g by preparing 1 g sample in 25 ml.

Equipment

Equipment	
Konelab 30 analyzer	Thermo Fisher Scientific (required)
Diluter	E.g., Hamilton, Microlab 500
Analytical balance	E.g., Mettler, AT 200 or Sartorius 1702 with printer
Balance	E.g., Sartorius
pH meter	E.g., Radiometer, PHM85 or PHM 240, Metrohm
Thermometer (0–100 °C)	-
Magnetic stirrer plates	-

Chemicals

List of chemicals:

Name	Chemical Formula	Brand
ACES N-(2-acetamido)-2-aminoethanesulfuric acid	$C_4H_{10}N_2O_4S$	E.g., Sigma A9758
MES 2-(N-morpholine)-ethanesulfuric acid	$C_6H_{13}NO_4S, xH_2O$	E.g., Sigma M5287
Brij 35	-	E.g., Sigma B4184
Arabinoxylan (wheat flour; medium viscosity – 20 cSt)	-	Available on request
Sodium hydroxide (500 mM)	NaOH	E.g., VWR – Bie & Berntsen 31951.290
Bismuth acetate	$(CH_3CO_2)_3Bi$	E.g., Aldrich 401587
PAHBAH	-	Available on request
Potassium sodium tartrate, tetrahydrate	$C_4H_4KNaO_6, 4H_2O$	E.g., Merck 1.08087

IMPORTANT: Check out the Material Safety Data Sheets (MSDSs) for the chemicals.

Reagents

15% (w/v) Brij 35 stock solution

EXAMPLE: Preparation of 2000 ml:

Step	Action
1	Transfer 1000 ml of 30% (w/v) Brij 35 to a 2000 ml graduated flask.
2	Rinse the Brij flask with demineralized water and transfer the water to the 2000 ml flask.
3	Fill up to 2000 ml with demineralized water.
4	Mix vigorously and pour into a labeled capped bottle.
5	Storability: 2 months at approx. 4 °C in a refrigerator.

No risk label is required.

Sample diluent: ACES buffer 50 mM with 225 mg/l Brij, pH 6.0

EXAMPLE: Preparation of 5000 ml:

Step	Action
1	Weigh out 45.55 ± 0.005 g of ACES.
2	Transfer the salt to a 5000 ml graduated flask.
3	Add approx. 4550 ml of demineralized water. Mix with a magnetic stirrer for minimum 20 min or until dissolved.
4	Pipette 7.50 ml of Brij 35 stock solution 15% (w/v).
5	Adjust the pH to 6.00 ± 0.03 at room temperature with sodium hydroxide. <i>IMPORTANT:</i> Rinse and dry the electrode with a tissue before use.
6	Fill up to the mark with demineralized water. Mix again with a magnetic stirrer for a short time to ensure a homogeneous solution.
7	Storability: 3 days at room temperature.

No risk label required.

NXU-BUF/S: MES buffer 50 mM, pH 6.0

EXAMPLE: Preparation of 250 ml:

Step	Action
1	Weigh out 2.441 ± 0.005 g of MES.
2	Transfer the salt to a 250 ml graduated flask.
3	Add approx. 240 ml of demineralized water. Mix with a magnetic stirrer for minimum 20 min or until dissolved.
4	Adjust the pH to 6.00 ± 0.03 at room temperature with sodium hydroxide. <i>IMPORTANT:</i> Rinse and dry the electrode with a tissue before use.
5	Fill up to the mark with demineralized water. Mix again with a magnetic stirrer for a short time to ensure a homogeneous solution.
6	Storability: 4 days at room temperature.

No risk label required.

NXU-SUB/S: Substrate wheat arabinoxylan 5.60 g/l in MES buffer 50 mM, pH 6.0

EXAMPLE: Preparation of 50 ml:

Step	Action
1	Weigh out 0.2800 ± 0.001 g of wheat arabinoxylan in a 100 ml beaker.
2	Add approx. 40 ml of 50 mM MES buffer pH 6.0.
3	Stir and heat the solution in the beaker to approx. 55 °C for 30 min or until dissolved.
4	Move the beaker immediately to cool it down in a bath of ice. Use a magnetic stirrer and stop when the temperature has reached room temperature, which should also be the temperature at which the pH meter has been calibrated ± 1 °C (e.g., for a thermostat-controlled room at 21 ± 1 °C). Add a magnetic stirrer and adjust the pH to 6.00 ± 0.03 with NaOH or HCl, as appropriate. <i>IMPORTANT:</i> Rinse and dry the electrode with a tissue before use.
5	Rinse the electrode with 50 mM MES buffer over the NXU-SUB/S solution beaker.

6	Transfer quantitatively to a 50 ml graduated flask and fill up to the mark with 50 mM MES pH 6.0.
7	Mix with a magnetic stirrer for approx. 5 min.
8	Storability: 6 hr at room temperature.

No risk label required.

500 mM NaOH

Use bottled 500 mM NaOH (see chemicals).

Storability for bottled 500 mM NaOH for PAHBAH: 14 days at room temperature.

PAHBAH/S: PAHBAH/bismuth/tartrate solution

EXAMPLE: Preparation of 25 ml:

Step	Action
1	Weigh out 0.1380 ± 0.001 g of bismuth(III) acetate.
2	Weigh out 0.5000 ± 0.001 g of PAHBAH.
3	Weigh out 1.2500 ± 0.001 g of potassium sodium tartrate, tetrahydrate.
4	Transfer these powders to a 25 ml graduated flask.
5	Fill up to the mark with 500 mM NaOH. Wrap immediately in aluminum foil to protect from light.
6	Mix with a magnetic stirrer for 15 ± 5 min.
7	Check that the powder has dissolved. If it has not, prepare a new portion.
8	Storability: 8 days at room temperature protected from light. <i>IMPORTANT:</i> The reagent should retain the original colorless to light-yellow color. If there is a noticeable change in color to darker yellow, the reagent should be discarded.

Standard

The standard is available on request.

Preparation:

Preparation:

Step	Action																																										
1	Stock solution: Weigh out an amount of enzyme standard corresponding to 4555 NXU units and transfer to a 250 ml volumetric flask containing sample diluent.																																										
2	Stir for minimum 15 min and maximum 2 hr. Storability: 3 hr at room temperature.																																										
3	Working solutions: The standard curve is a seven-point curve with a factor of 4.0 between the lowest and highest standard points. The recommended total volume is 1200 µl. The standard solutions are prepared by diluting the stock solution with sample diluent on a diluter into the sample cups, in accordance with the following table: <table><tr><th rowspan="2">Standard no.</th><th colspan="2">Example to obtain dilution ratio</th><th rowspan="2">Dilution ratio</th><th rowspan="2">Concentration (NXU/ml)</th></tr><tr><th>Stock solution (µl)</th><th>Diluent (µl)</th></tr><tr><td>1</td><td>30</td><td>1170</td><td>40</td><td>0.4556</td></tr><tr><td>2</td><td>40</td><td>1160</td><td>30</td><td>0.6074</td></tr><tr><td>3</td><td>50</td><td>1150</td><td>24</td><td>0.7593</td></tr><tr><td>4</td><td>60</td><td>1140</td><td>20</td><td>0.9111</td></tr><tr><td>5</td><td>80</td><td>1120</td><td>15</td><td>1.215</td></tr><tr><td>6</td><td>100</td><td>1100</td><td>12</td><td>1.519</td></tr><tr><td>7</td><td>120</td><td>1080</td><td>10</td><td>1.822</td></tr></table> Storability: The final dilutions in Konelab cups are stable for 1 hr at room temperature.	Standard no.	Example to obtain dilution ratio		Dilution ratio	Concentration (NXU/ml)	Stock solution (µl)	Diluent (µl)	1	30	1170	40	0.4556	2	40	1160	30	0.6074	3	50	1150	24	0.7593	4	60	1140	20	0.9111	5	80	1120	15	1.215	6	100	1100	12	1.519	7	120	1080	10	1.822
Standard no.	Example to obtain dilution ratio		Dilution ratio	Concentration (NXU/ml)																																							
	Stock solution (µl)	Diluent (µl)																																									
1	30	1170	40	0.4556																																							
2	40	1160	30	0.6074																																							
3	50	1150	24	0.7593																																							
4	60	1140	20	0.9111																																							
5	80	1120	15	1.215																																							
6	100	1100	12	1.519																																							
7	120	1080	10	1.822																																							

QC sample

The QC sample is available on request.

Prepare a QC sample with known enzyme content in the same way as described for the samples below.

Samples

Dissolve minimum 1.0 g in a minimum volume of 25 ml.

Preparation:

Step	Action
1	Weigh out, dissolve, and dilute the samples in sample diluent. The activity of the final dilution must be approx. 1.35 NXU/ml.
2	Stir for minimum 15 min and maximum 2 hr. Storability: 3 hr at room temperature.
3	The samples are diluted to the final dilution with sample diluent. Storability: The final dilutions in Konelab cups are stable for 1 hr at room temperature.

Blank

A sample blank is performed automatically by the Konelab analyzer. No reagent blank is needed.

Procedure

Step	Action				
1	Prepare the reagents, dilutions of standard, QC sample, and samples.				
2	Start up the Konelab 30.				
3	Place the reagents in the Konelab:				
	Reagent	Konelab reagent name	Reagent container volume	Syringe speed	Stability in reagent container
	MES buffer 50 mM, pH 6.0	NXU-BUF/S	60 ml	Slow	1 day
	Substrate azo-wheat arabinoxylan 5.60 g/L in MES buffer 50 mM, pH 6.0	NXU-SUB/S	60 ml	Slow	1 day
	PAHBAH/bismuth/tartrate solution	PAHBAH/S	20 ml	Slow	1 day
4	Place the standards, QC sample, and samples in the Konelab in the stated order. <i>NOTE:</i> 50 samples can be analyzed in one run placed after the standard curve and one QC sample.				
5	Start the Konelab.				

Calculations

Step	Action
1	The “Main-Blank” signal is called “Result” in the Konelab “true-sample mode” presentation. This is the total signal (generated by enzyme reaction, xylan, and sample background) minus the sample background. The xylan substrate background is thus included in every “result” signal. A correction for this substrate background is obtained via the standard curve, which also includes this.
2	On the basis of the results in Abs for the seven standards, a standard curve is drawn with the activities of the standards in NXU/ml as the x-values and the signal of the standards as the y-values. The standard curve is a LogitLog4 fit.
3	<p>The enzyme activity of the diluted sample is read from the standard curve. The activity of a sample in NXU/g is calculated using the formula:</p> $NXU/g = \frac{S \cdot V \cdot F}{W}$ <p>S = Reading from the standard curve in NXU/ml V = Volume of the measuring flask in ml F = Dilution factor for second dilution W = Weight of sample in g</p>
4	<p>EXAMPLE: 0.9900 g of sample is dissolved in 100 ml and further diluted 12 times. On the Konelab the sample is measured to 2.3262 Abs.</p> <p>An activity of 20.93 NXU/ml is calculated from the standard curve. The relative activity of the sample is:</p> $\frac{20.93 \left(\frac{NXU}{mL} \right) \times 100 (ml) \times 12}{0.9900 (g)} = 25.4 \text{ NXU/g}$

Approval of analytical run

Standard curve:

Parameter	Requirement
Quality of fit (lower r^2 limit)	r^2 should be ≥ 0.9850 .
Curve appearance	The curve is nonlinear and increasing, though only slightly curved.

QC sample:

The measured activity of the QC sample must be the declared value +/- 2 standard deviations.

Samples:

The analytical result (= average of two weighings on two different standard curves) must have $CV \leq 7.2\%$.

Statement of analysis results

The results should be stated with three significant digits.

Configurations

Konelab test definition:

```

=====
Test definition          Arena 7.2AR1NVA1                      Page:      1

NXU                      Novozymes   S/N   E4319775   K8
                        Assay & Technology Development

Date :   09/03/2012
Time :   12:27
-----

Last change date 09/03/2012 12:26
Tick length (sec) 4.5
Full name          *****
Online Name        NXU
Test type          Photometric

Result unit        Abs
Number of Decim.   5

Test In Use        YES
                  LOW    HIGH
Test limit         *
Initial absorbance *
Dilution limit    *
Secondary dil 1+   0.0    0.0
Critical limit     *
Reflex test limit  *
Reflex test

Acceptance         Automatic   Reference class   LOW    HIGH    In Use
Dilution 1+       0.0

Sample type        Sample type 5 Correction factor 1.00
                  Correction bias 0.00    Abs
                  Temperature    50.0    °C

Calibration type   None
Factor            1.00    Bias                                0.00

Bias correction in use NO

Manual QC in Use   NO    Routine QC in Use                                NO

Blank              Sample
                  Fixed cuvette

Reagent            XYL-SUB/S   Volume (ul)          110
Disp. with         Extra      Add. Volume (ul)     50
Wash reagent       XYL-SUB/S   Repl. reagent       XYL-BUF/S
Reagent wash       Before dispense
Syringe speed      Slow

Incubation          Time (sec)          540

Sample             Volume (ul)          20
Disp. with         Extra      Add. Volume (ul)     65
Dilution with     Water      Wash reagent         None

Incubation          Time (sec)          400

Reagent            PAHBAH/S   Volume (ul)          60
Disp. with         Extra      Add. Volume (ul)     50
Wash reagent       PAHBAH/S
Reagent wash       Before dispense
Syringe speed      Slow

Incubation          Time (sec)          120

Measurement        End point
Wavelength (nm)    405 nm    Side wavel. (nm)     None
Meas. type         Fixed timing
  
```

NXU-BUF/S:

```
=====
Reagent definition      Arena 7.2                      Page:      1
                        Novozymes S/N 21645-K23
                        Assay & Technology Development
```

```
15/03/2012 10:31
-----
```

```
Reagent      NXU-BUF/s      Lot      Expiry date (dd/mm/yyyy)
-----
Stable on board (days)      1
Alarm limit (ml)             0.0
```

Information

```
Vial volume      20 ml
Barcode id
```

```
Syringe speed      Slow
```

Reagent used in tests

```
-----
NXU
```

```
Disk Pos  Lot      Vial vol  Vol left  Insert date  Stable until
-----
```

NXU-SUB/S:

```
=====
Reagent definition      Arena 7.2                      Page:      1
                        Novozymes S/N 21645-K23
                        Assay & Technology Development
```

```
15/03/2012 10:31
-----
```

```
Reagent      NXU-SUB/S      Lot      Expiry date (dd/mm/yyyy)
-----
Stable on board (days)      1
Alarm limit (ml)             0.0
```

Information

```
Vial volume      20 ml
Barcode id
```

```
Syringe speed      Slow
```

Reagent used in tests

```
-----
NXU
```

```
Disk Pos  Lot      Vial vol  Vol left  Insert date  Stable until
-----
```

PAHBAH/S:

```
=====
Reagent definition      Arena 7.2                      Page:      1
                        Novozymes S/N N0821060
                        Enzym Kemisk Laboratorium
```

```
17/12/2010 14:16
-----
```

```
Reagent      PAHBAH/S      Lot      Expiry date (dd/mm/yyyy)
-----
Stable on board (days)      1
Alarm limit (ml)             1.0
```

Information

```
Vial volume      20 ml
Barcode id
```

```
Syringe speed      Slow
```

Handling of enzymes and chemicals

Enzymes and enzyme solutions should be handled in a fume hood or in closed containers.

Avoid inappropriate handling of enzymes and enzyme solutions, which may result in aerosol/dust generation.

Avoid inhalation of dust aerosols and contact with skin and eyes.

Handling of chemicals and disposal of waste must be performed according to valid procedures.

Validity

Valid from July 2012

Novozymes A/S
Krogshøjvej 36
2880 Bagsvaerd
Denmark

Tel. +45 4446 0000
Fax +45 4446 9999

For more information
and addresses of
international offices,
please see
www.novozymes.com
info@novozymes.com

Novozymes is the world leader in bioinnovation. Together with customers across a broad array of industries we create tomorrow's industrial biosolutions, improving our customers' business and the use of our planet's resources. Read more at www.novozymes.com.

Enumeration of Total Viable Count

Scope All Novozymes Enzyme Business QC laboratories involved in analysis of samples from Novozymes production and GLP studies.

Principle **Total Viable Count (TVC)** is defined as the number of organisms which form colonies on a non-selective agar medium (Tryptic Soy Agar, TSA) after aerobic incubation for 3 days at 30-35°C. TSA is a rich non-selective agar medium.

The method outlined below conforms to the principles of (Ref. □) with the following exceptions:

- The test only covers the enumeration of microorganisms capable of growing on TSA (Total aerobic Microbial Count).
- The dilution water has an addition of 4% Tween 80.
- EP describes the use of duplicates. This method uses single tests.
- The agar plates are incubated for 3 days, not for 3-5 days.
- Growth promotion test of TSA is performed according to in-house procedures and not according to the description in EP.

Routine samples are analysed by the spiral plater (100 µl) or spread plate technique (100 µl or 1 ml) as described below:

Sample type	Requested test (LIMS code)	Technique	Volume spread	Lowest Dilution	No. of plates	Plate size	Detection limit
Enzyme samples and fluid hyaluronic acid	TVC	Spiral plating or spread plating	100 µl	10 ⁻¹	1 plate	9 cm	100 CFU / g or ml
	TVC(100)	Spread plating	1 ml	10 ⁻¹	4 plates	14 cm	10 CFU / g or ml
CIP-samples	CIP_TVC	Spiral plating or spread plating	100 µl	Undiluted	1 plate	9 cm	10 CFU / ml
		Petrifilm	1 ml		N/A	N/A	1 CFU / ml
FeF samples	FEF_TVC	Spread plating	1 ml	10 ⁻¹	4 plates	14 cm	10 CFU / g or ml

Depending on sample type, level of contamination and the detection limit needed for the specific sample, alternative procedures may be used.

IMPORTANT: Petrifilm must only be used to analyze CIP samples if pH of the CIP water is within range 6.6-8.5 (Ref. □ and □).

Continued on next page

Enumeration of Total Viable Count, *Continued*

Definition of units

The result is stated as:

- Total Viable Count (TVC) / g or ml
-

Samples

All sample types.

Detection limit

The detection limit of this method is dependent on the sample volume and the dilution in use (See "Principle").

Equipment

- Balance (± 0.1 g)
 - Magnetic stirrer
 - Petri dishes (9 cm or 14 cm)
 - Suitable sterile pipettes for transfer of 100 μ l or 1 ml (4x0.25 ml)
 - Spiral plater (for the spiral plate technique)
 - Sterile Drigalski spreaders (for the spread plate technique)
 - Incubator (30-35°C)
 - Stereo microscope or microscope
 - Plastic spreader (*Petrifilm test*)
-

Media and reagents

- Tween 80 buffer 4%, 90 ml (if necessary with a magnet) prepared acc. to [EB-ME-0052](#)
 - EP buffer, 90 ml buffered sodium chloride-peptone solution pH 7.0, prepared acc. to [EB-ME-0067](#)
 - TSA plates (9 or 14 cm) prepared acc. to [EB-ME-0041](#)
 - 3M™ Petrifilm™ Aerobic Count Plates (*Petrifilm test*)
-

Safety

It is the responsibility of the laboratory leader, that all personnel are aware of the correct handling of enzymes and reagents.

Continued on next page

Enumeration of Total Viable Count, *Continued*

Sample preparation

Enzyme samples and other solid samples are prepared as follows:

Sample type	Action
Enzyme samples FeF samples Other solid samples	Transfer 10 g of solid sample or 10 ml of liquid sample to 90 ml Tween 80 buffer 4%. <i>NOTE:</i> Immediately homogenize the sample by stirring or by shaking. Solid samples are homogenized on a magnetic stirrer for app. 20 minutes though min. 1 hour for Sweetzyme (batch code 1A).
Non-enzyme fluid samples (e.g. CIP samples)	Non-enzyme fluid samples are analyzed undiluted. If needed, 10-fold dilutions may be prepared with Tween 80 buffer 4%.
Fluid hyaluronic acid (HA)	Transfer 10 ml of liquid sample to 90 ml EP buffer. <i>IMPORTANT:</i> Homogenize on a magnetic stirrer for min. 1 hour. It is recommended to shake the sample after approx. 30 min.

TIP: All enzyme products must be analyzed from at least a 10^{-1} dilution due to possible inhibition of microorganisms in undiluted enzyme. If an enzyme product is known to contain growth inhibiting components (e.g. rodalone or proxel) consider analyzing further dilutions prepared with Tween 80 buffer 4% (e.g. 10^{-2} and 10^{-3} dilutions). In this case be aware that the quantification limit is lower than the spec. limit of the sample.

IMPORTANT: Valid for US laboratories: TVC analysis must also be performed using a 10^{-2} dilution if the spec. limit of the sample is > 30.000 and/or for samples from Recovery 1 and 2.

Continued on next page

Enumeration of Total Viable Count, *Continued*

Plating

Plating must be done within 15 minutes from end of homogenisation. If this is not possible, the sample can be stored at 2-8°C for up to 4 hours.

Test	Action
TVC	Transfer 100 µl from the 10 ⁻¹ dilution onto the surface of a TSA plate (9 cm). Repeat this for any of the necessary dilutions. <i>Or</i> Perform a spiral plating of 100 µl from the 10 ⁻¹ dilution in accordance with the directions for the specific spiral plater.
TVC(100) <i>or</i> TVC_FeF	Transfer 1 ml from the 10 ⁻¹ dilution onto the surface of 4 TSA plates (14 cm) with app. 0.25 ml onto each plate. Repeat this for any of the necessary dilutions.
TVC_CIP using TSA plates	Transfer 100 µl from the undiluted sample onto the surface of a TSA plate (9 cm). Repeat this for any of the necessary dilutions. <i>Or</i> Perform a spiral plating of 100 µl from the undiluted sample in accordance with the directions for the specific spiral plater.

Leave the plates on the table with lid on until the sample has been soaked into the agar.

Test	Action
TVC_CIP using Petrifilm	1. Transfer 1 ml from the undiluted sample to the center of the film. 2. Place plastic spreader, recessed side down, on center of sample and press down, gently and firmly to distribute inoculum. 3. Wait at least one minute for gel to form

Incubation

Incubate the TSA agar plates at 30-35°C for 3 days.

Incubate the Petrifilm with clear side up at 35-39°C for 2 days.

Continued on next page

Enumeration of Total Viable Count, *Continued*

Reading

TSA agar plates – Spread plate technique:

Count the number of colonies on the plates.

Size of agar plate	Interval of reading
9 cm	1–300 colonies per plate
14 cm	1–750 colonies per plate

TSA agar plates – Spiral plate technique:

The number of typical colonies on each plate is counted and the result is calculated in accordance with the directions for the specific spiral plater. Danish sites may refer to (Ref. □).

IMPORTANT: Small colonies, e.g. lactobacillus, may erroneously be misread as product crystallizations. If in doubt use stereo microscope for macroscopic observation and/or prepare a slide culture of a colony for light microscopy.

Petrifilm

Count the number of colonies on the film. Interval of reading is 1-250 colonies (Ref. □).

IMPORTANT: Discoloration from enzyme residues may occur. In case this is observed the result must be considered invalid.

TIP: Refer to (Ref. □) to get familiarized with reading Petrifilms.

Continued on next page

Enumeration of Total Viable Count, *Continued*

Calculation

General principles:

The calculation is based on the number of colonies (C_x) on the plate, and the sample volume analysed (V_x).

The result is stated with two significant figures (e.g. 2.2×10^1).

When Using results from	Then the result is	Where
One dilution	$\frac{C_x}{V_x}$	C_x = no. of colonies V_x = volume analysed
2 or more dilutions	$\frac{C_1 + C_2}{V_1 + V_2}$	C_1 = no. of colonies in lowest dilution C_2 = no. of colonies in next dilution V_1 = volume analyzed in lowest dilution V_2 = volume analyzed in next dilution

IMPORTANT: When using more than one dilution, the numbers from each dilution are compared (the likelihood of product inhibitions, contamination of the sample, analytical errors etc. is considered). In general, the highest dilution is used. If the result is stated on the basis of other dilutions, the reason must be given in the raw data.

When the sample volume is 0.1 ml then V_x and C_x are:

Dilution	Undiluted	10^{-1}	10^{-2}
V_x	0.1 ml	0.01 ml	0.001 ml
C_x	No. of colonies on the plate	No. of colonies on the plate	No. of colonies on the plate

EXAMPLE:

EXAMPLE: Examples of calculating spread plate of 0.1 ml sample:

C_x	V_x (g or ml)	Dilution	Result
0	0.01	10^{-1}	< 100 / g or ml
123	0.1	10^0	$\frac{123}{0.1} = 1.2 \times 10^3$ / g or ml
334	0.01	10^{-1}	> 3.0×10^4 / g or ml
253 24	0.01 0.001	10^{-1} 10^{-2}	$\frac{253+24}{0.01+0.001} = 2.5 \times 10^4$ / g or ml

Continued on next page

Enumeration of Total Viable Count, *Continued*

Calculation (*continued*)

When the sample volume is 1 ml (four 14 cm agar plates with 0.25 ml on each plate) then V_x and C_x are:

Dilution	Undiluted	10^{-1}	10^{-2}
V_x	1 ml	0.1 ml	0.01 ml
C_x	sum of colonies on the 4 plates	sum of colonies on the 4 plates	sum of colonies on the 4 plates

EXAMPLE: Examples of calculating spread plate of 1 ml sample:

C_x	V_x (g or ml)	Dilution	Result
0	0.1	10^{-1}	$< 10 / \text{g or ml}$
123	1	10^0	$\frac{123}{1} = 1.2 \times 10^2 / \text{g or ml}$
426	0.1	10^{-1}	$\frac{426}{0.1} = 4.3 \times 10^3 / \text{g or ml}$
3134	0.1	10^{-1}	$> 3.0 \times 10^4 / \text{g or ml}$
853 84	0.1 0.01	10^{-1} 10^{-2}	$\frac{853+84}{0.1+0.01} = 8.5 \times 10^3 / \text{g or ml}$

NOTE: Calculation at Danish laboratories may follow:

- Spread plating of 1 ml: [PSL-MSP-0069](#)
- Spread plating of 100 μl : [PSL-MSP-0082](#)
- Spiral plating of 100 μl : [PSL-MSP-0075](#)

Accuracy and precision

CV% (surface plating) = 25%

CV% (spiral plating) = 29%

REFERENCE: LUNA no. [2003-34435](#)

Filing

All documentation should be filed in accordance with the local filing SOP.

Continued on next page

Enumeration of Total Viable Count, *Continued*

Contingencies All deviations from this SOP should be discussed with the Method Responsible Scientist and should be documented.

- References**
- European Pharmacopoeia, Chapter 2.6.12. Microbiological examination of non-sterile products (Total viable aerobic count).
 - [PSL-MSP-0075](#): Beregning ved anvendelse af spiralplater (In Danish).
 - [PSL-TE-3001](#): Spiralplater (In Danish).
 - LUNA No. [2010-19643-01](#): Validation of pH Range Adjustment for Water Samples Using Petrifilm.
 - [3M Petrifilm Interpretation Guide](#)
 - [3M Petrifilm™ Aerobic Count Plates](#)
-

Revision Removed TVC-AIR samples. Analysis of air samples performed according to EB-SM-5001. Specified that Tween 80 is used throughout the document cf. [CISAR-PSL-Mik.Ba-64777](#). In the section "Principle", the amount analyzed and the detection limit when using Petrifilm have been corrected from 100 ul to 1 ml and from 10 to 1 CFU/ml, respectively.

Analytical Method

Enumeration of coliform bacteria using violet red bile agar

IMPORTANT

This method is used for the analysis of glucose isomerase and liquid products (with the exception of liquid xylanase).

Principle

Coliform bacteria (coliforms) are broadly defined as gram-negative, oxidase-negative, nonsporogenous rods which grow in aerobic or facultative anaerobic conditions. More specifically, coliforms are capable of fermenting lactose (due to the production of galactosidase) in the presence of bile at 37 °C. Coliforms are not a taxonomically defined group of bacteria, and consequently there is no common agreement on which microorganisms truly belong to the coliforms. However, Novozymes defines coliforms as organisms belonging to the genera *Escherichia*, *Citrobacter*, *Enterobacter*, *Klebsiella*, *Serratia*, and *Hafnia*. The presence of coliforms, especially *E. coli*, can be used as an indicator of the bacteriological hygiene of an enzyme product.

Violet Red Bile Agar (VRBA) is a selective and indicative agar:

Principle	Description
Selective principle	Crystal violet and bile salts inhibit growth, primarily of the gram-positive accompanying flora. This favors growth of the fast-growing gram-negative enterobacteria.
Indicative principle	Degradation of lactose to acid is indicated by the pH indicator neutral red, which changes its color to red and in some cases also by precipitation of bile acids. Coliforms degrade lactose.

Routine testing is performed in the following way:

Sample type	Requested test (LIMS code)	Technique	Volume spread	Lowest dilution	No. of plates	Plate size	Detection limit
Enzyme samples	COLIFOR M	Pour plate with cover layer	2.5 ml	10 ⁻¹	1 plate	14 cm	4 CFU/g or ml

Depending on the sample type, the level of contamination, and the detection limit needed for the specific sample, alternative procedures may be used.

The method outlined below conforms to ISO 4832 with the following deviations:

- ISO 4832 and ISO 6887-1 describe the use of a peptone salt solution or buffered peptone water as diluent. This Novozymes method uses Tween buffer 4%
- ISO 4832 describes the use of duplicates. This Novozymes method uses single tests

Definition of units

The result is stated as:

- Coliform bacteria/g or ml

Detection limit

The detection limit of this method is dependent on the sample volume and the dilution in use (see “Principle”).

Equipment

Balance (± 0.1 g)

Magnetic stirrer

Petri dishes (14 cm)

Suitable sterile pipette for transfer of 1 ml or 10 ml (2.5 ml)

Incubator (34–38 °C)

Media and reagents

- Tween buffer, 90 ml buffered sodium chloride-peptone solution pH 7.0 (if necessary with a magnet) containing 4% Tween 80, pH 7.0
- Violet Red Bile Agar (VRBA), Merck 1.01406

NOTE: If the agar is freshly prepared in the laboratory, suspend the media with 200 ml of exchanged water and leave for 15 min. Ensure that the media are thoroughly dissolved before the melting procedure by regular shaking. In addition, stir the agar immediately before cooling in the water bath and again before pouring into the Petri dishes.

Sample preparation

The samples are prepared as follows:

Step	Action
1	Transfer 10 g of solid sample or 10 ml of liquid sample into 90 ml of Tween buffer 4%.
2	Immediately homogenize the sample by stirring or shaking. Solid samples are homogenized on a magnetic stirrer for approx. 20 min.

IMPORTANT: All enzyme products must be analyzed from a 10^{-1} dilution due to possible inhibition of microorganisms in undiluted enzyme.

TIP: Further 10-fold dilutions can be prepared with Tween buffer 4%.

Plating

Plating is performed using the pour plate technique:

Description
1. Transfer 2.5 ml from the 10^{-1} dilution into an empty Petri dish (14 cm).
2. Pour approx. 40–45 ml of VRBA (47 ± 2 °C) into the Petri dish (= bottom layer) and mix carefully. Leave this to solidify.
3. Pour approx. 10 ml of VRBA (47 ± 2 °C) onto the bottom layer (= covering layer). Leave this to solidify.

IMPORTANT: Agar used for BB samples must be cooled to 45 ± 2 °C.

Incubation

Incubate the plates at 34–38 °C (target = 36 °C) for 1 day under aerobic conditions:

Reading

Count the number of typical colonies:

Count colonies on plates with	Typical colonies
1–375 colonies per plate	Purplish red with a diameter of ≥ 0.5 mm, sometimes surrounded by a reddish zone of precipitated bile.

Calculation

General principles:

The calculation is based on the number of colonies (C_x) on the plate and the sample volume analyzed (V_x).

The result is stated with two significant figures (e.g., 2.2×10^1).

When using results from	Then the result is	Where
1 dilution	$\frac{C_x}{V_x}$	C_x = no. of colonies V_x = volume analyzed
2 or more dilutions	$\frac{C_1 + C_2}{V_1 + V_2}$	C_1 = no. of colonies in lowest dilution C_2 = no. of colonies in next dilution V_1 = volume analyzed in lowest dilution V_2 = volume analyzed in next dilution

IMPORTANT: When using more than one dilution, the numbers from each dilution are compared (the likelihood of product inhibitions, contamination of the sample, analytical errors, etc., is considered). In general, the highest dilution is used. If the result is stated on the basis of other dilutions, the reason must be given in the raw data.

When the sample volume is 2.5 ml, then V_x and C_x are:

Dilution	10^{-1}	10^{-2}
V_x	0.25 ml	0.025 ml
C_x	No. of colonies on the plate	No. of colonies on the plate

EXAMPLE: Examples of calculating pour plate of 2.5 ml of sample on a 14 cm agar plate:

C_x	V_x (g or ml)	Dilution	Result
0	0.25	10^{-1}	$\frac{0}{0.25} = < 4/\text{g or ml}$
3	0.25	10^{-1}	$\frac{3}{0.25} = 12/\text{g or ml}$
412	0.25	10^{-1}	$\frac{375}{0.25} = 1.5 \times 10^3/\text{g or ml}$
53 8	0.25 0.025	10^{-1} 10^{-2}	$\frac{53+8}{0.25+0.025} = 2.2 \times 10^2/\text{g or ml}$

Accuracy and precision

CV% = 29%

References

1. ISO 4832, 2nd ed. (1991) Microbiology – General Guidelines for the enumeration of coliforms – colony count technique.
2. ISO 6887-1, 1st ed. (1999) Microbiology of food and animal feeding stuffs – Preparation of test samples, initial suspensions and decimal dilutions for microbiological examination – Part 1: General rules for the preparation of the initial suspension and decimal dilutions

Handling of enzymes and chemicals

Enzymes and enzyme solutions should be handled in a fume hood or in closed containers.

Avoid inappropriate handling of enzymes and enzyme solutions, which may result in aerosol/dust generation.

Avoid inhalation of dust aerosols and contact with skin and eyes.

Handling of chemicals and disposal of waste must be performed according to valid procedures.

Validity

Valid from December 2011.

Novozymes A/S
Krogshøjvej 36
2880 Bagsvaerd
Denmark

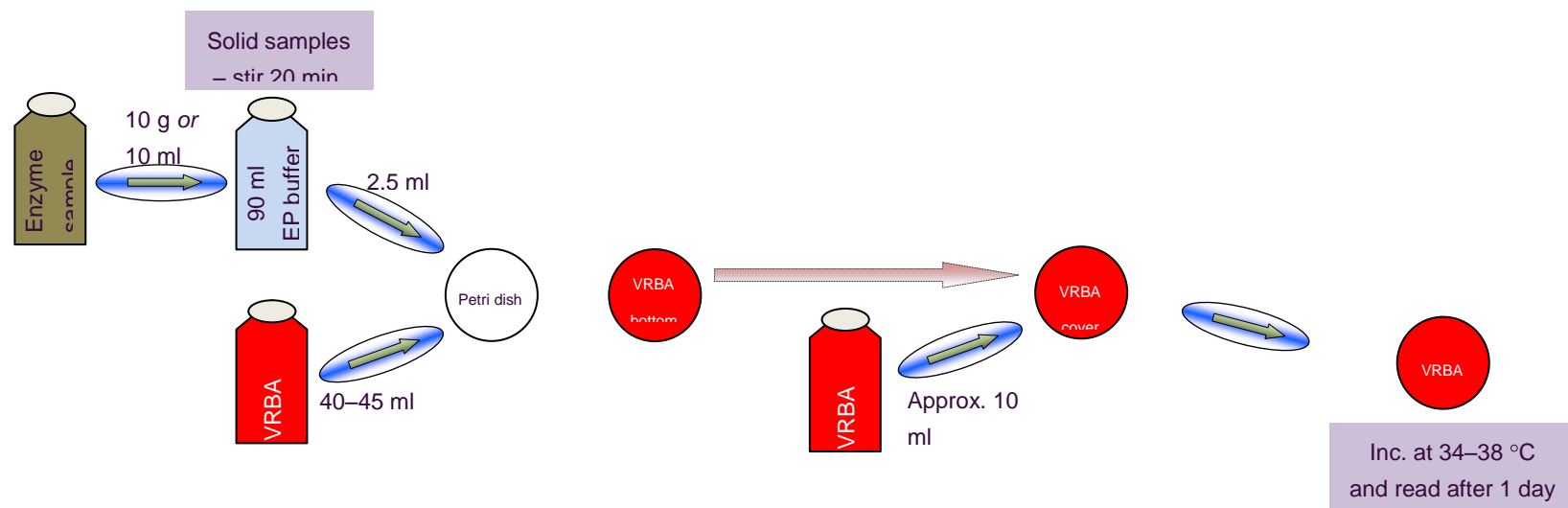
Tel. +45 4446 0000
Fax +45 4446 9999

For more information
and addresses of
international offices,
please see
www.novozymes.com
info@novozymes.com

Novozymes is the world leader in bioinnovation. Together with customers across a broad array of industries we create tomorrow's industrial biosolutions, improving our customers' business and the use of our planet's resources. Read more at www.novozymes.com.

Appendix- Flow chart

Enumeration of coliform bacteria using Violet red Bile Agar



Analytical Method

Detection of *Escherichia coli* (*E. coli*) in 25 g

Principle

E. coli is a Gram-negative, indole-positive, facultative anaerobic rod. It is considered to be a fecal indicator.

Detection of *E. coli* in 25 g is carried out as a qualitative analysis using nonselective enrichment in buffered peptone water (BPW) followed by isolation of β -D-glucuronidase-positive *E. coli* on a selective indicative agar medium (TBX agar). β -glucuronidase-negative *E. coli* strains (3–4%) form colorless colonies on TBX agar (e.g., *E. coli* O157). The detection of *E. coli* O157 is performed as ImmunoMagnetic Separation (IMS) using Dynabeads® anti-O157 and plating onto two selective indicative agar media (CT-SMAC agar and CHROMagar O157). Suspect *E. coli* O157 colonies are verified using the *E. coli* O157 latex test.

Suspect colonies from TBX agar and/or *E. coli* O157 latex-positive isolates from CT-SMAC agar and/or CHROMagar O157 are reported as *E. coli* detected in 25 g.

Important: The media used have the following characteristics:

Media	Characteristics
BPW broth	Nonselective broth.
TBX agar	<p>Selective properties: Growth of accompanying Gram-positive flora is largely inhibited by the use of bile salts.</p> <p>Indicative properties: The presence of the enzyme β-D-glucuronidase differentiates most <i>E. coli</i> spp. from other coliforms. <i>E. coli</i> absorbs the chromogenic substrate 5-bromo-4-chloro-3-indolyl-β-D-glucuronide (X-β-D-glucuronide). The enzyme β-glucuronidase splits the bond between the chromophore 5-bromo-4-chloro-3-indolyl and the β-D-glucuronide. <i>E. coli</i> colonies are colored blue-green.</p> <p>NOTE: For the recovery of sublethally injured <i>E. coli</i>, plates are incubated at 34–38 °C and not 44 °C as recommended by Merck (inhibits growth of</p>

	accompanying Gram-positive flora).
CT-SMAC agar (Sorbitol MacConkey agar)	<p>Polypeptone favors the growth of <i>E. coli</i> O157:H7. Sorbitol-negative bacterial (in particular O157:H7) colonies are colorless.</p> <p>Sorbitol-positive bacteria give rise to red colonies due to the change of the color of the pH indicator (neutral red).</p> <p>Contaminating bacteria are inhibited by the association of bile salts, crystal violet, cefixime, and potassium tellurite.</p>
CHROMagar O157 and CT-CHROMagar O157	A typical <i>E. coli</i> O157 will grow as a pink-mauve colony, whereas most other microorganisms are either inhibited or grow as blue or colorless colonies.

Definition of units

The result is stated as:

- DET (*E. coli* detected in 25 g) or
- ND (*E. coli* not detected in 25 g)

Standards

A positive reference strain can be used (e.g., *E. coli* ATCC 11229).

If a reference strain of *E. coli* O157 is included, it must be *E. coli* O157 without the genes coding for verotoxins (e.g., ATCC 43888).

Detection limit

Theoretical detection limit: 1 *E. coli* in 25 g

Equipment

Balance (± 0.1 g)

Magnetic stirrer

Incubator (34–38 °C)

Sterile inoculation loops (1- μ l)

Sterile swabs

Vortex mixer

Pipettes and sterile tips

For ImmunoMagnetic Separation (either mIMS or aIMS):

- For manual ImmunoMagnetic Separation (mIMS):
 - MPC-S rack and magnet (Invitrogen cat. no. 120.20) + Eppendorf tubes, 1.5-ml (Eppendorf cat. no. 0030 10.086) + MX-3 mixer (DynaL cat. no. 159.09) – mixer is optional.
- For automatic ImmunoMagnetic Separation (aIMS):
 - BeadRetriever™ (Invitrogen cat. no. 159-50) + tubes and tips (Invitrogen cat. no. 150-51)

Media and reagents

Buffered peptone water (BPW) (450 ml)

Chromocult® TBX agar plates (9-cm)

Cefixime-tellurite Sorbitol MacConkey agar (CT-SMAC agar plates, 9-cm)

CHROMagar O157 agar plates (9-cm) or CT-CHROMagar O157 (app. 5- or 9-cm)

Tryptone soya agar plates (TSA)
 Dynabeads[®] anti-O157, Dynal cat. no. 710.04
 Washing buffer (PBS-Tween 20 buffer), Sigma no. P-3563
E. coli O157 Latex Test Kit (for verification), Oxoid no. DR620

Safety

The *E. coli* O157 Latex Test Kit (Oxoid DR0620) is labeled R22 – Harmful if swallowed due to 0.1% sodium azide.

Transfer of sample to BPW

25 g of sample is transferred to 450–900 ml of BPW, depending on the sample type

Enrichment

The nonselective enrichment is performed as follows:
 Incubate BPW at 34–38 °C for 16–20 hr (minimum 16 hr).

Detection of β -D-glucuronidase-positive *E. Coli*

Detection of β -D-glucuronidase-positive *E. coli* is performed as follows:

- Streak the enriched sample onto the surface of a TBX agar plate using a sterile 10- μ l inoculation loop. If using two BPW bottles, streak on one agar plate from each bottle.
- Incubate the plate at 34–38 °C for 18–24 hr.
- Examine the plate for growth of typical *E. coli* colonies:

Organism	Growth on Chromocult [®] TBX agar
<i>E. coli</i>	Blue-green or dark-blue-to-violet colonies (Salmon-GAL and X-glucuronide reaction).
Coliforms (not <i>E. coli</i>)	Salmon-to-red colonies (Salmon-GAL reaction but no X-glucuronide reaction).
Other Gram-negatives	Colorless colonies, except for some organisms which possess β -D-glucuronidase activity. These colonies appear light-blue to turquoise.

Detection of *E. Coli* 0157

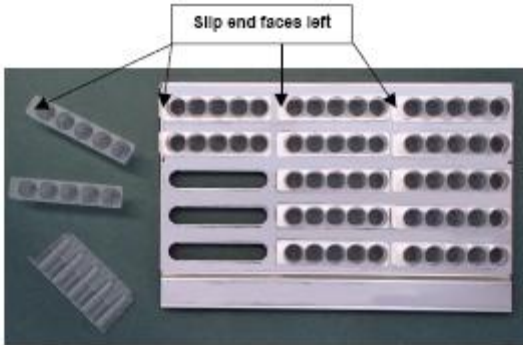
ImmunoMagnetic Separation (IMS) is performed either as manual IMS (mIMS) or automated IMS (aIMS):

Manual IMS (mIMS):

Step	Action
1	Place one Eppendorf tube per sample in the rack without the magnet inserted. Gently vortex the Dynabeads [®] anti-O157 and add 20 μ l of Dynabeads [®] anti-O157 to each tube. Use a lid opener to open the lids of the Eppendorf tubes.
2	Gently add 1 ml of the pre-enriched sample to the Eppendorf tube. Use a new pipette/tip for each sample. Close the lid. <i>NOTE:</i> If the sample is divided between two BPW bottles, take 500 μ l from each bottle
3	Incubate the tubes for approx. 10 min at room temperature. Gently rotate the rack without the magnet on an MX-3 mixer (Dynal) or by hand.
4	Insert the magnet into the rack. Tilt the rack frequently for approx. 3 min to ensure complete collection of beads. With correct capture, a distinct

	circular-to-oval brownish pellet is formed at the tube site halfway between the top and bottom of the tube.
5	Open the tubes gently using the lid opener. Place a Pasteur pipette at the water surface opposite the pellet. Gently pipette up the supernatant and liquid in the cap of the tube. Slow down pipetting when the surface of the liquid passes the pellet in order to make sure that no beads leave the tube through the pipette. If beads leave the sample, return the supernatant to the tube and repeat step 4. Use a new pipette/tip for each sample.
6	Carefully add 1 ml of washing buffer to each sample. Do not touch the tube with the pipette/ tip as this can cross-contaminate the samples as well as the buffer. Close the lids and remove the magnet from the rack. Wash the bead complex by rotating the rack three times. Repeat steps 4 to 6 twice, but the last time only resuspending the pellet in 100 µl of washing buffer

Automatic ImmunoMagnetic Separation (aIMS):

Step	Action
1	<p>Load one sample tube for each sample into a sample rack.</p>  <p><i>NOTE:</i> Each sample tube consists of five tubes called tubes 1 to 5 (tube 1 is to the left (= slip end) and tube 5 is to the right).</p>
2	Gently vortex the Dynabeads® anti-O157 until the pellet in the bottom of the tube disappears, then aseptically add 10 µl of properly mixed Dynabeads® anti-O157 into sample tubes 1 and 2.
3	Aseptically add 500 µl of washing buffer to sample tubes 1 and 2. Aseptically add 1000 µl of washing buffer to sample tubes 3 and 4. Aseptically add 100 µl of washing buffer to sample tube 5.
4	Add 500 µl of the enriched test sample to sample tubes 1 and 2; be careful not to contaminate other tubes. If the sample is divided between two BPW bottles, take 500 µl from each bottle.
5	Repeat step 4 for the remaining samples.
6	Aseptically insert the sterile protective sample tip combs into the instrument.
7	Insert the rack of filled tubes into the instrument and lock it in place.
8	Check that everything is properly aligned. Close the instrument door.
9	Select the EPEC/VTEC program sequence by scrolling with the arrow key, then press the Start button.

Streaking onto selective indicative agar plates:

Each IMS product (from mIMS or aIMS) is tested for the presence of *E. coli* O157 using selective indicative agar plates:

Step	Action
1	Gently vortex the pellet (IMS product).
2	Streak 50 µl of IMS product onto the surface of a CT-SMAC agar plate, then streak another 50 µl of IMS product onto the surface of a CHROMagar O157 plate (or a CT-CHROMagar O157 plate) as follows: Spread the bead-bacteria complex over one half of the plate with a sterile cotton swab. This ensures the break-up of the bead-bacteria complexes. Dilute further by streaking with a loop.
3	Incubate the plates at 34–38 °C for 18–24 hr.

Reading:

Agar	Description
CT-SMAC agar	On CT-SMAC agar, typical <i>E. coli</i> O157 colonies are transparent and almost colorless with a pale yellowish-brown appearance and a diameter of approx. 1 mm. Sorbitol-positive organisms form bright-red (pink) colonies. In some cases, suspect colonies are so few that they can only be recognized in the bacterial lawn in the primary streaking zone. In this case, subculture suspect colony material onto a new CT-SMAC agar plate. If the growth is too weak after 18–24 hr, the plates can be reincubated for up to 24 hr. In this case, representative sorbitol-negative colonies (transparent) should be verified using the <i>E. coli</i> O157 Latex Test Kit from Oxoid (see below).
CHROMagar O157 and CT-CHROMagar O157	A typical <i>E. coli</i> O157 will grow as a pink-mauve colony, whereas most other microorganisms are either inhibited or grow as blue or colorless colonies.

Verification of *E. coli* O157:

Suspect colonies on CT-SMAC agar and CHROMagar O157 (or CT-CHROMagar O157) are verified as *E. coli* O157 using the *E. coli* O157 Latex Test Kit from Oxoid. The verification is performed according to the manufacturer's description.

Interpretation of results

E. coli detected (DET) in 25 g

- Presence of typical colonies on TBX agar
- Presence of O157 latex-positive colonies from CT-SMAC agar and CHROMagar O157 (or CT-CHROMagar O157), i.e., suspect *E. coli* O157

E. coli not detected (ND) in 25 g

- Absence of typical colonies on TBX agar
- Absence of O157 latex-positive colonies from CT-SMAC agar and CHROMagar O157 (or CT-CHROMagar O157), i.e., suspect *E. coli* O157

Sensitivity and specificity

Sensitivity: 100%

Specificity: 100%

References

ISO 16649-2, 1st ed. (2001) Microbiology of food and animal feeding stuffs – Horizontal method for the enumeration of presumptive *Escherichia coli* – Part 2: Colony-count technique at 44°C using 5-bromo-4-chloro-3-indolyl-β-D-glucuronic acid.

ISO 16654, 1st ed. (2001): Microbiology of food and animal feeding stuffs – Horizontal method for the detection of *Escherichia coli* O157.

The detection of *E. coli* O157 is in accordance with ISO 16654 with the following exception:

- Enrichment is performed using buffered peptone water at 34–38 °C for 16–20 hr. ISO 16654 uses a modified TSB + novobiocin at 41.5 °C ± 1 °C for 18–24 hr
- ImmunoMagnetic Separation is only performed after 16–20 hr. ISO 16654 states after 6 hr and again, if necessary, after 12–18 hr (i.e., a total elapsed time of 18–24 hr)
- Verification is performed using the *E. coli* O157 latex test. ISO 16654 states the indole test and serological test

Handling of enzymes and chemicals

Enzymes and enzyme solutions should be handled in a fume hood or in closed containers.

Avoid inappropriate handling of enzymes and enzyme solutions, which may result in aerosol/dust generation.

Avoid inhalation of dust aerosols and contact with skin and eyes.

Handling of chemicals and disposal of waste must be performed according to valid procedures.

Validity

Valid from November 2011

Novozymes A/S
Krogshøjvej 36
2880 Bagsvaerd
Denmark

Tel. +45 4446 0000
Fax +45 4446 9999

For more information
and addresses of
international offices,
please see
www.novozymes.com
info@novozymes.com

Novozymes is the world leader in bioinnovation. Together with customers across a broad array of industries we create tomorrow's industrial biosolutions, improving our customers' business and the use of our planet's resources. Read more at www.novozymes.com.

Detection of *Salmonella* spp.

Principle

Detection of *Salmonella* spp. is carried out as a qualitative test.

The test is based on a non-selective enrichment of 25 g of sample in 450 ml of buffered peptone water for 18-24 hours followed by *Salmonella* specific PCR. Optionally, a secondary enrichment in the selective RVs broth may be added after enrichment in BPW.

The methods are in-house methods evaluated and validated at Novozymes.

Definition of units

The result is stated as:

DET (*Salmonella* detected in 25 g)

ND (*Salmonella* not detected in 25 g)

Standards

A positive reference strain can be included in the test, e.g., *Salmonella adabraka*, *Salmonella havana*, or *Salmonella senftenberg*.

Detection limit

Theoretical detection limit: 1 *Salmonella* sp. in 25 g.

Equipment

General equipment

Balance

Incubator for BPW and agar plates (34–38 °C)

Incubator or water bath for RVs (40.0–42.0 °C)

Vortex mixer

Automatic pipettes and sterile tips (10-100 µl, 100-1000 µl, and 1 ml)

PCR specific equipment and materials

AB 7500 Fast Real-Time PCR System
 Microcentrifuge (e.g. Ole Dich microcentrifuge)
 Heating block (e.g. Stuart Block Heater SBH200D)
 Automatic pipette dedicated to PCR, 10-100 µl
 Automatic pipette dedicated to PCR, 100-1000 µl
 Pipette tips dedicated to PCR, DNA and DNase free, 100 µl and 1000 µl
 Sterile pasteur pipettes
 Powder free gloves (PCR)
 FastReactionTubes 0,1ml 8/strip
 Tube Cap Strips 8 Caps/Strip
 Tubes RNase-Free 1.5mL

Media and reagents

Enrichment broths

Buffered Peptone Water (BPW) (450 ml)
 Optional: Rappaport Vassiliadis soya peptone broth (RVs broth) (Oxoid CM0866)

PCR specific reagents

MicroSEQ® Salmonella spp. Detection Kit (Life Technologies Cat. No. 4403930).
 PrepSEQ™ Rapid Spin Sample Preparation Kit (Life Technologies Cat. No. 4407760)
 EP buffer, 90 ml buffered sodium chloride-peptone solution pH 7.0.
 Nuclease-Free Water (e.g. Sigma Cat. No. 101210442)

Nonselective enrichment

The nonselective enrichment is performed in the following way:

Stage	Description
1	Transfer 25 g or 25 ml of sample to 450-ml BPW preheated to 40-42°C.
2	Incubate BPW at 34-38°C for 18-24 hr.

Optional: Selective enrichment in RVs broth

The selective enrichment in RVs is performed in the following way:

- Transfer 500 µl or 0.5 ml from BPW to 10-ml RVs tubes equilibrated to minimum room temperature
- Incubate the RVs broth at 40.0–42.0 °C for 22-26 hr

Note: If a water bath is used to incubate the RVs, there is no need to equilibrate the temperature of the broth.

DNA purification

CAUTION: When performing DNA purification there is a cross contamination risk, therefore, the following precautions should be taken:

- Set up only the materials and reagents needed for the particular work process in the LAF bench.
- Always use a new pipette tip for each sample at each step.
- Always handle one sample at a time keeping the remaining samples physically separated.
- When opening reagent bottles put lids/caps upside down behind the bottle.
- Always keep open bottles/reagents separate from the waste bin and not in the path where the pipette is transferred.
- Always close (eppendorf) tubes when they are not handled.
- Avoid passing your hands and pipettes above open bottles/tubes.

IMPORTANT: Work in LAF bench when performing DNA purification and use gloves when performing lysis procedure.

IMPORTANT: : Mix any reagents before use.

1. Mix BPW or RVs broth.

CAUTION: Be careful that the broth does not touch the lid when mixing.

2. Transfer 2 ml BPW broth (or optionally RVs broth) to a 2 ml eppendorf tube and microcentrifuge (hereafter named centrifuge) for 3 min. at max speed, e.g. 15.000g.

TIP: Store the BPW or RVs broth at a cool temperature (2-8°C) until PCR has been successfully completed. The RVs broth may be stored for max. 2 days at a cool temperature.

3. Discard the supernatant without touching the pellet, e.g. using a sterile pasteur pipette.
4. Add 650 µl EP buffer and re-suspend the pellet thoroughly.
5. Insert a spin column into a labeled tube.
6. Load 650 µl of sample onto the spin column and cap the column.
7. Load the tube into the centrifuge. Make sure the lid points toward the center of the centrifuge. Then centrifuge for 3 min. at max speed, e.g. 15.000g.

8. Remove the tube from the centrifuge, then discard the used spin column.

CAUTION: Make sure that any liquid on the outside of the spin column is scraped off on the edge of the eppendorf tube.

9. Aspirate, then discard the supernatant.

10. Add 50 µl of Lysis Buffer to the pellet. Re-suspend by pipetting up and down, or vortex until the pellet is re-suspended.
11. Cap the tube, then incubate at 95±3°C for 10 min.
12. Allow the sample to cool for 2 min. at room temp, then centrifuge for 1 min. at max. speed, e.g. 15.000g.
13. Add 250 µl of Nuclease-Free water, then centrifuge for 1 min. at max. speed, e.g. 15.000g.
14. Proceed with PCR, or store the tube at ±18°C. *Remark:* Avoid loading the black pellet when transferring to the lyophilized qPCR strip sample.

TIP: Material may be stored at cool (2-8°C) for max. 2 hours after completion of step 3, 8 or 13.

PCR preparation

IMPORTANT: Use gloves or wash your hands thoroughly after the PCR preparation. *The negative control contains 0 – 0.01 % Na-azide.*

IMPORTANT: Use a Pathogen Detection Negative Control for each PCR run.

1. Open the storage pouch containing the assay beads (MicroSEQ® *Salmonella* spp. Detection Kit).

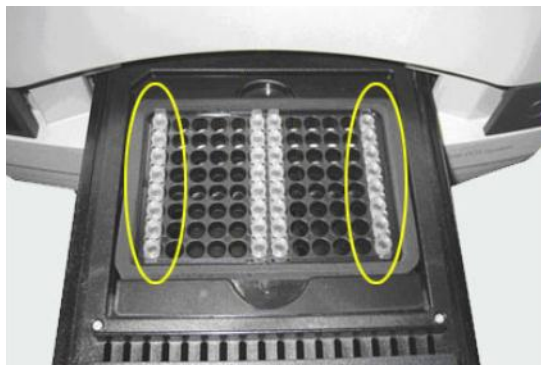
IMPORTANT: Do not remove the desiccant from the storage pouch.

2. Remove the appropriate number of individual tubes or 8-tube strips.
3. *NOTE:* Frozen samples and/or controls only: thaw these completely, vortex, then briefly spin them down using a microcentrifuge.
4. Examine the assay beads in the 8-tube strips. Gently tap the tubes as needed to settle all assay beads to the bottom of each tube.
5. Gently remove, then discard the concave caps. Avoid disturbing the beads from the bottom of the tubes.
6. For each sample or control, transfer 30 µl into a tube containing the appropriate assay beads. Beads dissolve in 1 to 5 seconds.

IMPORTANT: Dispense all unknown samples first followed by the negative control.

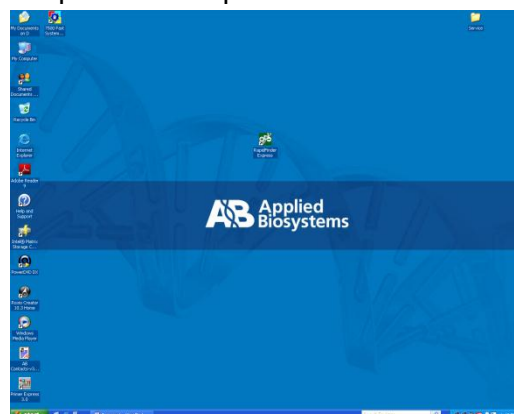
7. Add additional tubes as needed so that each strip contains a full set of 8 tubes.
8. Cap the tubes, sealing each tube with the flat (transparent) optical strip caps provided in the kit. Cap the tubes firmly with the strip cap tool to avoid collapsing, bending, or misaligning the tubes.

IMPORTANT: Avoid scratching the optical strip caps as this will interfere with the reading of fluorescence.
9. Confirm that the strips are straight and that each tube is in line with the adjacent tube.
10. Make sure reagents are thoroughly mixed and at the bottom of the tubes.
11. Carefully insert two or more 8-tube strips containing samples, starting from the center of the plate holder and moving out. This layout minimizes bending or misaligning the tube strips.
12. If column 1 (leftmost) and column 12 (rightmost) of the Plate Holder are not used, insert two fully capped, empty, 8-tube strips into these columns (see below photo).

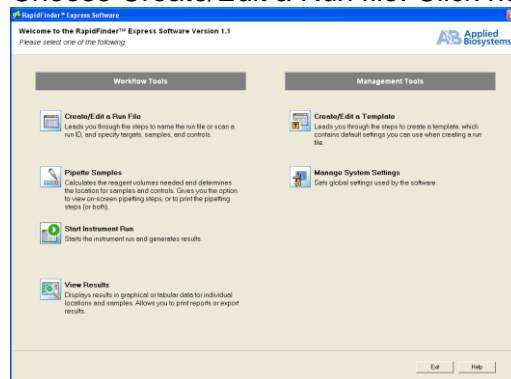


Run PCR reactions

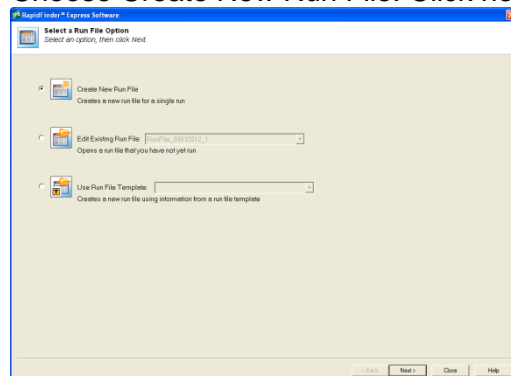
1. Turn on the PCR system first. Then turn on computer and open "RapidFinder Express".



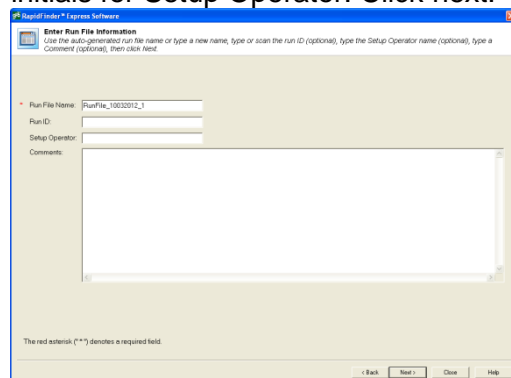
2. Choose Create/Edit a Run file. Click next.



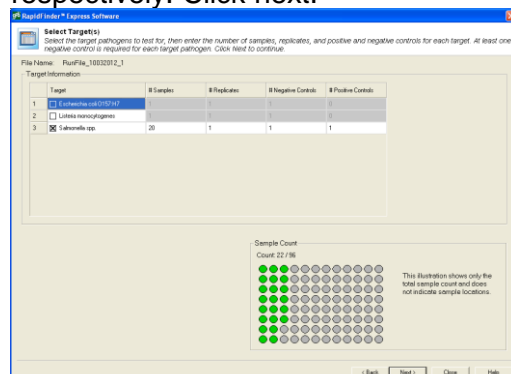
3. Choose Create New Run File. Click next.



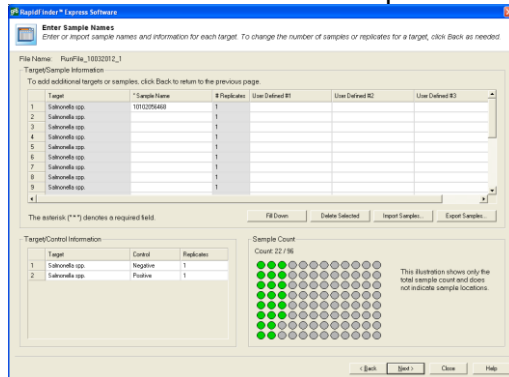
4. Enter Run File Information. Use default Run File Name and enter initials for Setup Operator. Click next.



5. Select Targets: Choose Salmonella spp. Enter number of samples. Enter '1' for replicates, negative and positive controls, respectively. Click next.



6. Enter LIMS numbers as Sample Names. Click next.



File Name: RunFile_10032012_1

Enter Sample Names
Enter or input sample names and information for each target. To change the number of samples or replicates for a target, click Back as needed.

Target/Sample Information

To add additional targets or samples, click Back to return to the previous page.

Target	Sample Name	# Replicates	Use Defined B1	Use Defined B2	Use Defined B3
1	Salmonella spp.	1			
2	Salmonella spp.	1			
3	Salmonella spp.	1			
4	Salmonella spp.	1			
5	Salmonella spp.	1			
6	Salmonella spp.	1			
7	Salmonella spp.	1			
8	Salmonella spp.	1			
9	Salmonella spp.	1			

The asterisk (*) denotes a required field.

Target/Control Information

Target	Control	Replicates
1	Salmonella spp.	Negative
2	Salmonella spp.	Positive

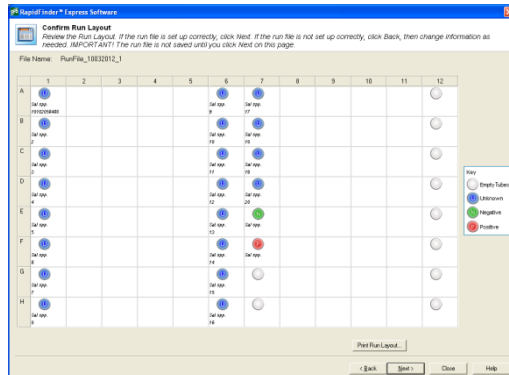
Sample Count

Count: 22 / 96

This illustration shows only the total sample count and does not indicate sample locations.

Buttons: Back, Next, Close, Help

7. Confirm Run Layout: Make a layout of the program securing equilibrium on the 96-well plate, i.e. using empty PCR tubes. Click next.



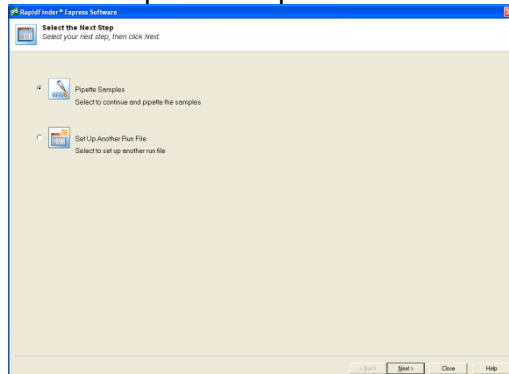
File Name: RunFile_10032012_1

Confirm Run Layout
Review the Run Layout. If the run file is set up correctly, click Next. If the run file is not set up correctly, click Back, then change information as needed. IMPORTANT! The run file is not saved until you click Next on this page.

Plate Run Layout

Buttons: Back, Next, Close, Help

8. Choose Pipette Samples. Click next.



File Name: RunFile_10032012_1

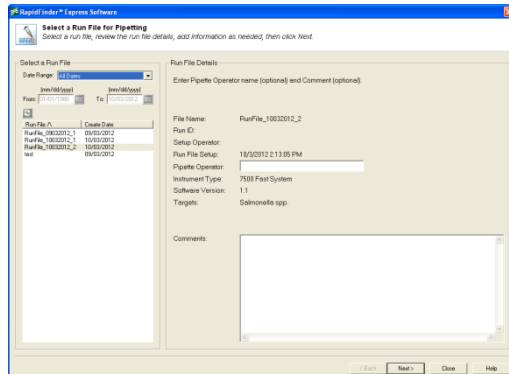
Select the Next Step
Select your next step, then click Next.

Pipette Samples
Select to continue and pipette the samples.

Set Up Another Run File
Select to set up another run file.

Buttons: Back, Next, Close, Help

9. Choose the above created Run File. Click next.



File Name: RunFile_10032012_1

Select a Run File for Pipetting
Select a run file, review the run file details, add information as needed, then click Next.

Select a Run File

Run File Details

Enter Pipette Operator name (optional) and Comment (optional).

File Name: RunFile_10032012_2

Run ID: 10032012_2

Setup Operator: 10/03/2012

Run File Setup: 10/03/2012 11:06 PM

Pipette Operator: 7500 Fast System

Instrument Type: 1.1

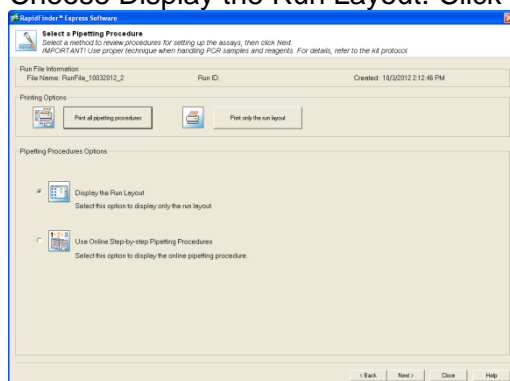
Software Version: 1.1

Targets: Salmonella spp.

Comments:

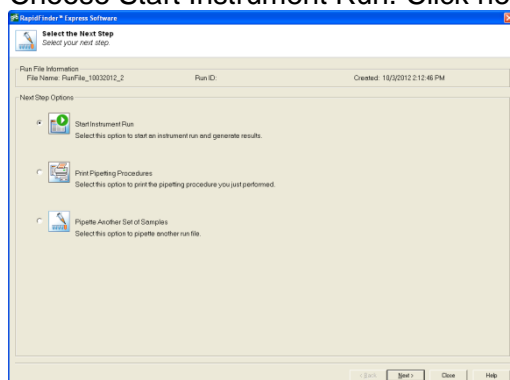
Buttons: Back, Next, Close, Help

10. Choose Display the Run Layout. Click next.



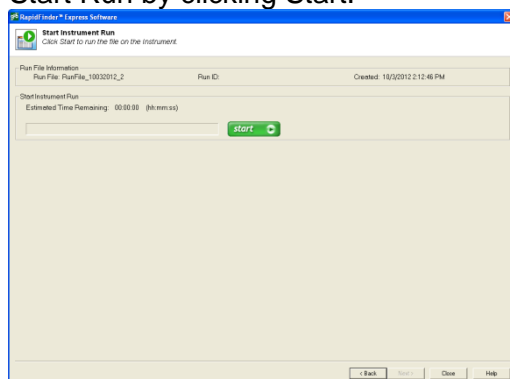
11. Confirm Run Layout. Click next.

12. Choose Start Instrument Run. Click next.

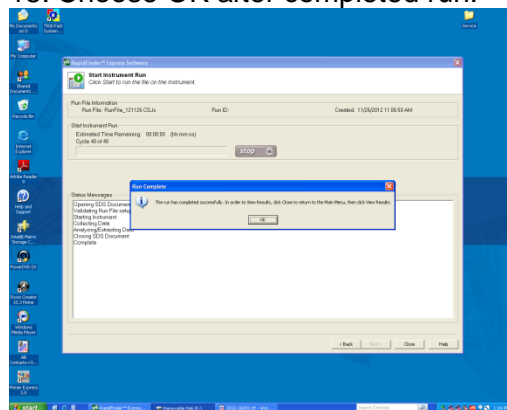


13. Load PCR tubes.

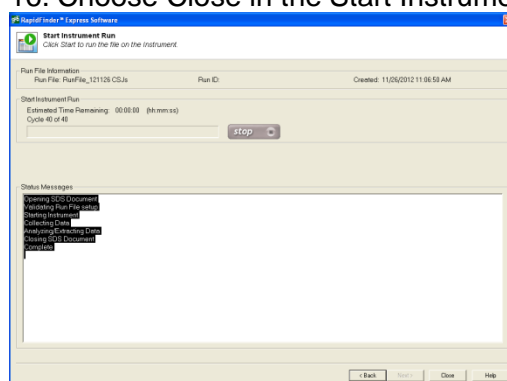
14. Start Run by clicking Start.



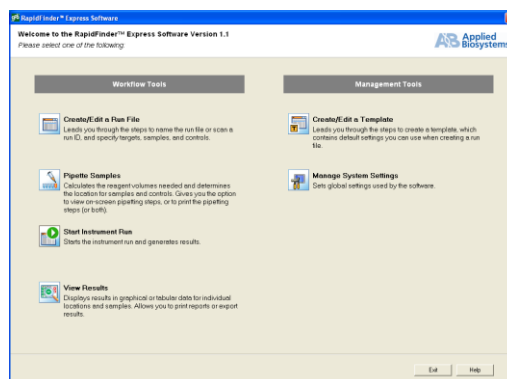
15. Choose OK after completed run.



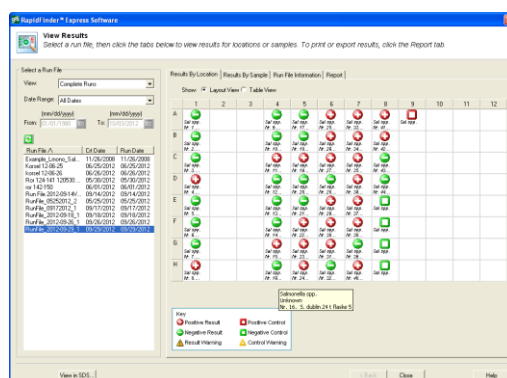
16. Choose Close in the Start Instrument Run window.



17. Choose View Results. Click next.



18. Choose relevant Run File and the sheet "Results By Location".



19. Interpretation of results

If...	Then report result as...
Negative control is marked as “+”	Re-perform PCR procedure with all “+” samples and negative controls
Sample is marked as “-”	<i>Salmonella</i> spp. not detected (ND)
Sample is marked as “+”	<i>Salmonella</i> spp. detected (DET)

TIP: The threshold value for a *Salmonella* positive sample is 35.69 cycles.

20. Click Close then Exit to close the RapidFinder Express software.

21. Choose Shutdown to turn computer off, then turn off PCR system.

IMPORTANT: AFTER PCR run:

- **NEVER EVER** open tubes.
- Throw tubes in the trash in the PCR room. Do not re-use tubes.
- Before leaving the room
 - Remove and throw gloves in the trash
 - Wash hands

Accuracy, sensitivity and specificity

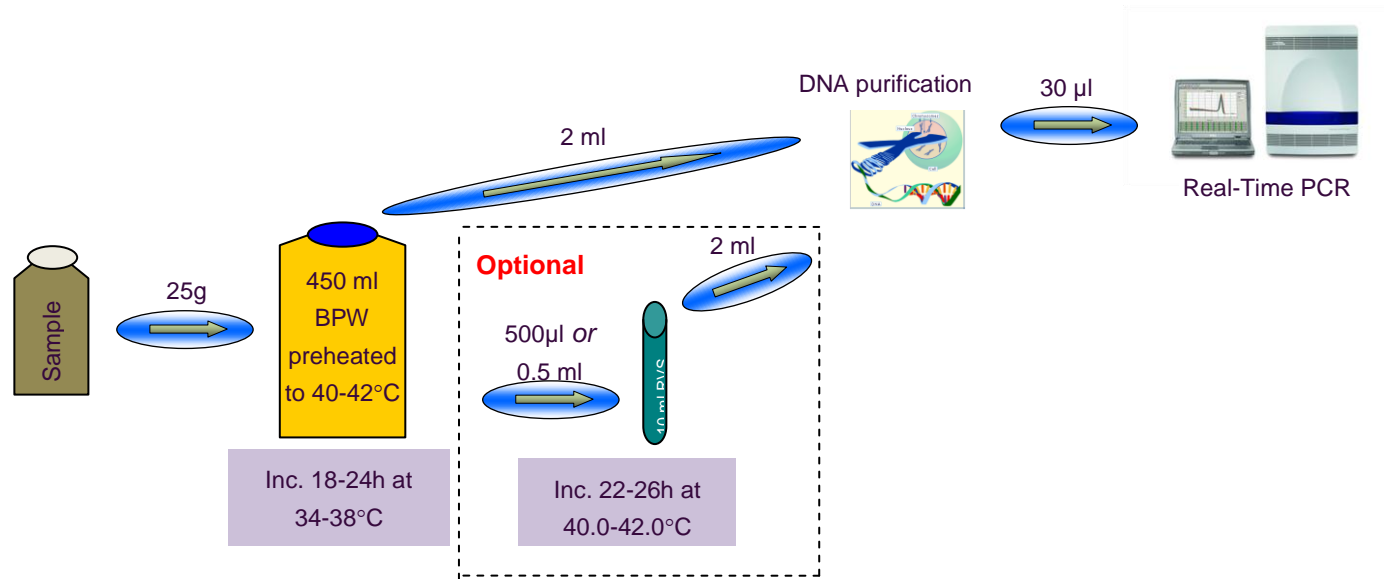
Accuracy: 100%

Sensitivity:

100%

Specificity: 100%

Flow Chart



Handling of enzymes and chemicals

Enzymes and enzyme solutions should be handled in a fume hood or in closed containers.

Avoid inappropriate handling of enzymes and enzyme solutions, which may result in aerosol/dust generation.

Avoid inhalation of dust aerosols and contact with skin and eyes.

Handling of chemicals and disposal of waste must be performed according to valid procedures.

Validity

Valid from March 2013

Novozymes A/S
Krogshøjvej 36
2880 Bagsvaerd
Denmark

Tel. +45 4446 0000
Fax +45 4446 9999

For more information
and addresses of
international offices,
please see
www.novozymes.com
info@novozymes.com

Novozymes is the world leader in bioinnovation. Together with customers across a broad array of industries we create tomorrow's industrial biosolutions, improving our customers' business and the use of our planet's resources. Read more at www.novozymes.com.

Detection of Antimicrobial activity

Scope All Novozymes QC laboratories involved in analysis of samples from Novozymes production and GLP studies.

Principle **Detection of Antimicrobial activity** is based on the measurement of inhibition of bacterial growth under specific circumstances.
The method is in accordance with JECFA (1992)

LIMS code ANTIMIC

Definition of units The result is stated as:

- DET (Antimicrobial activity detected) or
- ND (Antimicrobial activity not detected)

Samples All sample types.

Standards *Staphylococcus aureus*, ATCC 6538
Escherichia coli, ATCC 11229
Bacillus cereus, ATCC 2
Bacillus circulans, ATCC 4516
Streptococcus pyogenes, ATCC 12344
Serratia marcescens, ATCC 14041
NOTE: The test organisms must be traceable.

Detection limit Not known.

Continued on next page

Detection of Antimicrobial activity, *Continued*

Equipment

Balance (± 0.1 g)
Sterile pipettes for transfer of 100 μ l, 1 ml and 10 ml
Inoculation loops 1 μ l
Paper discs, e.g. S&S Analytical Filter Papers No. 740-E (12.7 mm in diameter), autoclaved
Bio Safety Cabinet, Class II
Sterile gloves
Refrigerator (2-8°C)
Incubator (34-38°C)
-80°C freezer
Ruler or Vernier gauge
Petri dishes, 9 cm

Media and reagents

Tween buffer 4%
Tryptone Soya agar (TSA), 90 ml in 250 ml Blue cap bottles
Tryptone Soya agar plates, 9 cm with app. 15 ml agar (TSA)
CASO broth, 50 ml
IMPORTANT: Preparation in the local laboratory shall be done according to the current valid WW Media direction.
Ciprofloxacin discs (5 μ g or 10 μ g) (bought ready to use).

Safety

It is the responsibility of the laboratory leader that all personnel are aware of the correct handling of enzymes and reagents.

Continued on next page

Detection of Antimicrobial activity, *Continued*

Day 1: Preparation of test organisms in CASO

Handling the test organisms must be performed in a Bio Safety Cabinet, Class II.

Step	Action
1	Inoculate each of the 6 test organisms using a 1 µl inoculation loop (the strains are taken directly from a Cryo tube that has been stored in a -80°C freezer) in separate CASO broth, 50 ml.
2	Contemporary, streak out each test organism, using the same inoculation loop as in step 1, on the surface of a TSA plate to look for purity.
3	Incubate the CASO broth and TSA plates overnight at 34-38°C.

Day 2: Number of test organisms in CASO

The number of test organisms is tested in each of the CASO broths.

Step	Action
1	Make a 10^{-4} dilutions of the following test organisms: <ul style="list-style-type: none">• Bacillus cereus• Bacillus cirkulans
2	Make a 10^{-5} dilutions of the following test organisms: <ul style="list-style-type: none">• Staphylococcus aureus• Escherichia coli• Streptococcus pyrogenes• Serratia marcescens
3	Determine the Total viable count of each dilution by spread plate or spiral plate on TSA plates. Incubate overnight at 34-38°C

Continued on next page

Detection of Antimicrobial activity, *Continued*

Day 2: Infection control (purity of the Cryo tubes)

Purity of the test organisms from the Cryo tubes are controlled the following way:

Step	Action
1	Control the purity of the 6 test organisms on TSA plates from the day before.
2	Write down the result (+ or – infection).

Day 2: Preparation of test plates and purity of the test organisms in CASO broth

Preparation of test plates must be done in a Bio Safety Cabinet, Class II and wearing sterile gloves.

Step	Action
1	For each test organism a bottle containing 90 ml of Tryptone Soya agar (TSA) is melted and cooled (to app. 47°C)
2	Transfer 10 ml of CASO broth inoculated with <i>S. aureus</i> to a 250 ml Blue cap bottle with 90 ml melted and cooled Tryptone Soya agar (TSA). Mix carefully.
3	Pour app. 10 ml of the TSA-microorganism mixture onto an already prepared TSA plates (containing app. 15 ml TSA). Distribute the TSA-microorganism mixture evenly on the surface of the TSA plate, and allow solidifying.
4	Make another 9 plates as described in step 3.
5	Control the purity of the CASO broth by streaking out from the last drop of the bottle with a 1 µl inoculation loop onto the surface of one TSA plate.
6	Repeat step 2-5 for the rest of the microorganisms. <i>IMPORTANT:</i> Transfer only 5 ml of the CASO broth containing <i>Streptococcus pyogenes</i> to 90 ml of melted and cooled TSA.
7	Incubate the TSA plates prepared in step 5 overnight at 34-38°C.

Continued on next page

Detection of Antimicrobial activity, *Continued*

Day 2: Control of test plates with Ciprofloxacin

Control the test plates with Ciprofloxacin to determine whether the test organisms are capable of making an inhibition zone on the test plate.
The control must be done on one test plate per test organism.

Step	Action
1	Put one disc of Ciprofloxacin onto the middle of a test plate.
2	Place the test plate overnight at 2-8°C.
3	Incubate the test plate overnight at 34-38°C.

Day 3: Purity in CASO broth

Check the purity of the TSA plates from the day before.
Write down the result of the purity test for each of the test organisms (+ or – infection).

Day 3: Number of colonies on TSA plates

Count the number of colonies on the TSA plates from the day before.
Write down the results.
IMPORTANT: To approve the test plates all readings must be $>10^6$ CFU.

Day 3: Reading of in- hibition zone

Reading of the TSA plates with Ciprofloxacin from the day before is done by measuring the diameter of the inhibition zone on each of the test plates using a ruler or a Vernier gauge.
Write down the results.
IMPORTANT: Each zone must be ≥ 25 mm.

Sample preparation

The samples are prepared as followed:

- Transfer 10 g of solid sample or 10 ml of liquid sample to 90 ml Tween buffer 4%
- Immediately homogenize the sample by stirring or by shaking. Solid samples are homogenized on a magnetic stirrer for app. 20 minutes

Continued on next page

Detection of Antimicrobial activity, *Continued*

Test procedure

The test is performed in the following way:

TIP: It is recommended to work with dry plates, and to place the disc on the test plate immediately before addition of sample so the filters do not absorb moisture from the plates and thus cannot absorb the sample.

Step	Action
1	Place a sterile paper disc on each of the 6 test plates (one test plate per micro organism). <i>NOTE:</i> Up till 5 sterile paper discs can be placed on one plate (giving the possibility of analysing up to 5 samples per set of 6 test plates).
2	Inoculate each paper disc with 100 µl of the 10 ⁻¹ dilution of the sample prepared above.
3	Place the plates overnight at 2-8°C.
4	Incubate the plates overnight at 34-38°C.
5	Measure the diameter of the inhibition zone on each of the plates using a ruler or a Vernier gauge.
6	Write down the results (inhibition zone in mm.).

Continued on next page

Detection of Antimicrobial activity, *Continued*

Interpretation of results

Results are given according to the sheet below:

Is there...	with a zone measuring...	...the result is
0 inhibition zones	0 mm	Not detected (ND)
X inhibition zones	<16 mm	Not detected (ND)
1 inhibition zones	≥16 mm	Not detected (ND)
2 inhibition zones	≥16 mm	Not detected (ND)
3 inhibition zones	≥16 mm	Detected (DET)

If the result is Detected (DET) a remark is given on which of the test organisms that shows obvious antimicrobial activity in the sample and the size of the zone is stated.

IMPORTANT: If the result is Detected (DET) the Responsible Scientist is contacted.

Accuracy and precision

Not validated.

Archiving

All documentation should be archived in accordance with the local archiving SOP.

Contingencies

All deviations from this SOP should be discussed with the Method Responsible Scientist and should be documented.

References

Joint FAO/WHO Expert Committee on Food Additives (JECFA). Compendium of food additive specifications, Volume 1, Rome 1992, appendix A to annex 1.

Revision

Both 5 µg and 10 µg Ciprofloxacin discs can be used (Luna no. 2008-31511)

Detection of production strains

Scope

All Novozymes QC laboratories involved in analysis of samples from Novozymes production and GLP studies.

Principle

The production strain is defined as the organism used for fermentation of a given Novozymes product. Agar media and incubation conditions used for detection of a specific production strain is listed in [BD 001-IN-000](#)

The reference strain is defined as an isolate of the production strain used in the laboratory as a reference during the analysis.

Strains not listed in [BD 001-IN-000](#) are detected according to specific **Analytical Directions** prepared and approved by the EB Method Responsible Scientist. Analytical Directions are typically used in connection with GLP studies.

When analyzing samples from Novozymes production, the detection is carried out by spread plating of 0.1 g or 0.1 ml of sample.

When analyzing samples from GLP studies, the detection is carried out by spread plating or enrichment of 1 g of sample acc. to the specific Analytical Direction.

Detection of morphologically typical colonies (compared with the reference strain) indicates the presence of the production strain.

Definition of units

When analyzing samples from Novozymes production, the result is stated as:

- DET (The productions strain detected in 0.1 g or 0.1 ml) *or*
- ND (The productions strain not detected in 0.1 g or 0.1 ml)

When analyzing samples from GLP studies, the result is stated as:

- DET (The productions strain detected in 1 g) *or*
- ND (The productions strain not detected in 1 g)

IMPORTANT: When detected, the app. number of production strain / g or ml is stated.

Samples

Novozymes products

Continued on next page

Detection of production strains, *Continued*

Detection limit

The detection limit of this method is dependent on the sample volume and the dilution in use.

Sample volume	Size and number of agar plates	Dilution	Detection limit
1 ml, spread plate	14 cm (4 plates)	10^{-1}	10 colonies / g or ml
10 ml, spread plate	14 cm (40 plates)	10^{-1}	1 colonies / g or ml

Equipment

Balance (± 0.1 g)
Magnetic stirrer
Petri dishes (14 cm and 9 cm)
Suitable sterile pipettes for transfer of 10 ml, 1 ml (4x0.25 ml) and 0.25 ml
Sterile Drigalski spatula
Incubator
(relevant incubation temperatures are listed in [BD 001-IN-000](#))

Continued on next page

Detection of production strains, *Continued*

Media and reagents for Bacterial strains

Dilution buffer: Tween buffer 4%, 90 ml (If necessary, with a magnet) prepared acc. to [EB-ME-0052](#)

Agar media:

Abbreviation	Full name	Prepared acc. to EB Media direction (link)	Purpose
AT-2	AT-2 agar	EB-ME-0001	Detection & verification
B-TSA	Basic Tryptic Soy Agar	EB-ME-0055	Detection
B-TSA w.CAM	Basic Tryptic Soy Agar with or without Chloramphenicol (CAM) <i>NOTE:</i> The addition of CAM is optional	EB-ME-0056	Detection
Schaeffers	Schaeffers agar	EB-ME-0036	Verification
Sch.starch	Schaeffers agar with 1% starch	EB-ME-0037	Verification
Skim milk	Tryptic Soy Agar with 1 % skim milk	EB-ME-0038	Verification
TBX w.AMP	Chromocult®TBX agar + ampicillin (100 mg/l)	EB-ME-0066	Detection
TSA	Tryptic Soy Agar	EB-ME-0041	Detection
TSA w.CAM	Tryptic Soy Agar with or without Chloramphenicol (CAM) <i>NOTE:</i> The addition of CAM is optional	EB-ME-0057	Detection
TSA w.kana	Tryptic Soy Agar with kanamycin	EB-ME-0058	Detection

Continued on next page

Detection of production strains, *Continued*

Media and reagents for Fungal strains

Dilution buffer: Tween buffer 4%, 90 ml (If necessary, with a magnet) prepared acc. to [EB-ME-0052](#)
Agar media:

Abbreviation	Full name	Prepared acc. to EB Media direction (link)	Purpose
Cove-T-2	Cove-T-2 agar	EB-ME-0013	Detection & verification
DG-18	DG-18 agar	EB-ME-0017	Verification
Phytate	Phytate agar	EB-ME-0028	Verification
Sch.starch	Schaeffers agar with 1% starch	EB-ME-0037	Verification
YPG	YPG agar with or without tetracycline <i>NOTE:</i> The addition of tetracycline is optional	EB-ME-0044	Detection
YPSS	YPSS agar with or without tetracycline <i>NOTE:</i> The addition of tetracycline is optional	EB-ME-0045	Detection
YSG	Yeast/Soy Peptone/Glucose	MSA-SUB-FS-0064	Verification

If verification on Schaeffers agar with starch is performed then Lugol's iodine solution (0.5%) is used. Lugol's solution is prepared acc. to [EB-ME-0021](#).

Safety

It is the responsibility of the laboratory leader, that all personnel are aware of the correct handling of enzymes and reagents.

Continued on next page

Detection of production strains, *Continued*

Sample preparation

The samples are prepared as follows:

Step	Action
1	Transfer 10 g of solid sample or 10 ml of liquid sample to 90 ml Tween buffer 4%.
2	Immediately homogenize the sample by stirring or by shaking. Solid samples are homogenized on a magnetic stirrer for app. 20 minutes.

IMPORTANT: All enzyme products must be analyzed from a 10^{-1} dilution due to possible inhibition of micro organisms in undiluted enzyme.

Plating

Plating must be done within 15 minutes from end of homogenization. If this is not possible, the sample can be stored at 2-8°C for up to 4 hours.

NOTE: Relevant agar plates and incubation conditions (time and temperature) are listed in [BD 001-IN-000](#)

Step	Action
1	NOTE: Prepare the test plates: <ul style="list-style-type: none">When analyzing samples from Novozymes production: Transfer 1 ml from the 10^{-1} dilution onto the surface of 4 relevant agar plates (14 cm) with app. 0.25 ml on each plate.When analyzing samples from Tox batches (GLP): Analyse according to the relevant Analytical Direction.
2	Prepare the 2 positive control plates: <ul style="list-style-type: none">Transfer 0.25 ml from the 10^{-1} dilution onto the surface of 1 relevant agar plate (14 cm), and streak the bacteria reference strain or point inoculate the fungal production strain onto the inoculated plate.Streak the bacteria reference strain or point inoculate the fungal strain onto another agar plate (not inoculated with sample).
3	Leave the plates on the table until the sample has been soaked into the agar.

Continued on next page

Detection of production strains, *Continued*

Reading

The colonies on the test-plates are compared morphologically with the colonies of the reference strain.

If ...	Then ...
No suspect colonies are observed on the test-plates ...	The test is ended and the result is stated as: ND (the production strain is Not Detected)
Suspect colonies are observed on the test-plates ...	The test is continued as described below (Verification).

IMPORTANT: The reference strain must grow on both of the two positive control plates. If not, the test is repeated.

Verification

Suspect colonies from the test plates and the reference strain are streaked or point inoculated onto one or more of the agar plates (9 cm or 14 cm) listed in [BD 001-IN-000](#) (column "Verification"). Inoculation and reading of these agar media are described below. The plates are incubated as described in the column "Verification". If necessary, these media can be supplemented with other agar media, e.g. the agar medium used for the detection.

AT-2 agar

Detection of pullulanase activity:

	Description
Principle	Pullulanase-producing strains degrade the amylopectin in the agar. As a result, blue zones (haloes) will surround the colonies of the isolate.
Inoculation	Point inoculation
Reading	Colonies of the isolate are compared morphologically with the colonies of the reference strain. The surface of the plates is carefully flooded with Lugol's solution (0.5%). Blue zones surrounding the colonies in a reddish-brown medium indicate pullulanase activity. <i>NOTE:</i> If the production strain produces amylase in addition to pullulanase, clear zones will surround the colony. Between the clear zone and the reddish-brown medium a narrow blue zone might be seen.

Continued on next page

Detection of production strains, *Continued*

Cove-T-2 agar Detection of amdS-transformed fungi:

	Description
Principle	GMO strains transformed with the marker amdS grow well on the agar, while other strains appear with feeble or no growth.
Inoculation	Point inoculation.
Reading	<i>NOTE:</i> Colonies of the isolate are compared morphologically with the colonies of the reference strain. Vigorous growth on Cove-T-2 indicates presence of an amdS-transformed strain.

DG-18 agar Comparison of morphology of fungi:

	Description
Principle	DG-18 is a general growth medium for Fungi. The agar is used for comparison of morphology of fungal isolates with the reference strain.
Inoculation	Point inoculation
Reading	<i>NOTE:</i> Colonies of the isolate are compared morphologically with the colonies of the reference strain.

Phytate agar Detection of phytase activity:

	Description
Principle	Phytase-producing strains degrade phytate in the agar. As a result, clear zones (haloes) will surround the colonies of the isolate.
Inoculation	Point inoculation
Reading	<i>NOTE:</i> Colonies of the isolate are compared morphologically with the colonies of the reference strain. Before inoculation the plates are opaque. The presence of phytase activity is indicated by presence of clear zones (haloes) surrounding the colonies.

Continued on next page

Detection of production strains, *Continued*

Schaeffers agar

Sporulation test (*Bacillus* spp.):

	Description
Principle	Schaeffers agar induces sporulation of wild type strains, but the production strains show no sporulation on Schaeffers agar after incubation for 2-3 days.
Inoculation	Point inoculation
Reading	<i>NOTE:</i> Colonies of the isolate are compared morphologically with the colonies of the reference strain. The colonies are examined by microscopy for sporulation. The production strain shows no sporulation after incubation for 2-3 days.

Schaeffers starch agar

Detection of amylase activity (all isolates) and sporulation test (*Bacillus* spp.):

	Description
Principle	<u><i>Bacillus</i> spp.:</u> Schaeffers agar induces sporulation of wild type <i>Bacillus</i> strains, but the <i>Bacillus</i> production strains show no sporulation on Schaeffers agar after incubation for 2-3 days. <u><i>Bacillus</i> spp. & Fungi:</u> Amylase producing strains degrade the starch in the agar. As a result, in clear zones (haloes) will surround the colonies of the isolate.
Inoculation	Point inoculation
Reading	Colonies of the isolate are compared morphologically with the colonies of the reference strain. <u><i>Bacillus</i> spp.:</u> The colonies are examined by microscopy for sporulation. The production strain shows no sporulation after incubation for 2-3 days. <u><i>Bacillus</i> spp. & fungi:</u> The surface of the plates is carefully flooded with Lugol's solution (0.5%). Clear zones around the colonies in a blue (dark blue) indicates amylase activity.

Continued on next page

Detection of production strains, *Continued*

Skim milk agar Detection of proteolytic activity:

	Description
Principle	Protease-producing strains degrade the skim milk in the agar. As a result, clear zones (haloes) surround the colonies of the isolate.
Inoculation	Point inoculation
Reading	<i>NOTE:</i> Colonies of the isolate are compared morphologically with the colonies of the reference strain. Before inoculation the plates are opaque. Presence of clear zones (haloes) surrounding the colonies of the isolate after end of incubation indicate the presence of a proteolytic activity.

Calculation

The result is stated on the basis of the number of typical colonies.

- No typical colonies: ND (Production strain not detected in 0.1 g or 0.1 ml)
- Typical colonies: DET (Production strain detected in 0.1 g or 0.1 ml).

If detected, the app. number of production strains / g or ml is stated.

IMPORTANT: If any production strain is detected, the Method Responsible Scientist is contacted immediately. In addition, QCC-cor is informed by mail.

Accuracy and precision

The theoretical detection limit is:

- When analysing samples from Novozymes production:
10 production strains / g or ml
 - When analysing samples from GLP studies:
1 production strains / g
-

Archiving

All documentation should be archived in accordance with the local archiving SOP.

Continued on next page

Detection of production strains, *Continued*

Contingencies All deviations from this SOP should be discussed with the Method Responsible Scientist and should be documented.

References [BD 001-IN-000](#)

Revision “EB – Productions Strain list” changed to [BD 001-IN-000](#)

Appendix 4

Documentation regarding the manufacturing process

1. Statement on compliance of Good Manufacturing Practices, Food
2. ISO 9001:2008 certificate

To Whom It May Concern

March 18, 2013

Statement no. 401.13

Statement on Good Manufacturing Practice - GMP

- general description of production, control and hygiene

Novozymes A/S is a manufacturer of enzymes used in the food industry. We hereby certify that:

The products are produced according to good manufacturing practices for manufacturing, packing, or holding human food in order to prevent serious food hazards. Furthermore, our documented quality system is ISO 9001¹ certified by DS Certificering, accredited by DANAK. The quality system includes:

- Production operations are conducted in accordance with adequate sanitation principles.
- HACCP plan. Critical control points (CCPs) are identified and controlled, and the products are released if in compliance with these requirements.
- Critical measuring equipment is identified and calibrated at regular intervals.
- Instructions on cleaning of equipment, utensils and rooms are established and cleaning is documented.
- The personnel is trained in hygienic practices in order to prevent contamination of products and equipment.
- The personnel is trained in the quality system.
- The buildings and equipment are monitored periodically with special reference to maintenance.
- The production of our food enzymes complies with EC regulation 852/2004/EC, including amendments, on *the hygiene of foodstuffs*.
- The packaging materials used for our food enzyme products comply with EC regulation 1935/2004/EC, and related legislation including amendments on materials and articles intended to come into contact with foodstuffs.
- The production is under control of and inspected by the authorities according to EC regulation 882/2004/EC, including amendments, on *the official control of foodstuffs* as interpreted and implemented in Danish legislation.

¹The scope of the 9001 certificate is: Development, Production and Sales of Biopolymers and Industrial Enzymes.

BUREAU VERITAS
Certification



Certification

Awarded to

Novozymes Enzymes Business

Sites as to attached appendix

Bureau Veritas Certification certifies that the Management System of the above organisation has been audited and found to be in accordance with the requirements of the Management System standards detailed below.

STANDARD

ISO 9001:2008

SCOPE OF SUPPLY

Development, Production and Sales of Biopolymers and Industrial Enzymes.

Original approval date: 25-03-1996

Subject to the continued satisfactory operation of the organisation's Management System, this certificate is valid until: 25-03-2015

To check the validity of this certificate please call: (+45) 77 311 000.

Further clarification regarding the scope of this certificate and the applicability of the system requirements may be obtained by consulting the organisation

Certificate Number: DK003201-1

Date: 28-02-2013



Certification body address: Brandon House, 180 Borough High Street, London SE1 1LB, UK
Certification office: Oldenborggade 1B, DK-7000 Fredericia

This certificate remains the property of Bureau Veritas Certification Holding SAS – UK Branch



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008

BUREAU VERITAS
Certification



Certification

Awarded to

Novozymes Enzymes Business

Bureau Veritas Certification has issued this appendix to the certificate of approval of the above organisation.

Head office: Krogshøjvej 36, 2880 Bagsværd, Denmark

Sites:

*Novozymes A/S
Hillerødgade 31 & 42
2200 København N
Denmark*

*Novozymes A/S
Hallas Allé 1
4400 Kalundborg
Denmark*

*Novozymes (China) Biotechnology Co. Ltd.
150 Nanhai Road
TEDA
300457 Tianjin
China*

Certificate Number: DK003201-1

Date: 28-02-2013

dos Arden

Certification body address: Brandon House, 180 Borough High Street, London SE1 1LB, UK
Certification office: Oldenborggade 1B, DK-7000 Fredericia

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BUREAU VERITAS
Certification



Novozymes (China) Investment Co. Ltd.
No. 22 Xinxu Zhong Lu
Shangdi Zone, Haidian District
Beijing 10085
China

Suzhou Hongda Enzyme Co. Ltd.
Sha Xi Town
Taicang City Jiang Su Province
215421 China
China

Novozymes USA
77 Perry Chapel Church Road
Franklinton
North Carolina 27525-0576
USA

Novozymes Nebraska
600 S. 1st Street
NE 68008 Blair
USA

Novozymes Brazil
Rua Professor Francisco Ribeiro, 683
CEP 83707-660, Bairro Barigüi
Araucária - Paraná
Brazil

Novozymes Switzerland
Neumatt
CH-4243 Dittingen
Switzerland

Certificate Number: DK003201-1

Date: 28-02-2013

dos Anchen

Certification body address: Brandon House, 180 Borough High Street, London SE1 1LB, UK
Certification office: Oldenborggade 1B, DK-7000 Fredericia

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BUREAU VERITAS
Certification



Novozymes South Asia Private Limited
Genisys Building
Plot No. 32, 47-50
EPIP Area Bangalore
560 066 Karnataka
India

Novozymes South Asia Private Limited
Survej No. 193
Hoody Village, Whitefield Road
Bangalore, 560 048
India

Novozymes South Asia Private Limited
20th KM Hosur Road
Electronics City
Bangalore 560 100
India

Sales Region:

Sales Region Headquarter (HQ)
Kroghøjvej 36
2880 Bagsvaerd
Denmark

Sales Region North America (NA)
Novozymes North America Inc.
77 Perry Chapel Church Road
Franklinton
North Carolina 27525-0576
USA

Certificate Number: DK003201-1

Date: 28-02-2013

dos Arden

Certification body address: Brandon House, 180 Borough High Street, London SE1 1LB, UK
Certification office: Oldenborggade 1B, DK-7000 Fredericia

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Appendix 5

Safety documentation

1. Sequence homology of Xylanase from HyGe329 to known toxins and allergen analysis of Xylanase from HyGe329. Novozymes Report No.: 2013-06699
2. Summary of toxicity data. Xylanase, PPQ33502 from *Bacillus licheniformis* Novozymes Report No.: 2013-03354
3. Xylanase, PPQ33502: Test for mutagenic activity with strains of *Salmonella typhimurium* and *Escherichia coli*. Novozymes Study No. 20128049. Novozymes Report no.: 2012-13362
4. Xylanase, PPQ33502: Induction of micronuclei in cultured human peripheral blood lymphocytes. Covance Study No.: 8261061. Novozymes Reference No.: 2013-02893
5. Xylanase, PPQ33502, A 90-Day Gavage Toxicity Study in Rats. CiToxLAB, Scantox Study No.: 74852. Novozymes Reference No.: 2013-02669

Sequence homology of Xylanase from HyGe329 to known toxins and Allergen analysis of Xylanase from HyGe329

Esben Friis
LUNA# 2013-06699-01

April 29, 2013

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1 Sequence homology of Xylanase from HyGe329 to known toxins

Uniprot database

Protein sequences that contain the word *toxin* in the description field were extracted from UNIPROT (Database date: 01-Mar-2013). This database contains entries from SWISSPROT and TREMBL. 31365 entries were found. Each of the sequences was placed in its uniquely named Fasta file. The Xylanase from HyGe329 sequence was placed in a separate file "HyGe329.fasta". The awk script in appendix A was used to invoke the sequence alignment program ClustalW 2.0.10 to align each sequence to Xylanase from HyGe329. A summary file containing the length of each sequence and number of identical residues is also created. From this, the identity percentage to the Xylanase from HyGe329 sequence or the compared toxin sequence is calculated, whichever is longest. This is chosen because the toxin sequences have many different lengths, both much shorter and much longer than the Xylanase from HyGe329 sequence. By always using the longest sequence, artificial high scores from very short or very long toxins are avoided. The largest homology encountered was 16.2%, indicating that the homology to any toxin sequence in this databas is indeed random and very low. The results are shown in appendix B.

2 Allergen analysis of Xylanase from HyGe329

Allergen Databases

The EFSA scientific opinion [1] recommend that searches are done in more than one allergen database, to ensure that as many known allergens as possible are considered. In this case, all available allergen sequences were downloaded from the following databases:

- <http://allergenonline.org>. This is the home page of the The Food Allergy Research and Resource Program (FARRP) allergen protein database. The present report use data downloaded 01-Mar-2013. Appendix D shows a list. A few of the entries were omitted, due to wrong accession codes, unpublished sequences or other errors, see appendix D.1.
- <http://www.allergen.org>. This is the official site for the systematic allergen nomenclature that is approved by the World Health Organization and International Union of Immunological Societies (WHO/IUIS) Allergen Nomenclature Sub-committee. The present report use data downloaded 01-Mar-2013. Appendix E shows a list. A few of the entries were omitted, due to wrong accession codes, unpublished sequences or other errors, see appendix E.1.

Analyses

1. more than 35% identity in the amino acid sequence of the expressed protein (i.e.without the leader sequence, if any), using a window of 80 amino acids and a suitable gap penalty (using Clustal-type alignment programs or equivalent alignment programs). This is one of the recommended test methods of the EFSA scientific opinion [1], and also of the earlier publication from the FAO/WHO Expert group [2]. The queries were done using Fasta 3.4, using the scripts in appendix C
2. same as item 1, but with scaling enabled. In this way, matches with high identity, but over windows shorter than 80 amino acids can be identified. For example a match with 50% identity over 60 amino acids would still have enough identical amino acids to exceed the 35% threshold over 80 amino acids: $60 \cdot 0.50/80 = 0.375 = 37.5\%$.
3. Alignment of Xylanase from HyGe329 to each of the allergens, and identify hits with more than 35% identity over the full length of the alignment. These queries were performed using the global alignment "needle", which is an implementation of the Needleman-Wunsch global alignment algorithm [3] in the program package EMBOSS [4].

The two first are in compliance with the recommendations in the EFSA scientific opinion [1]. The latter adds some more detailed information for hits identified by the two first methods.

Results

Database: allergenonline.org

35% identity over 80 amino acids

The following allergens had one or more matches using the method described in item 1 above (see appendix F for a complete list).

(No hits found)

35% identity over 80 amino acids with scaling

The following allergens had one or more matches using the method described in item 2 above (see appendix F for a complete list).

(No hits found)

Identity over full length

All allergens with more than 10% sequence identity to Xylanase from HyGe329 are shown in appendix F.3. The identities to the allergens identified by the 35% identity over 80 amino acids method are shown below.

(No hits found)

Database: allergen.org

35% identity over 80 amino acids

The following allergens had one or more matches using the method described in item 1 above (see appendix G for a complete list).

(No hits found)

35% identity over 80 amino acids with scaling

The following allergens had one or more matches using the method described in item 2 above (see appendix G for a complete list).

(No hits found)

Identity over full length

All allergens with more than 10% sequence identity to Xylanase from HyGe329 are shown in appendix G.3. The identities to the allergens identified by the 35% identity over 80 amino acids method are shown below.

(No hits found)

Conclusion

No significant homology was found between Xylanase from HyGe329 and any of the allergens in the databases mentioned above.

References

- [1] Scientific opinion on the assessment of allergenicity of GM plants and microorganisms and derived food and feed. EFSA panel on genetically Modified Organisms (GMO panel). European Food Safety Authority (EFSA), Parma 2010. (The document may be downloaded from <http://www.efsa.europa.eu/en/scdocs/scdoc/1700.htm>)
- [2] Evaluation of Allergenicity of Genetically Modified Foods (Report of a Joint FAO/WHO Expert Consultation on Allergenicity of Foods Derived from Biotechnology 22–25 January 2001), Food and Agriculture Organization of the United Nations (FAO), Rome 2001. http://www.who.int/foodsafety/publications/biotech/ec_jan2001/en/
- [3] Needleman, S. B. and Wunsch, C. D. (1970) *J. Mol. Biol.* **48**, p 443-453.
- [4] Rice, P., Longden, I. and Bleasby, A. (2000): "EMBOSS: The European Molecular Biology Open Software Suite" *Trends in Genetics* **16**, No 6. p 276-277

A Scripts for toxin homology search

Awk scripts for alignment of sequences to the Xylanase from HyGe329 sequence and calculation of sequence lengths and identities. First the script used to run the alignments. The script is stored in a file called "runaligns".

```
#!/bin/tcsh
cat NZYM-CE.fasta $1 >tmp.txt
clustalw tmp.txt
grep -v ">" $1 | gawk '{printf "%s",$0} END {printf "\n"}' | wc | \
    gawk '{print $3-1}' > $1.len
cat tmp.aln | gawk '{printf "%s",$0} END {printf "\n"}' | \
    sed 's/[~*]//g' | wc | gawk '{print $3-1}' > $1.idt
echo $1 | gawk '{printf "%s ",$0}' >> summary
cat $1.len $1.idt | gawk '{printf "%s ",$0} END {printf "\n"}' >>summary
mv tmp.aln $1.out
```

Before start, the file "summary" must be deleted. The analysis is automatically done for all .fasta files in the current directory (and subdirectories, if present) by the command:

```
find . -name "*.fasta" -exec runaligns {} \;
```

Afterwards the sequence length and identity information can be found in the file summary. This file is processed through the following Python script, which calculates the percentages as described in the text.

```
#!/usr/bin/python
import string,commands

compare_length = 407
data = []

f = open ("summary","r")

buffer = "XX"
i=0

while buffer != "":
    buffer = f.readline()
    if buffer != "":
        data.append(string.split(buffer))
        data[i][1] = int(data[i][1])
        data[i][2] = int(data[i][2])

        i = i+1
f.close()
```

```

for i in range(len(data)):
    fullname = commands.getoutput("grep "+string.upper(data[i][0][2:-6])+" description.txt")
    percentid = 100.0*float(data[i][2])/float(max(data[i][1],compare_length))
    if (percentid >= 10.0):
        printlist = [data[i][0][2:-6], data[i][1], data[i][2], \
                      percentid, \
                      fullname[18:83] ]
        print '%-13s %4d %4d %5.1f    %-60s' % tuple(printlist)

```

B Toxin homology results

UNIPROT entries, that contain the word "toxin", but not "fragment" in the description field and their identity to Xylanase from HyGe329. The columns are

1. sequence database accession number
2. sequence length
3. number of identical residues after alignment to Xylanase from HyGe329
4. percent identity compared to Xylanase from HyGe329 or the sequence, whichever is longest.
5. sequence description

Matches $\geq 10\%$ are shown

j71fa8	378	66	16.2	SubName: Full=Zeta toxin family protein;
f0md38	332	64	15.7	SubName: Full=RTX prokaryotic toxin family protein;
a2qkr3	364	63	15.5	SubName: Full=Function: TOXF is specifically required for HC...
f0bkg7	388	62	15.2	SubName: Full=Zonular occludens toxin (Zot);
q46150	398	61	15.0	RecName: Full=Phospholipase C; Short=PLC; EC=3.1.4.3; AltNam...
f7r1e6	363	61	15.0	SubName: Full=Putative toxin regulator;
d2yuv6	399	61	15.0	SubName: Full=Zona occludens toxin;
c2jin8	399	61	15.0	SubName: Full=Zona occludens toxin;
a0pxh4	398	61	15.0	SubName: Full=Phospholipase C (PLC) (Phosphatidylcholinechol...
q2k6y0	538	79	14.7	SubName: Full=Putative RTX toxin hemolysin-type protein;
j4w6u7	390	60	14.7	SubName: Full=Cercosporin toxin biosynthesis protein;
h6nfn9	350	60	14.7	SubName: Full=RTX toxins and-related Ca ²⁺ -binding protein;
h1xn55	387	60	14.7	SubName: Full=Zonular occludens toxin family protein;
f3pyd8	277	60	14.7	SubName: Full=Toxin-antitoxin system, toxin component, Fic d...
e4lr34	348	60	14.7	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
c7gfd7	337	60	14.7	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
j1wzg8	394	59	14.5	SubName: Full=Zona occludens toxin;
f5t8d8	345	59	14.5	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
f4dvq4	386	59	14.5	SubName: Full=Zonular occludens toxin;
f3xwr9	344	59	14.5	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
f3pdy3	375	59	14.5	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
f0n891	367	59	14.5	SubName: Full=Zonula occludens toxin family protein;
f0n116	332	59	14.5	SubName: Full=RTX prokaryotic toxin family protein;
f0mxy3	332	59	14.5	SubName: Full=RTX prokaryotic toxin family protein;
e6n078	362	59	14.5	SubName: Full=Zonular occludens toxin (Zot) family protein;
e0e4e2	379	59	14.5	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
c2vlx5	382	59	14.5	SubName: Full=41.9 kDa insecticidal toxin;
c2v4w1	382	59	14.5	SubName: Full=41.9 kDa insecticidal toxin;
c2u6f0	382	59	14.5	SubName: Full=41.9 kDa insecticidal toxin;
b5gie6	371	59	14.5	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
a1c8i9	326	59	14.5	SubName: Full=Toxin biosynthesis proten (Fum3), putative;
q8gcy3	398	58	14.3	SubName: Full=Alpha-toxin; Flags: Precursor;
q45471	336	58	14.3	SubName: Full=35.8-kilodalton mosquitocidal toxin;
p38442	399	58	14.3	RecName: Full=Zona occludens toxin; AltName: Full=Zonular oc...

k5v0r8	399	58	14.3	SubName: Full=Zona occludens toxin;
k5u1t5	470	67	14.3	SubName: Full=Zonular occludens toxin family protein;
k5tc08	399	58	14.3	SubName: Full=Zona occludens toxin;
k5rr19	399	58	14.3	SubName: Full=Zona occludens toxin;
k5rfj5	399	58	14.3	SubName: Full=Zona occludens toxin;
k5nn81	399	58	14.3	SubName: Full=Zonular occludens toxin family protein;
k5mms3	399	58	14.3	SubName: Full=Zonular occludens toxin family protein;
k5l4a5	399	58	14.3	SubName: Full=Zonular occludens toxin family protein;
k5k6t5	399	58	14.3	SubName: Full=Zonular occludens toxin family protein;
k5ixx9	399	58	14.3	SubName: Full=Zonular occludens toxin family protein;
k2xbm5	399	58	14.3	SubName: Full=Zona occludens toxin;
k2wjs6	399	58	14.3	SubName: Full=Zona occludens toxin;
k2vve1	399	58	14.3	SubName: Full=Zona occludens toxin;
k2vul8	399	58	14.3	SubName: Full=Zona occludens toxin;
k2v0z9	399	58	14.3	SubName: Full=Zona occludens toxin;
k2tr04	399	58	14.3	SubName: Full=Zona occludens toxin;
j1zv88	399	58	14.3	SubName: Full=Zona occludens toxin;
j1zle2	399	58	14.3	SubName: Full=Zona occludens toxin;
j1z1q3	399	58	14.3	SubName: Full=Zona occludens toxin;
j1xk23	399	58	14.3	SubName: Full=Zona occludens toxin;
j1w2c0	399	58	14.3	SubName: Full=Zona occludens toxin;
j1vrt1	399	58	14.3	SubName: Full=Zona occludens toxin;
j1gb65	399	58	14.3	SubName: Full=Zona occludens toxin;
j1f2i1	399	58	14.3	SubName: Full=Zona occludens toxin;
j1ezz9	399	58	14.3	SubName: Full=Zona occludens toxin;
j1e7j9	399	58	14.3	SubName: Full=Zona occludens toxin;
j1d007	399	58	14.3	SubName: Full=Zona occludens toxin;
j1c0f3	399	58	14.3	SubName: Full=Zona occludens toxin;
i7c513	326	58	14.3	SubName: Full=Zeta toxin family protein;
i2e2g0	370	58	14.3	SubName: Full=Binary toxin A;
h8jy65	399	58	14.3	SubName: Full=Zona occludens toxin;
h6llq3	338	58	14.3	SubName: Full=Leukocidin/hemolysin toxin family protein;
h1tpe4	281	58	14.3	SubName: Full=Exfoliative toxin B; EC=3.4.21.-;
h0udj3	337	58	14.3	SubName: Full=Clostridium epsilon toxin ETX/Bacillus mosquit...
h0sgy7	582	83	14.3	SubName: Full=Putative secretion ATP-binding protein (ABC-ty...
g8v567	281	58	14.3	SubName: Full=Exfoliative toxin B; EC=3.4.21.-;
g7trb1	399	58	14.3	SubName: Full=Zona occludens toxin;
g7c6f0	399	58	14.3	SubName: Full=Zona occludens toxin;
g7bwa1	399	58	14.3	SubName: Full=Zona occludens toxin;
g7bi98	399	58	14.3	SubName: Full=Zona occludens toxin;
g7b7f9	399	58	14.3	SubName: Full=Zona occludens toxin;
g7awx2	399	58	14.3	SubName: Full=Zona occludens toxin;
g7ane1	399	58	14.3	SubName: Full=Zona occludens toxin;
g7aa78	399	58	14.3	SubName: Full=Zona occludens toxin;
g7a313	399	58	14.3	SubName: Full=Zona occludens toxin;
g6zsi4	399	58	14.3	SubName: Full=Zona occludens toxin;
g6zey7	399	58	14.3	SubName: Full=Zona occludens toxin;
g6z6f5	399	58	14.3	SubName: Full=Zona occludens toxin;
g4tbn7	433	62	14.3	SubName: Full=Related to MAK11 protein (Maintenance of kille...
f9c6w1	399	58	14.3	SubName: Full=Zona occludens toxin;
f9bba4	399	58	14.3	SubName: Full=Zona occludens toxin;
f9a2q5	399	58	14.3	SubName: Full=Zona occludens toxin;
f8zvp3	399	58	14.3	SubName: Full=Zona occludens toxin;
f8zjv5	399	58	14.3	SubName: Full=Zona occludens toxin;
f8z9f3	399	58	14.3	SubName: Full=Zona occludens toxin;
f8yys9	399	58	14.3	SubName: Full=Zona occludens toxin;
f6av87	454	65	14.3	SubName: Full=Zonular occludens toxin;
f3liq7	398	58	14.3	SubName: Full=RTX toxin;

f1w3e5	426	61	14.3	SubName: Full=RTX toxins and Ca2+-binding proteins-like prot...
e6mzi2	332	58	14.3	SubName: Full=RTX family exoprotein; SubName: Full=RTX proka...
d9rni6	338	58	14.3	SubName: Full=Leukocidin/hemolysin toxin family protein;
d6jk12	395	58	14.3	SubName: Full=Zona occludens toxin;
d5hes4	363	58	14.3	SubName: Full=Predicted membrane protein, putative toxin reg...
d0hix7	399	58	14.3	SubName: Full=Zona occludens toxin;
d0h7l2	399	58	14.3	SubName: Full=Zona occludens toxin;
c9e7d1	399	58	14.3	SubName: Full=Zonula occludens toxin; SubName: Full=Zot;
c8ld31	338	58	14.3	SubName: Full=Leukocidin/hemolysin toxin family protein;
c6yc26	399	58	14.3	SubName: Full=Zona occludens toxin;
c6rzf9	399	58	14.3	SubName: Full=Zona occludens toxin;
c5rb87	362	58	14.3	SubName: Full=Possible toxin regulator;
c3nx65	399	58	14.3	SubName: Full=Zona occludens toxin;
c2iib8	399	58	14.3	SubName: Full=Zona occludens toxin;
a8zrf3	333	58	14.3	SubName: Full=ATPase, Zeta toxin;
a6qil7	338	58	14.3	SubName: Full=Leukocidin/hemolysin toxin family F subunit;
a5vxx3	326	58	14.3	SubName: Full=Zeta toxin family protein;
a5f097	399	58	14.3	SubName: Full=Zona occludens toxin;
a3h3z5	399	58	14.3	SubName: Full=Zona occludens toxin;
a1et22	399	58	14.3	SubName: Full=Zona occludens toxin;
d7j6t4	429	61	14.2	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
a5ejn8	583	83	14.2	SubName: Full=Putative toxin/protease secretion system;
a3rxj6	424	60	14.2	SubName: Full=Possible Zonular occludens toxin (Zot);
j9y368	474	67	14.1	SubName: Full=RTX toxin;
i0bjc0	461	65	14.1	SubName: Full=RTX toxins and-related Ca2+-binding protein;
h6nhx5	461	65	14.1	SubName: Full=RTX toxins and-related Ca2+-binding protein;
q9cra0	300	57	14.0	RecName: Full=Ecto-ADP-ribosyltransferase 4; EC=2.4.2.31; Al...
q838u8	487	68	14.0	RecName: Full=NAD(+)--arginine ADP-ribosyltransferase EFV; E...
j9w150	362	57	14.0	SubName: Full=Putative toxin regulator;
i7l927	280	57	14.0	SubName: Full=Toxin secretion/phage lysis holin;
i0bni4	456	64	14.0	SubName: Full=RTX toxins and-related Ca2+-binding protein;
f9ry20	379	57	14.0	SubName: Full=Zonular occludens toxin;
f4fx55	362	57	14.0	SubName: Full=Putative toxin regulator;
f4fi70	342	57	14.0	SubName: Full=Zeta toxin family protein;
f4dmy3	386	57	14.0	SubName: Full=Zonular occludens toxin;
e4rfu1	326	57	14.0	SubName: Full=Zeta toxin family protein;
e4lqr6	323	57	14.0	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d7j307	367	57	14.0	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d7ip50	334	57	14.0	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d7hjn8	399	57	14.0	SubName: Full=Zona occludens toxin;
d3huw1	327	57	14.0	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d2up08	351	57	14.0	SubName: Full=Leukocidin/hemolysin toxin subunit S;
d0cux1	480	67	14.0	SubName: Full=Putative RTX toxins and related Ca2+-binding p...
a0yr49	260	57	14.0	SubName: Full=Hemolysin-type calcium-binding toxin;
i3tk64	524	73	13.9	SubName: Full=Rhizobiocin/RTX toxin and hemolysin-type calci...
h0ta22	584	81	13.9	SubName: Full=Putative secretion ATP-binding protein (ABC-ty...
f8fb41	461	64	13.9	SubName: Full=RTX toxins and related Ca2+-binding protein;
d2tws1	483	67	13.9	SubName: Full=Insecticidal toxin complex protein;
q9rf12	398	56	13.8	RecName: Full=Phospholipase C; Short=PLC; EC=3.1.4.3; AltNam...
q9f5r1	277	56	13.8	SubName: Full=Toxin co-regulated pilus virulence regulatory ...
q45871	293	56	13.8	SubName: Full=HA-33; SubName: Full=HA-33 protein; SubName: F...
p17981	287	56	13.8	RecName: Full=T-cell ecto-ADP-ribosyltransferase 1; EC=2.4.2...
k1wrt5	501	69	13.8	SubName: Full=Toxin biosynthesis cytochrome P450 monooxygena...
k0fzn9	369	56	13.8	SubName: Full=41.9 kDa insecticidal toxin;
j8ycz5	395	56	13.8	SubName: Full=Zonula occludens toxin family protein;
j8wmk0	395	56	13.8	SubName: Full=Zonula occludens toxin family protein;
j5skz9	304	56	13.8	SubName: Full=Zeta toxin family protein;
j5hu61	327	56	13.8	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...

g7xke4	419	58	13.8	SubName: Full=Toxin biosynthesis protein Tri7-like;
g7htu9	449	62	13.8	SubName: Full=RTX toxins and related Ca2+-binding proteins;
f2f0u1	342	56	13.8	SubName: Full=Predicted membrane protein, putative toxin reg...
f0adp0	390	56	13.8	SubName: Full=Zonula occludens toxin family protein;
e0n6u2	395	56	13.8	SubName: Full=Zonula occludens toxin family protein;
d5u624	294	56	13.8	SubName: Full=Toxin A; Flags: Precursor;
d3hzb6	380	56	13.8	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d0hix9	336	56	13.8	SubName: Full=General secretion pathway protein K (Cholera t...
c8mil5	338	56	13.8	SubName: Full=Leukocidin/Hemolysin toxin family protein;
c2c6g7	464	64	13.8	SubName: Full=Zona occludens toxin;
b8cp63	382	56	13.8	SubName: Full=Zonular occludens toxin;
b7wx60	388	56	13.8	SubName: Full=Zonular occludens toxin;
h8gqk8	460	63	13.7	SubName: Full=Zonula occludens toxin;
h0rpv6	583	80	13.7	SubName: Full=Putative secretion ATP-binding protein (ABC-ty...
h0ewe5	548	75	13.7	SubName: Full=Putative HC-toxin efflux carrier TOXA;
e2xk00	459	63	13.7	SubName: Full=Type I toxin efflux ATP-binding protein; EC=3....
a4yuz6	584	80	13.7	SubName: Full=Putative secretion ATP-binding protein (ABC-ty...
g7xud1	464	63	13.6	SubName: Full=Toxin biosynthesis protein;
c8nb73	425	58	13.6	SubName: Full=HipA family toxin-antitoxin system, toxin comp...
c2i0g6	464	63	13.6	SubName: Full=Zona occludens toxin;
q9f5q9	277	55	13.5	SubName: Full=Toxin co-regulated pilus virulence regulatory ...
q7x7u5	338	55	13.5	SubName: Full=Os07g0601000 protein; SubName: Full=Putative N...
q5hei1	330	55	13.5	RecName: Full=Phospholipase C; EC=3.1.4.3; AltName: Full=Bet...
q4fqb6	364	55	13.5	SubName: Full=Probable toxin regulator pfoR;
q2fwp1	330	55	13.5	RecName: Full=Phospholipase C; EC=3.1.4.3; AltName: Full=Bet...
q18801	399	55	13.5	RecName: Full=GDP-mannose 4,6 dehydratase 1; EC=4.2.1.47; Al...
p0c216	398	55	13.5	RecName: Full=Phospholipase C; Short=PLC; EC=3.1.4.3; AltNam...
p09978	330	55	13.5	RecName: Full=Phospholipase C; EC=3.1.4.3; AltName: Full=Bet...
o94089	398	55	13.5	SubName: Full=T-2 toxin biosynthesis protein;
o49166	356	55	13.5	SubName: Full=NADPH HC toxin reductase;
k4zpc0	364	55	13.5	SubName: Full=Putative mosquitocidal toxin;
i8uhe5	332	55	13.5	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
i8f5g3	308	55	13.5	SubName: Full=Zonular occludens toxin family protein;
f9vcs8	644	87	13.5	SubName: Full=RTX toxins and related Ca2+-binding protein;
f9v7s1	644	87	13.5	SubName: Full=RTX toxins and related Ca2+-binding protein;
f0h6f2	334	55	13.5	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
e9fjv7	381	55	13.5	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e4jf34	381	55	13.5	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e4jcv4	381	55	13.5	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e4iwm0	381	55	13.5	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e4il28	381	55	13.5	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e4i6r2	381	55	13.5	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
d9xl90	289	55	13.5	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d4xjp9	422	57	13.5	SubName: Full=HipA family toxin-antitoxin system;
d0gx15	336	55	13.5	SubName: Full=General secretion pathway protein K (Cholera t...
c5fqt0	414	56	13.5	SubName: Full=Cercosporin toxin biosynthesis protein;
c2gsj2	393	55	13.5	SubName: Full=Membrane protein toxin regulator family protei...
c0yyk0	393	55	13.5	SubName: Full=Membrane protein toxin regulator family protei...
b6vnm8	336	55	13.5	SubName: Full=Putative Insecticidal toxin;
a1w3y8	400	55	13.5	SubName: Full=Zonular occludens toxin;
q6ueh3	514	69	13.4	SubName: Full=Potential toxin transporter;
k8wct9	439	59	13.4	SubName: Full=RTX toxin transporter;
j0krr8	485	65	13.4	SubName: Full=Vacuolating toxin;
h1xmv3	531	71	13.4	SubName: Full=Toxin RTX-I translocation ATP-binding protein;...
g8tev8	462	62	13.4	SubName: Full=Binary exotoxin B/Anthrax toxin B moiety prote...
e9f8n5	545	73	13.4	SubName: Full=Insecticidal toxin complex protein;
e0msi4	508	68	13.4	SubName: Full=Rhizobiocin/RTX toxin and hemolysin-type calci...
b5sab6	449	60	13.4	SubName: Full=Probable hemolysin-type calcium-binding protei...

a3rpd0	449	60	13.4	SubName: Full=Hemolysin-type Calcium-binding protein-RTX tox...
a2pc75	456	61	13.4	SubName: Full=Zonular occludens toxin (Zot) family;
q8rsx9	234	54	13.3	SubName: Full=Toxic shock syndrome toxin-1;
q8gax8	281	54	13.3	SubName: Full=Exfoliative toxin D;
q7bgc7	430	57	13.3	SubName: Full=Toxin-coregulated pilus biosynthesis protein B...
q5pxe6	398	54	13.3	SubName: Full=Alpha toxin;
q0tv31	398	54	13.3	RecName: Full=Phospholipase C; Short=PLC; EC=3.1.4.3; AltNam...
p93188	362	54	13.3	SubName: Full=NADPH-dependent HC-toxin reductase;
p23476	430	57	13.3	RecName: Full=Toxin coregulated pilus biosynthesis protein B...
k7yxd6	405	54	13.3	SubName: Full=Toxin module HipA, protein kinase of phosphati...
k6byv1	396	54	13.3	SubName: Full=Putative insecticidal toxin complex;
k5ufs1	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
k5tt93	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
k5rue5	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
k5rl60	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
k2xfv2	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
k2ws12	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
k2vv33	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
k2v996	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
k2tnx5	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
k2t483	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
j2z5v8	362	54	13.3	SubName: Full=Putative toxin regulator;
j1zrq8	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
j1x0a7	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
j1w143	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
j1vsq1	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
j1puj4	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
j1pqs7	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
j1ld75	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
j1gy49	332	54	13.3	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
j1fsj4	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
j1f8c0	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
j1f470	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
j1e839	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
j1dq13	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
j1cyg9	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
j1c1p7	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
i0tw91	238	54	13.3	SubName: Full=Toxin, beta-grasp domain protein;
h8nty1	321	54	13.3	SubName: Full=Insecticidal toxin complex protein TcaC;
h8jv56	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
h8hdq3	352	54	13.3	SubName: Full=Putative toxin regulator;
h8ha28	352	54	13.3	SubName: Full=Putative toxin regulator;
h4y0r7	345	54	13.3	SubName: Full=Zonular occludens toxin family protein;
h4rsk5	435	58	13.3	SubName: Full=Toxin B domain protein;
h4hfc8	238	54	13.3	SubName: Full=Beta-grasp domain toxin protein;
h4h2k6	234	54	13.3	SubName: Full=Toxic shock syndrome toxin-1;
h4gti1	234	54	13.3	SubName: Full=Toxic shock syndrome toxin-1;
h4en47	238	54	13.3	SubName: Full=Beta-grasp domain toxin protein;
h4e1w0	234	54	13.3	SubName: Full=Toxic shock syndrome toxin-1;
h4ds00	238	54	13.3	SubName: Full=Beta-grasp domain toxin protein;
h4dkt2	234	54	13.3	SubName: Full=Toxic shock syndrome toxin-1;
h4d9g9	238	54	13.3	SubName: Full=Beta-grasp domain toxin protein;
h4csq3	234	54	13.3	SubName: Full=Toxic shock syndrome toxin-1;
h4c3t0	234	54	13.3	SubName: Full=Toxic shock syndrome toxin-1;
h4bpq5	238	54	13.3	SubName: Full=Toxin beta-grasp domain protein;
h4bjg4	234	54	13.3	SubName: Full=Toxic shock syndrome toxin-1;
h4b0z8	238	54	13.3	SubName: Full=Beta-grasp domain toxin protein;
h4atj1	238	54	13.3	SubName: Full=Beta-grasp domain toxin protein;

h4ake8	238	54	13.3	SubName: Full=Beta-grasp domain toxin protein;
h4ac74	238	54	13.3	SubName: Full=Beta-grasp domain toxin protein;
h3z1v8	238	54	13.3	SubName: Full=Toxin, beta-grasp domain protein;
h3ye85	238	54	13.3	SubName: Full=Toxin, beta-grasp domain protein;
h3x2j6	238	54	13.3	SubName: Full=Toxin, beta-grasp domain protein;
h3trj1	234	54	13.3	SubName: Full=Toxin, OB domain protein;
h3s8l9	234	54	13.3	SubName: Full=Toxic shock syndrome toxin-1;
h3rr67	376	54	13.3	SubName: Full=Putative toxin regulator;
h1tdt1	238	54	13.3	SubName: Full=Toxin, beta-grasp domain protein;
h1t3d1	234	54	13.3	SubName: Full=Toxin, OB domain protein;
h0ezn4	358	54	13.3	SubName: Full=Putative HC-toxin efflux carrier TOXA;
g7tmz5	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
g7cue8	459	61	13.3	SubName: Full=RTX toxin-like protein;
g7c4v0	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
g7bu97	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
g7bgk3	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
g7b5r1	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
g7av68	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
g7aln7	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
g7aai9	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
g7a1b3	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
g6zqt1	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
g6zd82	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
g6z4p9	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
f9k446	238	54	13.3	SubName: Full=Toxin, beta-grasp domain protein;
f9f0g5	391	54	13.3	SubName: Full=Zonula occludens toxin family protein;
f9c557	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
f9b8r9	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
f9a320	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
f8zty6	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
f8zj39	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
f8z7q1	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
f8yws1	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
f7z6i4	392	54	13.3	SubName: Full=Membrane protein putative toxin regulator-like...
f5wj49	238	54	13.3	SubName: Full=Toxin, beta-grasp domain protein;
f5w4w9	281	54	13.3	SubName: Full=Exfoliative toxin B; EC=3.4.21.-;
f3ta38	238	54	13.3	SubName: Full=Toxin, beta-grasp domain protein;
e9uxg6	283	54	13.3	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
e7nci5	430	57	13.3	SubName: Full=Toxin-antitoxin system, toxin component, GNAT ...
e5thn5	234	54	13.3	SubName: Full=Toxic shock syndrome toxin-1;
e5ray2	238	54	13.3	SubName: Full=Staphylococcal/Streptococcal toxin, beta-grasp...
e1sqk4	415	55	13.3	SubName: Full=Toxin secretion, membrane fusion protein;
d7hlb3	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
d6lzm4	234	54	13.3	SubName: Full=Toxic shock syndrome toxin-1;
d6ka78	288	54	13.3	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d6k088	406	54	13.3	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d6hlt6	264	54	13.3	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
d4s1m0	316	54	13.3	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d2utw0	234	54	13.3	SubName: Full=Toxic shock syndrome toxin-1 (TSST-1);
d2gtd1	234	54	13.3	SubName: Full=Toxic shock syndrome toxin-1 (TSST-1);
d2ghu7	234	54	13.3	SubName: Full=Toxic shock syndrome toxin-1;
d1vzv1	340	54	13.3	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d0hrr4	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
c9l9c8	376	54	13.3	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
c8t6s0	268	54	13.3	SubName: Full=Xre family toxin-antitoxin system;
c8mig8	238	54	13.3	SubName: Full=Toxin beta-grasp domain-containing protein;
c8l4c6	238	54	13.3	SubName: Full=Toxin beta-grasp domain-containing protein;
c6yev6	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...

c6rw10	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
c5jx93	301	54	13.3	SubName: Full=Toxin biosynthesis protein;
c3nt69	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
c3lt80	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
c2igm6	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
b7tgy9	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
b7tgx9	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
b7tgx4	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
b7tgw4	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
b1hq61	337	54	13.3	SubName: Full=Hypothetical Mtx2/3 toxin-like protein;
b0y2h3	247	54	13.3	SubName: Full=Toxin biosynthesis ketoreductase, putative;
a6u0y5	238	54	13.3	SubName: Full=Toxin beta-grasp domain protein; Flags: Precur...
a5is51	238	54	13.3	SubName: Full=Toxin, beta-grasp domain protein; Flags: Precu...
a3gyr6	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
a3gme2	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
a1f0y4	430	57	13.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
q7vsx8	463	61	13.2	RecName: Full=Type IV secretion system protein PtlD; AltName...
q46220	454	60	13.2	SubName: Full=Iota toxin component Ia; Flags: Precursor;
k6bz31	455	60	13.2	SubName: Full=Putative insecticidal toxin complex;
k2vhu7	456	60	13.2	SubName: Full=Zonular occludens toxin family protein;
k0fzv0	515	68	13.2	SubName: Full=Mosquitocidal toxin protein;
j1ebz0	456	60	13.2	SubName: Full=Zonular occludens toxin family protein;
f7j0a4	454	60	13.2	SubName: Full=Iota toxin component Ia;
b1bsy1	454	60	13.2	SubName: Full=Iota toxin component Ia;
a4sli3	461	61	13.2	SubName: Full=RTX toxin-like protein;
a2ppc2	456	60	13.2	SubName: Full=Zonular occludens toxin (Zot) family;
a1tpt9	453	60	13.2	SubName: Full=Zonular occludens toxin;
j3kpy9	411	54	13.1	SubName: Full=Anthrax toxin receptor 2;
h6nka0	457	60	13.1	SubName: Full=RTX toxins and-related Ca2+-binding protein;
f8fia0	457	60	13.1	SubName: Full=RTX toxins and related Ca2+-binding protein;
e1kph0	412	54	13.1	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
c1fuh3	490	64	13.1	SubName: Full=Toxin complex component ORF-X3;
b3h1n0	579	76	13.1	SubName: Full=RTX toxin protein;
a3upb9	413	54	13.1	SubName: Full=Toxin secretion, membrane fusion protein;
q9f5r3	349	53	13.0	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
q9agx1	430	56	13.0	SubName: Full=Toxin-coregulated pilus biosynthesis protein B...
q589w8	296	53	13.0	SubName: Full=HMG-CoA hydrolase for ACT-toxin synthesis;
q41867	357	53	13.0	SubName: Full=NADPH HC-toxin reductase;
p45782	407	53	13.0	RecName: Full=Type II secretion system protein L; Short=T2SS...
p45780	406	53	13.0	RecName: Full=Type II secretion system protein F; Short=T2SS...
o49165	356	53	13.0	SubName: Full=NADPH HC toxin reductase;
o49164	356	53	13.0	SubName: Full=NADPH HC toxin reductase;
k8x392	401	53	13.0	SubName: Full=Toxin XaxA;
k4z9z7	301	53	13.0	SubName: Full=Insecticidal toxin complex protein;
k2t132	349	53	13.0	SubName: Full=Putative insecticidal toxin complex;
k0jjm0	280	53	13.0	SubName: Full=Toxin A;
j3fv33	302	53	13.0	SubName: Full=Zeta toxin;
i2yub1	384	53	13.0	SubName: Full=Cytolethal distending toxin A/C family;
i2jal3	352	53	13.0	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
i2fge6	241	53	13.0	SubName: Full=Toxic shock syndrome toxin-1;
i0xer3	238	53	13.0	SubName: Full=Toxin, beta-grasp domain protein;
h4rsk0	389	53	13.0	SubName: Full=Toxin B domain protein;
h4mnz8	389	53	13.0	SubName: Full=Toxin B domain protein;
h4ggv9	238	53	13.0	SubName: Full=Toxin, beta-grasp domain protein;
h4g0i6	238	53	13.0	SubName: Full=Toxin, beta-grasp domain protein;
h4edl9	238	53	13.0	SubName: Full=Beta-grasp domain toxin protein;
h4e6m4	238	53	13.0	SubName: Full=Beta-grasp domain toxin protein;
h4d384	238	53	13.0	SubName: Full=Beta-grasp domain toxin protein;

h4c168	238	53	13.0	SubName: Full=Beta-grasp domain toxin protein;
h4ccq7	238	53	13.0	SubName: Full=Beta-grasp domain toxin protein;
h4a408	238	53	13.0	SubName: Full=Beta-grasp domain toxin protein;
h3zzu8	238	53	13.0	SubName: Full=Toxin, beta-grasp domain protein;
h3ysn7	238	53	13.0	SubName: Full=Toxin, beta-grasp domain protein;
h3xz96	238	53	13.0	SubName: Full=Toxin, beta-grasp domain protein;
h3xtx8	238	53	13.0	SubName: Full=Toxin, beta-grasp domain protein;
h3xif0	238	53	13.0	SubName: Full=Toxin, beta-grasp domain protein;
h3xfi2	238	53	13.0	SubName: Full=Toxin, beta-grasp domain protein;
h3txh8	238	53	13.0	SubName: Full=Toxin, beta-grasp domain protein;
h3rx37	238	53	13.0	SubName: Full=Beta-grasp domain toxin protein;
h1ttv3	238	53	13.0	SubName: Full=Toxin, beta-grasp domain protein;
h1tik9	238	53	13.0	SubName: Full=Toxin, beta-grasp domain protein;
h0dc34	238	53	13.0	SubName: Full=Toxin, beta-grasp domain protein;
h0d2b7	238	53	13.0	SubName: Full=Toxin, beta-grasp domain protein;
h0cxm9	238	53	13.0	SubName: Full=Toxin, beta-grasp domain protein;
h0c138	238	53	13.0	SubName: Full=Toxin, beta-grasp domain protein;
h0b1v4	238	53	13.0	SubName: Full=Toxin, beta-grasp domain protein;
h0a1l7	238	53	13.0	SubName: Full=Toxin, beta-grasp domain protein;
g8v184	238	53	13.0	SubName: Full=Toxin, beta-grasp domain protein;
g5k6i5	357	53	13.0	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
g0ugk2	382	53	13.0	SubName: Full=Membrane protein, toxin regulator;
g0slx1	430	56	13.0	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
f9zv55	404	53	13.0	SubName: Full=Zonular occludens toxin;
f9p4y7	331	53	13.0	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
f9kl63	238	53	13.0	SubName: Full=Toxin, beta-grasp domain protein;
f5w6u6	238	53	13.0	SubName: Full=Toxin, beta-grasp domain protein;
f3tn09	238	53	13.0	SubName: Full=Toxin, beta-grasp domain protein;
f3t4e8	238	53	13.0	SubName: Full=Toxin, beta-grasp domain protein;
e9tnx7	364	53	13.0	SubName: Full=Zonula occludens toxin;
e7jhy0	384	53	13.0	SubName: Full=Cytolethal distending toxin A/C family protein...
d9wsz1	314	53	13.0	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d8iim5	373	53	13.0	SubName: Full=Possible toxin regulator;
d8bb65	364	53	13.0	SubName: Full=Zonula occludens toxin;
d6sew7	241	53	13.0	SubName: Full=Toxic shock syndrome toxin-1;
d6e8z1	265	53	13.0	SubName: Full=Zeta toxin;
d4s305	361	53	13.0	SubName: Full=Putative toxin regulator PfoR;
d4ltx2	378	53	13.0	SubName: Full=Predicted membrane protein, putative toxin reg...
d2yk16	430	56	13.0	SubName: Full=Toxin coregulated pilus biosynthesis protein B...
d2qan2	382	53	13.0	SubName: Full=Antitoxin/toxin system zeta toxin;
d0z4z3	514	67	13.0	SubName: Full=ADP-ribosyltransferase toxin aexT (Exoenzyme T...
d0h651	430	56	13.0	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
c9mz30	356	53	13.0	SubName: Full=Toxin-antitoxin system, antitoxin component, X...
c5f0g4	251	53	13.0	SubName: Full=Cytolethal distending toxin B;
b9juu4	301	53	13.0	SubName: Full=Rhizobiocin/RTX toxin;
b7tgz8	226	53	13.0	SubName: Full=Toxin co-regulated pilin;
b7tgz4	430	56	13.0	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
b7tgy4	430	56	13.0	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
b5qj85	316	53	13.0	SubName: Full=Putative toxin-like outer membrane protein;
b3hxx8	364	53	13.0	SubName: Full=Putative uncharacterized protein; SubName: Ful...
b3g4c5	333	53	13.0	SubName: Full=RTX toxin-like protein;
b2za57	226	53	13.0	SubName: Full=Toxin-coregulated pilin;
b1v2y2	398	53	13.0	SubName: Full=Phospholipase C (PLC) (Phosphatidylcholinechol...
a5whz5	364	53	13.0	SubName: Full=Membrane protein putative toxin regulator-like...
a5f393	430	56	13.0	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
a3s9h7	438	57	13.0	SubName: Full=Putative toxin secretion transmembrane protein...
a3eic8	430	56	13.0	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
a1eic4	430	56	13.0	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...

q5ek40	666	86	12.9	RecName: Full=Cholix toxin; EC=2.4.2.36; AltName: Full=Exoto...
k5p9a6	458	59	12.9	SubName: Full=Zonular occludens toxin family protein;
k5ndf8	458	59	12.9	SubName: Full=Zonular occludens toxin family protein;
g8pyp3	433	56	12.9	SubName: Full=RTX toxins-related Ca2+-binding protein;
g4iut6	457	59	12.9	SubName: Full=Cholera toxin secretion EpsM protein;
f1yr32	487	63	12.9	SubName: Full=RTX-III toxin determinant D;
c6bnq7	448	58	12.9	SubName: Full=Zonular occludens toxin;
b1nya1	450	58	12.9	SubName: Full=RTX toxin ABC transporter;
a6xv06	456	59	12.9	SubName: Full=Zonula occludens toxin;
a6a644	456	59	12.9	SubName: Full=Zonular occludens toxin (Zot) family;
q9gum2	383	52	12.8	RecName: Full=Beta-1,4-N-acetylgalactosaminyltransferase bre...
q93nb5	354	52	12.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
q67uq2	358	52	12.8	SubName: Full=Os06g0651100 protein; SubName: Full=Putative N...
q48i06	438	56	12.8	SubName: Full=Zona occludens toxin, putative;
q45422	292	52	12.8	SubName: Full=Mosquitocidal toxin;
q3izg0	578	74	12.8	SubName: Full=ABC protein toxin exporter, fused ATPase and i...
q3iyt6	437	56	12.8	SubName: Full=Hemolysin-type calcium-binding region; RTX tox...
q3hr45	398	52	12.8	SubName: Full=Alpha toxin;
q306l0	335	52	12.8	SubName: Full=40kDa insecticidal toxin;
q306k9	335	52	12.8	SubName: Full=40kDa insecticidal toxin;
q306k8	335	52	12.8	SubName: Full=40kDa insecticidal toxin;
q1q8i9	364	52	12.8	SubName: Full=Putative toxin regulator PfoR;
q0vc22	316	52	12.8	RecName: Full=Ecto-ADP-ribosyltransferase 5; EC=2.4.2.31; Al...
q01498	491	63	12.8	SubName: Full=NRRL Y-18665 plasmid pPac1-2 killer toxin; Sub...
k2rj98	341	52	12.8	SubName: Full=Toxin biosynthesis protein;
k1kta6	593	76	12.8	SubName: Full=RTX-I toxin determinant B;
j9uvvg6	280	52	12.8	SubName: Full=Toxin A;
j3p3w0	392	52	12.8	SubName: Full=Uncharacterized protein; SubName: Full=Zeta to...
i6y0k5	337	52	12.8	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
i0uvs5	366	52	12.8	SubName: Full=Zeta toxin;
h4w9t7	374	52	12.8	SubName: Full=Zonular occludens toxin family protein;
h4h614	238	52	12.8	SubName: Full=Beta-grasp domain toxin protein;
h4evy3	238	52	12.8	SubName: Full=Beta-grasp domain toxin protein;
g7zcp8	273	52	12.8	SubName: Full=Putative Hemolysin-type calcium-binding RTX to...
g0ep51	294	52	12.8	SubName: Full=Toxin A;
f9sav3	343	52	12.8	SubName: Full=Zonular occludens toxin;
f9ks20	238	52	12.8	SubName: Full=Toxin, beta-grasp domain protein;
f51lp8	339	52	12.8	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
f3xqr7	341	52	12.8	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
f3pyj4	271	52	12.8	SubName: Full=Toxin-antitoxin system, toxin component, Fic d...
f2zal5	317	52	12.8	SubName: Full=PL-toxin I;
e9ux89	414	53	12.8	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d9ww89	299	52	12.8	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d8hfp3	234	52	12.8	SubName: Full=Toxic shock syndrome toxin-1;
d7igc6	371	52	12.8	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d6dia3	341	52	12.8	SubName: Full=Predicted membrane protein, putative toxin reg...
d5ry79	349	52	12.8	SubName: Full=Toxin regulator;
d5q344	349	52	12.8	SubName: Full=Toxin regulator;
d4xda6	437	56	12.8	SubName: Full=HipA family toxin-antitoxin system;
d4rwf6	307	52	12.8	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d4lij1	363	52	12.8	SubName: Full=Predicted membrane protein, putative toxin reg...
d1vv31	360	52	12.8	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d1p0c2	344	52	12.8	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
c8n7a9	477	61	12.8	SubName: Full=RTX toxin transporter;
c81058	307	52	12.8	SubName: Full=Putative zeta toxin; poison-antidote element;
c6lwg5	354	52	12.8	SubName: Full=Putative toxin regulator PfoR;
c4uqv6	279	52	12.8	SubName: Full=RTX toxin and Ca2+-binding protein;
c4se14	475	61	12.8	SubName: Full=RTX toxin and Ca2+-binding protein;

c2eu21	370	52	12.8	SubName: Full=Possible toxin regulator;
c2ck47	341	52	12.8	SubName: Full=Toxin regulator;
a8y1p7	384	52	12.8	RecName: Full=Beta-1,4-N-acetylgalactosaminyltransferase bre...
a6an11	461	59	12.8	SubName: Full=Zonular occludens toxin (Zot) family;
a5jj19	234	52	12.8	SubName: Full=Toxic shock syndrome toxin-1;
a3elq4	462	59	12.8	SubName: Full=Toxin secretion transporter, putative;
a1zpk1	445	57	12.8	SubName: Full=Putative insecticidal toxin complex;
q1c1l6	432	55	12.7	SubName: Full=Putative insecticidal toxin;
k8wpb8	442	56	12.7	SubName: Full=RTX toxin ABC transporter protein (MFP) RtxD;
k5kqt9	458	58	12.7	SubName: Full=Zonular occludens toxin family protein;
f2i838	513	65	12.7	SubName: Full=Toxin-antitoxin system toxin component, PIN fa...
e2cst8	416	53	12.7	SubName: Full=RTX-III toxin determinant A from serotype 2;
d1y3n1	504	64	12.7	SubName: Full=General secretion pathway protein E (Type II t...
d0gvw5	457	58	12.7	SubName: Full=Zona occludens toxin;
q8eix5	452	57	12.6	SubName: Full=Multidrug and toxin efflux protein MATE family...
j0upb3	420	53	12.6	SubName: Full=JHE-like toxin PirB;
g6xuv4	539	68	12.6	SubName: Full=Putative toxin secretion ATP-binding ABC trans...
e7ex57	443	56	12.6	SubName: Full=Multidrug and toxin extrusion protein 1;
e3bql2	453	57	12.6	SubName: Full=RTX toxin transporter;
d5es42	430	54	12.6	SubName: Full=Putative toxin secretion protein;
a3xs15	704	89	12.6	SubName: Full=Toxin secretion ATP-binding protein;
q9f0l4	234	51	12.5	SubName: Full=Toxic shock syndrome toxin-1;
q96f18	570	71	12.5	RecName: Full=Multidrug and toxin extrusion protein 1; Short...
q7x6n6	335	51	12.5	SubName: Full=Os07g0601100 protein; SubName: Full=Putative N...
q7n8b1	408	51	12.5	RecName: Full=Photox toxin; EC=2.4.2.31; AltName: Full=Mono(...
q7a4k7	234	51	12.5	SubName: Full=Toxic shock syndrome toxin-1;
q7a2n8	234	51	12.5	SubName: Full=Toxic shock syndrome toxin-1;
q6wrw3	358	51	12.5	SubName: Full=Alveicin B bacteriocin toxin;
q5rfd2	570	71	12.5	RecName: Full=Multidrug and toxin extrusion protein 1; Short...
q57539	327	51	12.5	SubName: Full=35.8-kilodalton mosquitocidal toxin;
q57028	327	51	12.5	SubName: Full=35.8-kilodalton mosquitocidal toxin;
q2yvp2	234	51	12.5	SubName: Full=Toxic shock syndrome toxin-1;
q12ly8	441	55	12.5	SubName: Full=Aerolysin/hemolysin/leukocidin toxin; Flags: P...
q04bx5	351	51	12.5	SubName: Full=Predicted membrane protein, putative toxin reg...
p84613	281	51	12.5	RecName: Full=Insecticidal crystal toxin protein;
p05516	370	51	12.5	RecName: Full=41.9 kDa insecticidal toxin; AltName: Full=Str...
o54462	234	51	12.5	SubName: Full=Toxic shock syndrome toxin-1;
k9bxa0	404	51	12.5	SubName: Full=Zonula occludens toxin;
k4rak2	275	51	12.5	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
j4qeb4	339	51	12.5	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
j1ij08	278	51	12.5	SubName: Full=Omega toxin-like domain protein;
j0waf2	381	51	12.5	SubName: Full=Membrane protein, toxin regulator;
j0u9l1	457	57	12.5	SubName: Full=Zonula occludens toxin;
i7jd91	379	51	12.5	SubName: Full=Predicted membrane protein, putative toxin reg...
i6ayy5	408	51	12.5	SubName: Full=Zonular occludens toxin (Zot); Flags: Precurs...
i2wg41	197	51	12.5	SubName: Full=Hemolysin toxin protein A domain protein;
h6nny6	248	51	12.5	SubName: Full=Cytolethal distending toxin protein B;
h4q8l2	320	51	12.5	SubName: Full=Toxin B domain protein;
h4mnz6	228	51	12.5	SubName: Full=Toxin B domain protein;
h4lm33	320	51	12.5	SubName: Full=Toxin B domain protein;
h4gl1t0	238	51	12.5	SubName: Full=Toxin, beta-grasp domain protein;
h2nvb6	570	71	12.5	SubName: Full=Multidrug and toxin extrusion protein 1;
h2fw35	358	51	12.5	SubName: Full=Zonular occludens toxin;
h1stf0	238	51	12.5	SubName: Full=Toxin, beta-grasp domain protein;
h1ste4	234	51	12.5	SubName: Full=Toxin, OB domain protein;
h1q9j8	385	51	12.5	SubName: Full=Toxin component;
h0dim3	234	51	12.5	SubName: Full=Toxin, OB domain protein;
h0apn8	234	51	12.5	SubName: Full=Toxin, OB-fold domain protein;

g9z1t1	345	51	12.5	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
g9ykv9	350	51	12.5	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
g7l7e9	447	56	12.5	SubName: Full=Multidrug and toxin extrusion protein;
g5svl0	348	51	12.5	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
g4pdn9	335	51	12.5	SubName: Full=Exfoliative toxin; EC=3.4.21.-;
f9zvc3	448	56	12.5	SubName: Full=Zonular occludens toxin;
f9kh95	234	51	12.5	SubName: Full=Toxin, OB-fold domain protein;
f9kf44	234	51	12.5	SubName: Full=Toxin, OB-fold domain protein;
f8nfd8	356	51	12.5	SubName: Full=Protoplast regeneration and killer toxin resis...
f5t7s2	250	51	12.5	SubName: Full=Putative toxin-antitoxin system, toxin compone...
f3xp80	348	51	12.5	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
f3f571	296	51	12.5	SubName: Full=Insecticidal toxin complex protein;
f0upj3	448	56	12.5	SubName: Full=Toxin-insensitive protein;
e8lda0	350	51	12.5	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
e5zzd0	345	51	12.5	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
e5g5f8	465	58	12.5	SubName: Full=RTX toxin and related Ca2+-binding protein-lik...
e4sws2	351	51	12.5	SubName: Full=Predicted membrane protein, putative toxin reg...
e1ekw2	323	51	12.5	SubName: Full=Leukocidin/Hemolysin toxin family;
e1ds35	323	51	12.5	SubName: Full=Leukocidin/Hemolysin toxin family;
e1d4g0	323	51	12.5	SubName: Full=Leukocidin/Hemolysin toxin family;
e1c2r3	323	51	12.5	SubName: Full=Leukocidin/Hemolysin toxin family;
d9y6k6	290	51	12.5	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
d9w856	291	51	12.5	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d7j838	367	51	12.5	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d7j633	351	51	12.5	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d6e6k1	354	51	12.5	SubName: Full=Predicted membrane protein, putative toxin reg...
d6e4s3	296	51	12.5	SubName: Full=Zonular occludens toxin (Zot);
d5rwt1	249	51	12.5	SubName: Full=Toxin A;
d5k9g5	402	51	12.5	SubName: Full=Zeta_2 toxin;
d5k9e4	402	51	12.5	SubName: Full=Zeta_2 toxin;
d4k266	352	51	12.5	SubName: Full=Predicted membrane protein, putative toxin reg...
d3pi97	272	51	12.5	SubName: Full=Kunitz/BPTI-like toxin;
d3ahh7	338	51	12.5	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d2feq4	234	51	12.5	SubName: Full=Toxic shock syndrome toxin-1;
d1pq95	331	51	12.5	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d1eby3	402	51	12.5	SubName: Full=Zeta toxin family protein;
d0rtm9	307	51	12.5	SubName: Full=Exfoliative toxin A;
c7u172	298	51	12.5	SubName: Full=Putative entericidin like toxin protien;
c5whb6	313	51	12.5	SubName: Full=Putative exfoliative toxin;
c2q549	368	51	12.5	SubName: Full=41.9 kDa insecticidal toxin;
c0qxe9	267	51	12.5	SubName: Full=Toxin A;
b6qdj2	249	51	12.5	SubName: Full=Toxin biosynthesis ketoreductase, putative;
a8y0l5	377	51	12.5	RecName: Full=GDP-mannose 4,6 dehydratase 1; EC=4.2.1.47; Al...
a8ulg6	322	51	12.5	SubName: Full=Necrotic enteritis toxin B; SubName: Full=NetB...
a7x4h0	234	51	12.5	SubName: Full=Toxic shock syndrome toxin-1;
a6gp14	384	51	12.5	SubName: Full=Putative RTX toxin;
a6b0c4	323	51	12.5	SubName: Full=Leukocidin/Hemolysin toxin family;
a5jj18	234	51	12.5	SubName: Full=Toxic shock syndrome toxin-1;
a3vhu3	463	58	12.5	SubName: Full=Hemolysin-type calcium-binding toxin;
q9kgq7	461	57	12.4	SubName: Full=Zonula occludens toxin like protein;
h1x0s6	412	51	12.4	SubName: Full=Membrane protein, toxin regulator-like protein...
h1wwn6	412	51	12.4	SubName: Full=Membrane protein, toxin regulator-like protein...
h1wp49	412	51	12.4	SubName: Full=Membrane protein, toxin regulator-like protein...
f9rba1	436	54	12.4	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
f5lzs4	437	54	12.4	SubName: Full=Hemolysin-type calcium-binding region; RTX tox...
f3rqs4	461	57	12.4	SubName: Full=Zona occludens toxin;
e9fbd7	445	55	12.4	SubName: Full=Toxin biosynthesis protein, putative;
e1eb25	461	57	12.4	SubName: Full=Zonula occludens toxin (Zot) family;

e1dnq4	461	57	12.4	SubName: Full=Zonula occludens toxin (Zot) family;
e1crn1	461	57	12.4	SubName: Full=Zonula occludens toxin (Zot) family;
d0m8b3	461	57	12.4	SubName: Full=Zona occludens toxin;
q838c5	322	50	12.3	SubName: Full=Exfoliative toxin A, putative;
q71zu3	345	50	12.3	SubName: Full=Killer toxin K28;
q7bgc1	340	50	12.3	SubName: Full=Toxin-coregulated pilus biosynthesis protein E...
q63ue0	471	58	12.3	SubName: Full=Putative toxin-related secretion protein;
q306l3	368	50	12.3	SubName: Full=40kDa insecticidal toxin;
q1pl25	251	50	12.3	SubName: Full=RTX toxin;
q1c1l7	407	50	12.3	SubName: Full=Putative insecticidal toxin;
q13508	389	50	12.3	RecName: Full=Ecto-ADP-ribosyltransferase 3; EC=2.4.2.31; Al...
q04bp6	342	50	12.3	SubName: Full=Predicted membrane protein, putative toxin reg...
q03v93	376	50	12.3	SubName: Full=Predicted membrane protein, putative toxin reg...
p59026	399	50	12.3	RecName: Full=Phospholipase C; Short=PLC; EC=3.1.4.3; AltNam...
p45781	336	50	12.3	RecName: Full=Type II secretion system protein K; Short=T2SS...
p34253	313	50	12.3	RecName: Full=Protein KTI12; AltName: Full=Gamma-toxin targe...
p20974	275	50	12.3	RecName: Full=T-cell ecto-ADP-ribosyltransferase 2; EC=2.4.2...
p0c6c9	340	50	12.3	RecName: Full=Toxin coregulated pilus biosynthesis protein E...
p09332	277	50	12.3	RecName: Full=Exfoliative toxin B; EC=3.4.21.-; AltName: Ful...
o49163	357	50	12.3	SubName: Full=NADPH HC toxin reductase;
k6tky6	313	50	12.3	SubName: Full=Insecticide toxin TcdB middle/N-terminal domai...
k4z1f4	322	50	12.3	SubName: Full=Exfoliative toxin A;
k4q9u3	305	50	12.3	SubName: Full=K11041 exfoliative toxin A/B;
k2wup8	338	50	12.3	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
j7k7g4	358	50	12.3	SubName: Full=Anthrax toxin receptor 1 transcript variant 5;...
j3gf74	302	50	12.3	SubName: Full=Zeta toxin; Flags: Precursor;
j2sfq8	302	50	12.3	SubName: Full=Zeta toxin;
j1gfc8	338	50	12.3	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
j1gba9	338	50	12.3	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
j1cw53	338	50	12.3	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
i2e2g3	370	50	12.3	SubName: Full=Binary toxin A;
i0dpu2	400	50	12.3	SubName: Full=Toxin XaxA;
h8jv64	338	50	12.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
h8jv63	340	50	12.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
h4edm1	241	50	12.3	SubName: Full=Beta-grasp domain toxin protein;
h4e6m6	241	50	12.3	SubName: Full=Beta-grasp domain toxin protein;
h4d386	241	50	12.3	SubName: Full=Beta-grasp domain toxin protein;
h4cl70	241	50	12.3	SubName: Full=Beta-grasp domain toxin protein;
h4ccq9	241	50	12.3	SubName: Full=Beta-grasp domain toxin protein;
h3rx39	241	50	12.3	SubName: Full=Beta-grasp domain toxin protein;
h1wfb5	438	54	12.3	SubName: Full=Putative Hemolysin-type calcium-binding toxin,...
g9xsb1	346	50	12.3	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
g8s377	487	60	12.3	SubName: Full=Hansenula MRAKII killer toxin-resistant protei...
g7vk82	376	50	12.3	SubName: Full=Membrane protein, putative toxin regulator;
g7viw2	380	50	12.3	SubName: Full=Membrane protein, putative toxin regulator;
g0wpm4	504	62	12.3	SubName: Full=Zeta toxin family protein;
f9kz23	238	50	12.3	SubName: Full=Toxin, beta-grasp domain protein;
f3ebi8	438	54	12.3	SubName: Full=Zona occludens toxin;
f2zal6	315	50	12.3	SubName: Full=PL-toxin II;
f2bxt9	338	50	12.3	SubName: Full=Zeta toxin superfamily protein;
f0e1n2	504	62	12.3	SubName: Full=Zeta toxin family protein;
e9ub25	345	50	12.3	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
e9ehw3	496	61	12.3	SubName: Full=Putative mosquitocidal toxin;
e9e531	332	50	12.3	SubName: Full=Zeta toxin family protein;
e8qb96	305	50	12.3	SubName: Full=Putative exfoliative toxin;
e7pkf4	448	55	12.3	SubName: Full=Insecticidal toxin protein, putative;
e5ray0	319	50	12.3	SubName: Full=Alpha-hemolysin (Alpha-toxin) (Alpha-HL);
e5cuj7	335	50	12.3	SubName: Full=Putative toxin-antitoxin system, toxin compone...

e5aua1	408	50	12.3	SubName: Full=Insecticidal toxin complex protein TccB;
e4tx22	247	50	12.3	SubName: Full=RTX toxins and related Ca2+-binding protein; F...
e4lr30	314	50	12.3	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
e3wia1	283	50	12.3	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
e3bd20	384	50	12.3	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
e1ywp8	347	50	12.3	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
e0xv97	462	57	12.3	SubName: Full=Rtx toxins and related ca2+-binding proteins;
e0qm45	341	50	12.3	SubName: Full=Toxin regulator;
e0mq43	512	63	12.3	SubName: Full=Putative toxin-antitoxin system, toxin compone...
d9y0j7	290	50	12.3	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9wpy5	283	50	12.3	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9wdc5	276	50	12.3	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9rbi7	338	50	12.3	SubName: Full=Leukocidin/hemolysin toxin family protein;
d8utl4	552	68	12.3	SubName: Full=Toxin secretion ATP-binding protein;
d7w0k0	292	50	12.3	SubName: Full=Fic family toxin-antitoxin system;
d7jyf2	338	50	12.3	SubName: Full=Putative toxin-antitoxin system, toxin compone...
d7j8c0	336	50	12.3	SubName: Full=HipA family toxin-antitoxin system;
d7hla6	340	50	12.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
d6k6b7	287	50	12.3	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d6jzt7	294	50	12.3	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d4wt87	336	50	12.3	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d4wbh1	336	50	12.3	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d4vhn9	336	50	12.3	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d4j6h1	355	50	12.3	SubName: Full=Predicted membrane protein, putative toxin reg...
d4eyz9	322	50	12.3	SubName: Full=Putative exfoliative toxin A;
d4ep15	322	50	12.3	SubName: Full=Putative exfoliative toxin A;
d4ctm5	379	50	12.3	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d3akv1	365	50	12.3	SubName: Full=Toxin-antitoxin system, antitoxin component, X...
d0hrq7	340	50	12.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
d0hrq6	338	50	12.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
d0h644	340	50	12.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
c9q5c1	336	50	12.3	SubName: Full=General secretion pathway protein K (Cholera t...
c8xtg4	322	50	12.3	SubName: Full=Necrotic enteritis toxin B; SubName: Full=NetB...
c7vr65	322	50	12.3	SubName: Full=Exfoliative toxin A;
c6yew3	340	50	12.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
c6rw17	340	50	12.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
c3nt62	340	50	12.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
c3lt87	340	50	12.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
c2l143	361	50	12.3	SubName: Full=Toxin regulator;
c2khn0	376	50	12.3	SubName: Full=Membrane protein, toxin regulator;
c2ja14	340	50	12.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
c2ign3	340	50	12.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
b8lbe3	385	50	12.3	SubName: Full=Zonula occludens toxin family protein;
b8dhf6	337	50	12.3	SubName: Full=Exfoliative toxin;
b7tgw9	430	53	12.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
b4v4g7	430	53	12.3	SubName: Full=Zeta toxin protein;
a7wk53	464	57	12.3	SubName: Full=Cry49Aa protein; SubName: Full=Crystal toxin;
a6zzk6	313	50	12.3	SubName: Full=Toxin-insensitive protein;
a6zqf9	276	50	12.3	SubName: Full=Killer toxin resistant protein;
a5f382	340	50	12.3	RecName: Full=Toxin coregulated pilus biosynthesis protein E...
a4f2e5	273	50	12.3	SubName: Full=Cytolethal distending toxin A;
a3gys3	340	50	12.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
a3gmd5	340	50	12.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
a1f0z1	340	50	12.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
a1eib7	340	50	12.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
a0rm04	273	50	12.3	SubName: Full=Cytolethal distending toxin A;
q8ekm9	435	53	12.2	SubName: Full=Toxin-antitoxin system toxin HipA family;
q48el8	449	55	12.2	SubName: Full=Insecticidal toxin protein, putative;

p58911	501	61	12.2	RecName: Full=Toxin PsTX-60A; Flags: Precursor;
k5vba9	458	56	12.2	SubName: Full=Zonular occludens toxin family protein;
k5uq57	458	56	12.2	SubName: Full=Zonular occludens toxin family protein;
k5tim5	458	56	12.2	SubName: Full=Zonular occludens toxin family protein;
j5jqj8	410	50	12.2	SubName: Full=Host-specific AK-toxin Akt2;
f8ktk4	449	55	12.2	SubName: Full=Toxin-like outer membrane protein;
f2pxv8	443	54	12.2	SubName: Full=Toxin biosynthesis protein;
e4jlb3	443	54	12.2	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e4jbe0	443	54	12.2	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e4j0f2	443	54	12.2	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e4iic0	443	54	12.2	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e4i7f5	443	54	12.2	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
c1ijt3	658	80	12.2	SubName: Full=Toxin protein;
c0nq03	450	55	12.2	SubName: Full=Toxin-insensitive protein;
b9sx45	499	61	12.2	SubName: Full=Diphtheria toxin resistance protein 2, dph2, pu...
q5dz58	497	60	12.1	SubName: Full=Toxin coregulated pilus biosynthesis protein T...
q5b2e7	420	51	12.1	SubName: Full=TRI7-like toxin biosynthesis protein, putative...
q5aud5	539	65	12.1	SubName: Full=MFS toxin efflux pump (AflT), putative (AFU_or...
k9gzu7	420	51	12.1	SubName: Full=TRI7-like toxin biosynthesis protein, putative...
k9fa82	420	51	12.1	SubName: Full=TRI7-like toxin biosynthesis protein, putative...
k6arx0	472	57	12.1	SubName: Full=Putative insecticidal toxin complex;
k0z1i2	571	69	12.1	SubName: Full=RTX toxins and relateda2+-binding protein;
h6wb21	570	69	12.1	SubName: Full=Putative zeta toxin family protein;
g7xq95	438	53	12.1	SubName: Full=Similar to toxin biosynthesis protein;
f2l756	431	52	12.1	SubName: Full=Zeta toxin family protein;
f1zbf7	527	64	12.1	SubName: Full=Rhizobiocin/RTX toxin and hemolysin-type calci...
e7n9j6	414	50	12.1	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
e6lir5	486	59	12.1	SubName: Full=Zeta-toxin;
e3dhb7	535	65	12.1	SubName: Full=Putative toxin-like protein;
d4vbk8	422	51	12.1	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d2kba6	448	54	12.1	SubName: Full=Zonular occludens toxin;
d0fwh4	535	65	12.1	SubName: Full=Putative toxin-related protein;
c9psk6	428	52	12.1	SubName: Full=Xre family toxin-antitoxin system;
b4f0p7	454	55	12.1	SubName: Full=Putative HlyD-family toxin secretion protein;
b1mxh1	412	50	12.1	SubName: Full=Predicted membrane protein, putative toxin reg...
a7jyu1	453	55	12.1	SubName: Full=RTX toxins and related Ca2+-binding proteins;
a6frh9	556	67	12.1	SubName: Full=RTX toxins and related Ca2+-binding protein;
q8r2g4	371	49	12.0	RecName: Full=Ecto-ADP-ribosyltransferase 3; EC=2.4.2.31; Al...
q8gnj4	272	49	12.0	SubName: Full=Exfoliative toxin ExhD;
q8cff0	331	49	12.0	RecName: Full=Poly [ADP-ribose] polymerase 11; Short=PARP-11...
q871r1	336	49	12.0	SubName: Full=Related to protein conferring sensitivity to k...
q7wzg4	330	49	12.0	SubName: Full=Exfoliative toxin;
q7vsx4	374	49	12.0	RecName: Full=Type IV secretion system protein PtlG; AltName...
q6upc3	258	49	12.0	SubName: Full=Cytolethal distending toxin A;
q6sv31	319	49	12.0	SubName: Full=Putative alpha toxin; Flags: Precursor;
q5zvc5	543	65	12.0	SubName: Full=Toxin secretion ATP binding protein;
q3db06	219	49	12.0	SubName: Full=Exfoliative toxin A;
q2sg28	312	49	12.0	SubName: Full=Cytolethal distending toxin B-like protein;
q2glx0	319	49	12.0	RecName: Full=Alpha-hemolysin; Short=Alpha-HL; AltName: Full...
q1igt2	458	55	12.0	SubName: Full=Putative type I toxin efflux membrane fusion p...
q1hq93	458	55	12.0	SubName: Full=Diphtheria toxin resistance protein;
q1emi4	367	49	12.0	SubName: Full=Putative associated RTX toxin transporter;
q0tus0	500	60	12.0	RecName: Full=Perfringolysin O; AltName: Full=Theta-toxin; A...
q0mqm7	370	49	12.0	SubName: Full=Binary toxin A;
q03w61	380	49	12.0	SubName: Full=Predicted membrane protein, putative toxin reg...
q03v59	352	49	12.0	SubName: Full=Predicted membrane protein, putative toxin reg...
p12963	370	49	12.0	RecName: Full=41.9 kDa insecticidal toxin; AltName: Full=Str...
p0c2e9	500	60	12.0	RecName: Full=Perfringolysin O; AltName: Full=Theta-toxin; A...

p09616	319	49	12.0	RecName: Full=Alpha-hemolysin; Short=Alpha-HL; AltName: Full...
p06575	370	49	12.0	RecName: Full=41.9 kDa insecticidal toxin; AltName: Full=Str...
o32585	258	49	12.0	SubName: Full=Cytolethal distending toxin A; SubName: Full=C...
k2ts27	301	49	12.0	SubName: Full=Insecticidal toxin protein, putative;
k2akz1	331	49	12.0	SubName: Full=Rhizobiocin/RTX toxin;
k1c5d1	393	49	12.0	SubName: Full=Zonular occludens toxin;
j9hjr3	393	49	12.0	SubName: Full=Zonular occludens toxin;
j4x264	327	49	12.0	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
j2nu64	299	49	12.0	SubName: Full=Zeta toxin; Flags: Precursor;
j0jnr4	404	49	12.0	SubName: Full=Vacuolating toxin;
i8u5u1	415	50	12.0	SubName: Full=Toxin biosynthesis protein (Tri7), putative;
i7kfw0	379	49	12.0	SubName: Full=Predicted membrane protein, putative toxin reg...
i2jcr8	347	49	12.0	SubName: Full=Zonula occludens toxin;
i2e2g2	370	49	12.0	SubName: Full=Binary toxin A;
i0vnx7	258	49	12.0	SubName: Full=Type III cytolethal distending toxin protein C...
i0tzn9	254	49	12.0	SubName: Full=Toxin, beta-grasp domain protein;
i0s7q6	334	49	12.0	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
h8ghf5	369	49	12.0	SubName: Full=Zonula occludens toxin;
h8fle5	394	49	12.0	SubName: Full=Zonular occludens toxin family protein;
h6p9v0	312	49	12.0	SubName: Full=Exfoliative toxin A;
h4irj7	291	49	12.0	SubName: Full=Zonular occludens toxin family protein;
h4hfd0	241	49	12.0	SubName: Full=Beta-grasp domain toxin protein;
h4en49	241	49	12.0	SubName: Full=Beta-grasp domain toxin protein;
h4ds02	241	49	12.0	SubName: Full=Beta-grasp domain toxin protein;
h4d9h1	241	49	12.0	SubName: Full=Beta-grasp domain toxin protein;
h4bxu4	228	49	12.0	SubName: Full=Toxic shock syndrome toxin-1;
h4bpq7	241	49	12.0	SubName: Full=Toxin beta-grasp domain protein;
h4b100	241	49	12.0	SubName: Full=Beta-grasp domain toxin protein;
h4atj3	241	49	12.0	SubName: Full=Beta-grasp domain toxin protein;
h4akf0	241	49	12.0	SubName: Full=Beta-grasp domain toxin protein;
h4ac76	241	49	12.0	SubName: Full=Beta-grasp domain toxin protein;
h3yw82	254	49	12.0	SubName: Full=Toxin, beta-grasp domain protein;
h3yg91	254	49	12.0	SubName: Full=Toxin, beta-grasp domain protein;
h3y8j2	254	49	12.0	SubName: Full=Toxin, beta-grasp domain protein;
h3x4q8	254	49	12.0	SubName: Full=Toxin, beta-grasp domain protein;
h3t7d2	424	51	12.0	SubName: Full=Zona occludens toxin;
h3t148	424	51	12.0	SubName: Full=Zona occludens toxin;
h1t7i8	254	49	12.0	SubName: Full=Toxin, beta-grasp domain protein;
h1snq9	254	49	12.0	SubName: Full=Toxin, beta-grasp domain protein;
h0cpz7	254	49	12.0	SubName: Full=Toxin, beta-grasp domain protein;
g9zrq2	241	49	12.0	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
g9yhg8	301	49	12.0	SubName: Full=Toxin-antitoxin system, toxin component, Fic d...
g8uqq1	373	49	12.0	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
g8p5r8	324	49	12.0	SubName: Full=Exfoliative toxin A;
g7vkj6	352	49	12.0	SubName: Full=Membrane protein, putative toxin regulator;
g7fbw9	326	49	12.0	SubName: Full=Exfoliative toxin A/B;
g7f0l9	320	49	12.0	SubName: Full=Exfoliative toxin A/B;
g7enm0	325	49	12.0	SubName: Full=Exfoliative toxin A/B;
g5q3v3	303	49	12.0	SubName: Full=Cytolethal distending toxin subunit B;
g5ns16	301	49	12.0	SubName: Full=Cytolethal distending toxin subunit B;
g5gy40	476	57	12.0	SubName: Full=Putative toxin-antitoxin system, toxin compone...
glyxi6	258	49	12.0	SubName: Full=Cytolethal distending toxin A/C family protein...
g0agw5	371	49	12.0	SubName: Full=Zonula occludens toxin-like protein;
f9xw44	273	49	12.0	SubName: Full=Cytolethal distending toxin A;
f9sk55	543	65	12.0	SubName: Full=Toxin coregulated pilus biosynthesis protein ...
f9kxh2	254	49	12.0	SubName: Full=Toxin, beta-grasp domain protein;
f9k3x6	254	49	12.0	SubName: Full=Toxin, beta-grasp domain protein;
f9jxt3	254	49	12.0	SubName: Full=Toxin, beta-grasp domain protein;

f5wm11	254	49	12.0	SubName: Full=Toxin, beta-grasp domain protein;
f5wgd4	254	49	12.0	SubName: Full=Toxin, beta-grasp domain protein;
f5w8g2	254	49	12.0	SubName: Full=Toxin, beta-grasp domain protein;
f4una8	258	49	12.0	SubName: Full=Cytolethal distending toxin subunit A (CDT A);...
f4ac07	279	49	12.0	SubName: Full=Putative epsilon-toxin type B;
f3tkb6	260	49	12.0	SubName: Full=Exfoliative toxin B; EC=3.4.21.-;
f3the9	254	49	12.0	SubName: Full=Toxin, beta-grasp domain protein;
f3ilp0	304	49	12.0	SubName: Full=Insecticidal toxin protein, putative;
f2tgw9	357	49	12.0	SubName: Full=Toxin biosynthesis protein;
f1z7n2	336	49	12.0	SubName: Full=Rhizobiocin/RTX toxin and hemolysin-type calci...
f0p3j0	330	49	12.0	SubName: Full=Exfoliative toxin;
e9exn2	407	49	12.0	SubName: Full=Putative toxin subunit;
e7p9q2	282	49	12.0	SubName: Full=Insecticidal toxin protein, putative;
e5ray4	241	49	12.0	SubName: Full=Staphylococcal/Streptococcal toxin, beta-grasp...
e5r7q9	254	49	12.0	SubName: Full=Staphylococcal/Streptococcal toxin, beta-grasp...
e4la10	338	49	12.0	SubName: Full=Zeta toxin;
e4jl09	388	49	12.0	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e4j7e4	388	49	12.0	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e4j2x9	388	49	12.0	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e4iij7	388	49	12.0	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e4id66	388	49	12.0	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e2sut2	320	49	12.0	SubName: Full=Toxin-antitoxin system;
e1mcx0	237	49	12.0	SubName: Full=Putative diphtheria toxin repressor;
e1iux6	326	49	12.0	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
e1gyk1	333	49	12.0	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
e1df93	466	56	12.0	SubName: Full=Zonular occludens toxin;
e0sl26	389	49	12.0	SubName: Full=RTX toxins-like Ca2+-binding protein;
e0nky3	337	49	12.0	SubName: Full=Toxin regulator;
d9xx30	286	49	12.0	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9wuc3	283	49	12.0	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9wcw2	291	49	12.0	SubName: Full=Putative toxin-antitoxin system, toxin compone...
d7vnu2	297	49	12.0	SubName: Full=Fic family toxin-antitoxin system;
d6k4k2	289	49	12.0	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d6jza3	282	49	12.0	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d4mx99	351	49	12.0	SubName: Full=Predicted membrane protein, putative toxin reg...
d4l0a1	353	49	12.0	SubName: Full=Predicted membrane protein, putative toxin reg...
d4kji1	353	49	12.0	SubName: Full=Predicted membrane protein, putative toxin reg...
d4kb50	352	49	12.0	SubName: Full=Predicted membrane protein, putative toxin reg...
d3y4l3	322	49	12.0	SubName: Full=Necrotic enteritis toxin B;
d2txi8	540	65	12.0	SubName: Full=Toxin complex component ORF-X2;
d2n8v0	338	49	12.0	SubName: Full=Synergohymenotropic toxin;
d1w768	381	49	12.0	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d1avh7	349	49	12.0	SubName: Full=Membrane protein putative toxin regulator-like...
d0yp07	237	49	12.0	SubName: Full=Diphtheria toxin repressor;
d0iec8	336	49	12.0	SubName: Full=General secretion pathway protein K (Cholera t...
c9mwc8	308	49	12.0	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
c9lr41	375	49	12.0	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
c8ndj7	329	49	12.0	SubName: Full=Fic family toxin-antitoxin system, toxin compo...
c8mih6	241	49	12.0	SubName: Full=Toxin beta-grasp domain-containing protein;
c8lkp9	241	49	12.0	SubName: Full=Toxin beta-grasp domain-containing protein;
c8l4c4	241	49	12.0	SubName: Full=Toxin;
c6llv9	342	49	12.0	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
c5zzq0	258	49	12.0	SubName: Full=Type III cytolethal distending toxin protein C...
c5grr0	357	49	12.0	SubName: Full=Toxin biosynthesis protein;
c3ism2	526	63	12.0	SubName: Full=Mosquitocidal toxin protein;
c2ki78	352	49	12.0	SubName: Full=Membrane protein, toxin regulator;
c2jzf2	347	49	12.0	SubName: Full=Possible membrane protein, probable toxin regu...
c2d340	328	49	12.0	SubName: Full=VIP2 family actin-ADP-ribosylating toxin;

c0ay17	358	49	12.0	SubName: Full=Putative hemolysin toxin protein A;
b8r8l4	191	49	12.0	SubName: Full=Putative RTX toxin;
b8n7n4	542	65	12.0	SubName: Full=MFS toxin efflux pump (AflT), putative;
b8mxk8	415	50	12.0	SubName: Full=Toxin biosynthesis protein (Tri7), putative;
b6jzv5	565	68	12.0	SubName: Full=Multidrug and toxin extrusion protein;
b6eq46	527	63	12.0	SubName: Full=Putative type I toxin secretion system, membra...
b5qhw4	285	49	12.0	SubName: Full=Cytolethal distending toxin;
b5ghw6	289	49	12.0	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
b5blw1	330	49	12.0	SubName: Full=Exfoliative toxin;
b1sx84	303	49	12.0	SubName: Full=Zonular occludens toxin;
b1hq58	370	49	12.0	SubName: Full=41.9 kDa insecticidal toxin;
b0yr14	288	49	12.0	SubName: Full=Putative RTX toxin-related Ca2+-binding protei...
b0ske4	367	49	12.0	SubName: Full=Putative associated RTX toxin transporter;
b0luq8	370	49	12.0	SubName: Full=Binary toxin A;
a8tvc3	565	68	12.0	SubName: Full=RTX toxins and related Ca2+-binding protein;
a8pmg6	308	49	12.0	SubName: Full=Shiga toxin A-chain (RRNA N-glycosidase); EC=3...
a7dv67	387	49	12.0	SubName: Full=RTX toxins and related Ca2+-binding protein; S...
a6u2t3	254	49	12.0	SubName: Full=Toxin OB-fold domain protein; Flags: Precursor...
a6u0y7	241	49	12.0	SubName: Full=Toxin beta-grasp domain protein; Flags: Precu...
a5itz5	254	49	12.0	SubName: Full=Toxin, OB-fold domain protein; Flags: Precurso...
a5is53	241	49	12.0	SubName: Full=Toxin, beta-grasp domain protein; Flags: Precu...
a4f2d9	273	49	12.0	SubName: Full=Cytolethal distending toxin A;
a4f2c4	273	49	12.0	SubName: Full=Cytolethal distending toxin A;
a3i0q0	434	52	12.0	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
a1wsu5	365	49	12.0	SubName: Full=Zeta toxin family protein;
q9agw9	489	58	11.9	SubName: Full=Toxin-coregulated pilus biosynthesis outer mem...
q7z3e1	657	78	11.9	RecName: Full=TCDD-inducible poly [ADP-ribose] polymerase; E...
q4wlc8	429	51	11.9	SubName: Full=Toxin biosynthesis protein Tri7-like , putativ...
q489z5	455	54	11.9	SubName: Full=Zona occludens toxin;
q487y5	455	54	11.9	SubName: Full=Zona occludens toxin-like protein;
q1igt4	445	53	11.9	SubName: Full=Putative type I toxin efflux outer membrane pr...
k2u279	469	56	11.9	SubName: Full=Insecticidal toxin protein;
k1yxm2	480	57	11.9	SubName: Full=RTX toxin membrane fusion protein;
j3fkb1	487	58	11.9	SubName: Full=Ca2+-binding protein, RTX toxin; Flags: Precur...
i9wqy7	455	54	11.9	SubName: Full=RTx toxin hemolysin-type calcium-binding prote...
h9cjj7	512	61	11.9	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
f7ux71	519	62	11.9	SubName: Full=RTX toxin;
e7pd78	504	60	11.9	SubName: Full=Zeta toxin family protein;
e1kqp8	496	59	11.9	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d0wgu6	420	50	11.9	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d0h649	489	58	11.9	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
b0xm34	429	51	11.9	SubName: Full=Toxin biosynthesis protein Tri7-like , putativ...
a5f395	489	58	11.9	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
a3gme0	489	58	11.9	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
a1l1p9	590	70	11.9	RecName: Full=Multidrug and toxin extrusion protein 1; Short...
a1chu3	519	62	11.9	SubName: Full=Toxin biosynthesis cytochrome P450 monooxygena...
q9l878	263	48	11.8	SubName: Full=Cytolytic toxin Cyt2Ba8;
q93q17	475	56	11.8	RecName: Full=ADP-ribosyltransferase toxin AexT; EC=2.4.2.-;...
q92032	407	48	11.8	RecName: Full=Snake venom metalloproteinase ACLH; Short=SVMP...
q8gnj6	301	48	11.8	SubName: Full=Exfoliative toxin ExhB;
q8gnj5	278	48	11.8	SubName: Full=Exfoliative toxin ExhC;
q8gj13	258	48	11.8	SubName: Full=Cytolethal distending toxin A;
q5mq79	265	48	11.8	SubName: Full=Beta-2 toxin; SubName: Full=Beta2 toxin; SubNa...
q5mq78	265	48	11.8	SubName: Full=Beta2 toxin;
q4zfu0	265	48	11.8	SubName: Full=Beta2 toxin;
q4zft9	265	48	11.8	SubName: Full=Beta2 toxin;
q4jev5	492	58	11.8	SubName: Full=Pore-forming toxin-like protein Hfr-2;
q45723	263	48	11.8	RecName: Full=Type-2Ba cytolytic delta-endotoxin; AltName: F...

q2j943	450	53	11.8	SubName: Full=Zeta toxin;
q036g8	347	48	11.8	SubName: Full=Predicted membrane protein, putative toxin reg...
p70352	309	48	11.8	RecName: Full=Ecto-ADP-ribosyltransferase 5; EC=2.4.2.31; A1...
p06886	234	48	11.8	RecName: Full=Toxic shock syndrome toxin-1; Short=TSST-1; Fl...
o88554	559	66	11.8	RecName: Full=Poly [ADP-ribose] polymerase 2; Short=PARP-2; ...
k6lvp9	251	48	11.8	SubName: Full=Zeta toxin;
k5rfm3	397	48	11.8	SubName: Full=Zonula occludens toxin;
k5ey41	391	48	11.8	SubName: Full=Zonula occludens toxin;
k3hrb9	258	48	11.8	SubName: Full=Cytolethal distending toxin A;
k2vv37	414	49	11.8	SubName: Full=RTX toxin RtxA domain protein;
k2h2f8	276	48	11.8	SubName: Full=Toxin resistance protein, putative;
k1wl71	250	48	11.8	SubName: Full=Hemolysin-type calcium-binding toxin;
k1rgq0	305	48	11.8	SubName: Full=Ras-related C3 botulinum toxin substrate 1;
k0xvf9	424	50	11.8	SubName: Full=Zona occludens toxin;
k0jky3	332	48	11.8	SubName: Full=Toxin A;
j5hs75	325	48	11.8	SubName: Full=Toxin-antitoxin system, antitoxin component, X...
j4vm74	332	48	11.8	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
j3jaa3	260	48	11.8	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
j0mx32	334	48	11.8	SubName: Full=Putative toxin-antitoxin system, toxin compone...
i9p721	334	48	11.8	SubName: Full=Putative toxin-antitoxin system, toxin compone...
i7msg2	276	48	11.8	SubName: Full=Putative insecticidal toxin domain protein;
i5pdf0	258	48	11.8	SubName: Full=Cytolethal distending toxin A;
i4ipd4	241	48	11.8	SubName: Full=Putative Cytolethal distending toxin subunit B...
i3djl1	332	48	11.8	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
i2t3u8	258	48	11.8	SubName: Full=Cytolethal distending toxin A/C family;
i0dy11	442	52	11.8	SubName: Full=RTX toxin transporter;
h4p1p4	258	48	11.8	SubName: Full=Cytolethal distending toxin A/C family protein...
h4fsg5	258	48	11.8	SubName: Full=Type III cytolethal distending toxin protein C...
h4a410	250	48	11.8	SubName: Full=Beta-grasp domain toxin protein;
h3ua87	239	48	11.8	SubName: Full=Toxin-antitoxin system, toxin component, MazF ...
h3twb7	239	48	11.8	SubName: Full=Toxin-antitoxin system, toxin component, MazF ...
h1t510	239	48	11.8	SubName: Full=Toxin-antitoxin system, toxin component, MazF ...
h0tf60	583	69	11.8	SubName: Full=Putative secretion ATP-binding protein (ABC-ty...
h0eck9	368	48	11.8	SubName: Full=Putative HC-toxin efflux carrier TOXA;
h0ceb0	250	48	11.8	SubName: Full=Toxin, beta-grasp domain protein;
h0auz9	242	48	11.8	SubName: Full=Toxin, beta-grasp domain protein;
g8atw6	273	48	11.8	SubName: Full=Putative hemolysin-type calcium-binding RTX to...
g7xaq6	249	48	11.8	SubName: Full=Toxin biosynthesis ketoreductase;
g7w7u8	345	48	11.8	SubName: Full=Putative membrane protein, putative toxin regu...
g6b1w2	333	48	11.8	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
g5gtr6	281	48	11.8	SubName: Full=Zeta-toxin;
g4kam2	317	48	11.8	SubName: Full=Cytolethal distending toxin subunit CdtB;
g4clj5	353	48	11.8	SubName: Full=Zonula occludens toxin family protein;
g1ygt6	258	48	11.8	SubName: Full=Cytolethal distending toxin A/C family protein...
g0zij4	262	48	11.8	SubName: Full=Putative toxin;
f9jxt1	242	48	11.8	SubName: Full=Toxin, beta-grasp domain protein;
f6m8n2	278	48	11.8	SubName: Full=Exfoliative toxin ExhC;
f5sqx6	364	48	11.8	SubName: Full=Toxin regulator;
f4t8f6	244	48	11.8	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
f4siu8	459	54	11.8	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
f0gyy6	552	65	11.8	SubName: Full=Toxin secretion/phage lysis holin;
e9fjv5	249	48	11.8	SubName: Full=Toxin-antitoxin system, antitoxin component, X...
e9exn1	416	49	11.8	SubName: Full=Putative toxin subunit;
e9eu03	332	48	11.8	SubName: Full=Zeta toxin family protein;
e9eqv1	516	61	11.8	SubName: Full=MFS toxin efflux pump (AflT);
e7b9x0	317	48	11.8	SubName: Full=Cytolethal distending toxin subunit B;
e6fnn7	387	48	11.8	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e6b5p5	320	48	11.8	SubName: Full=Toxin B domain protein;

e5uz31	425	50	11.8	SubName: Full=HipA family Toxin-antitoxin system;
e519z0	362	48	11.8	SubName: Full=40 kDa insecticidal toxin;
e5cli5	378	48	11.8	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e4uxf1	587	69	11.8	SubName: Full=Multidrug and toxin extrusion protein 2;
e3r4w6	382	48	11.8	SubName: Full=Putative toxin-antitoxin system, toxin compone...
e3dhb6	424	50	11.8	SubName: Full=Botulinum toxin-like protein;
e1me95	415	49	11.8	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
e0hcg4	387	48	11.8	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
d9xk82	306	48	11.8	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9we78	293	48	11.8	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d8gal6	347	48	11.8	SubName: Full=Predicted membrane protein, putative toxin reg...
d7k6c6	312	48	11.8	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d7k549	331	48	11.8	SubName: Full=Toxin-antitoxin system, antitoxin component, X...
d7j5m9	331	48	11.8	SubName: Full=Toxin-antitoxin system, antitoxin component, X...
d6m3x4	291	48	11.8	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d6m205	296	48	11.8	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d618q3	229	48	11.8	SubName: Full=Fic family toxin-antitoxin system, toxin compo...
d6krn4	374	48	11.8	SubName: Full=Putative toxin-antitoxin system, toxin compone...
d5rdg5	381	48	11.8	SubName: Full=HipA family toxin-antitoxin system;
d4wbe1	305	48	11.8	SubName: Full=Toxin-antitoxin system, toxin component family...
d4v7p2	502	59	11.8	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d3vak4	475	56	11.8	SubName: Full=RTX toxin ABC transporter protein RtxD;
d3v105	404	48	11.8	SubName: Full=Toxin XaxA;
d3i7q2	431	51	11.8	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d3app9	333	48	11.8	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
d3aa91	317	48	11.8	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
d2up07	338	48	11.8	SubName: Full=Leukocidin/hemolysin toxin family protein;
d2u4e1	272	48	11.8	SubName: Full=Insecticidal toxin complex protein;
d2tvp2	449	53	11.8	SubName: Full=RTX toxin ABC transporter protein;
d2n6d5	319	48	11.8	SubName: Full=Alpha-hemolysin (Alpha-toxin) (Alpha-HL);
d2fns1	338	48	11.8	SubName: Full=Leukocidin/hemolysin toxin family protein;
d1qt65	493	58	11.8	SubName: Full=Putative toxin-antitoxin system protein;
d0ysg1	415	49	11.8	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d0wd88	370	48	11.8	SubName: Full=Zonula occludens toxin family protein;
d0gkz8	352	48	11.8	SubName: Full=Toxin-antitoxin system, antitoxin component, X...
d0eva2	399	48	11.8	SubName: Full=Zonula occludens toxin type 1;
c9sp65	294	48	11.8	SubName: Full=Zeta toxin family protein;
c9m739	317	48	11.8	SubName: Full=Putative Zeta toxin of the postsegregational k...
c8mcl2	242	48	11.8	SubName: Full=Toxin beta-grasp domain-containing protein;
c7tqf0	319	48	11.8	SubName: Full=Shiga toxin 2d subunit A;
c5a9q8	372	48	11.8	SubName: Full=Zonular occludens toxin;
c4tiu2	258	48	11.8	SubName: Full=Cytolethal distending toxin A;
c4tis4	258	48	11.8	SubName: Full=Cytolethal distending toxin A;
c4ltp3	276	48	11.8	SubName: Full=Toxin resistance protein, putative;
c2u736	526	62	11.8	SubName: Full=Mosquitocidal toxin protein;
c2fc10	347	48	11.8	SubName: Full=Membrane protein, toxin regulator;
c1ldv5	257	48	11.8	SubName: Full=Killer toxin REsistant;
b7xlz2	325	48	11.8	SubName: Full=Dermonecrotic toxin;
b5qks7	347	48	11.8	SubName: Full=Predicted membrane protein, putative toxin reg...
b5gbb6	277	48	11.8	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
b3ip45	490	58	11.8	SubName: Full=RTX toxin RtxA;
b2n3w9	258	48	11.8	SubName: Full=Cytolethal distending toxin A;
b2fs66	337	48	11.8	SubName: Full=Putative phage-related protein, similar to zon...
b1t3r7	302	48	11.8	SubName: Full=Zonular occludens toxin; Flags: Precursor;
b1bun0	265	48	11.8	SubName: Full=Beta-2 toxin;
a9lsg2	301	48	11.8	SubName: Full=Exfoliative toxin ExhB;
a7gbf7	490	58	11.8	SubName: Full=Toxin complex component ORF-X3;
a6dwi9	688	81	11.8	SubName: Full=Rhizobiocin/RTX toxin;

a3whs3	569	67	11.8	SubName: Full=Toxin secretion ABC transporter ATP-binding pr...
a3eid4	340	48	11.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
a0z973	405	48	11.8	SubName: Full=Addiction module toxin, Txe/YoeB;
a0yz25	249	48	11.8	SubName: Full=Probable RTX (Repeat in structural toxin) prot...
a0kw86	238	48	11.8	SubName: Full=Zeta toxin family protein;
q6sy98	463	54	11.7	SubName: Full=Putative toxin transporter;
q0jyt1	445	52	11.7	SubName: Full=RTX toxin membrane fusion protein;
q0fty9	521	61	11.7	SubName: Full=Toxin secretion ABC transporter protein, HlyB ...
k9gur4	443	52	11.7	SubName: Full=Toxin biosynthesis protein, putative;
k9f5n2	443	52	11.7	SubName: Full=Toxin biosynthesis protein, putative;
k8rlu8	511	60	11.7	SubName: Full=Zeta toxin family protein;
k2v6t4	489	57	11.7	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
k1vut0	461	54	11.7	SubName: Full=Protoplast regeneration and killer toxin resis...
j5sdr7	461	54	11.7	SubName: Full=Protoplast regeneration and killer toxin resis...
j2kqp9	409	48	11.7	SubName: Full=Zonula occludens toxin;
i4kv96	419	49	11.7	SubName: Full=Pertussis toxin, subunit 1 domain protein;
h0swu5	574	67	11.7	SubName: Full=Putative secretion ATP-binding protein (ABC-ty...
h0siy8	563	66	11.7	SubName: Full=Putative secretion protein (HlyD family); toxi...
g7z4g0	591	69	11.7	SubName: Full=ABC transporter, ATPase component (Type I toxi...
g0clj1	563	66	11.7	SubName: Full=Toxin secretion ABC transporter ATP-binding pr...
f9rba3	478	56	11.7	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
f2j697	444	52	11.7	SubName: Full=Putative toxin/protease secretion system;
e6an77	460	54	11.7	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d8isf1	478	56	11.7	SubName: Full=Cholera toxin secretion EpsM protein;
c9npw1	453	53	11.7	SubName: Full=Zona occludens toxin;
b7j5f6	496	58	11.7	SubName: Full=Outer membrane toxin secretion efflux protein,...
b2uip3	443	52	11.7	SubName: Full=Zonular occludens toxin;
a6fkb6	616	72	11.7	SubName: Full=RTX toxins and related Ca2+-binding proteins-l...
a6d2n0	540	63	11.7	SubName: Full=Toxin secretion ABC transporter protein, HlyB ...
a1cpj9	548	64	11.7	SubName: Full=MFS toxin efflux pump (AflT), putative;
q8pma4	588	68	11.6	SubName: Full=Toxin secretion ABC transporter ATP-binding pr...
q6yix9	560	65	11.6	SubName: Full=Diphtheria toxin;
q6t277	535	62	11.6	SubName: Full=Ink toxin 1;
q3es64	501	58	11.6	SubName: Full=MOSQUITOCIDAL TOXIN PROTEIN;
k9bd02	500	58	11.6	SubName: Full=Zeta toxin;
k6mas4	414	48	11.6	SubName: Full=Zonula occludens toxin;
k6kzm5	500	58	11.6	SubName: Full=Zeta toxin;
k5ptu8	500	58	11.6	SubName: Full=Zeta toxin;
k5pnq2	500	58	11.6	SubName: Full=Zeta toxin;
k5nl26	414	48	11.6	SubName: Full=Zonula occludens toxin;
k5efp5	500	58	11.6	SubName: Full=Zeta toxin;
k5di14	414	48	11.6	SubName: Full=Zonula occludens toxin;
k1fgp2	414	48	11.6	SubName: Full=Zonula occludens toxin;
k1ele4	500	58	11.6	SubName: Full=Zeta toxin;
k0c977	423	49	11.6	SubName: Full=Type I protease secretion protein, hemolytica ...
j5iih6	500	58	11.6	SubName: Full=Zeta toxin;
j3nfs5	535	62	11.6	SubName: Full=Multidrug and toxin extrusion protein 1; SubNa...
j1mdn6	500	58	11.6	SubName: Full=Zeta toxin;
j1lai9	500	58	11.6	SubName: Full=Zeta toxin;
j1bdm5	500	58	11.6	SubName: Full=Zeta toxin;
g4y0w6	458	53	11.6	SubName: Full=Putative ABC associated RTX toxin transporter;...
g4y0v7	458	53	11.6	SubName: Full=Putative ABC associated RTX toxin transporter;...
f7swz7	450	52	11.6	SubName: Full=Toxin complex component ORF-X3;
f5i5x7	414	48	11.6	SubName: Full=Zonula occludens toxin;
f5i008	414	48	11.6	SubName: Full=Zonula occludens toxin;
f3p1w6	569	66	11.6	SubName: Full=Toxin secretion/phage lysis holin;
f0xgi8	441	51	11.6	SubName: Full=Toxin biosynthesis regulatory protein;
f0urw0	413	48	11.6	SubName: Full=Toxin biosynthesis protein;

e9em79	456	53	11.6	SubName: Full=TRI7-like toxin biosynthesis protein;
e4hjc7	569	66	11.6	SubName: Full=Toxin secretion/phage lysis holin;
e4dyp7	569	66	11.6	SubName: Full=Toxin secretion/phage lysis holin;
e0w1w1	466	54	11.6	SubName: Full=Diphtheria toxin resistance protein 2, dph2, pu...
e0the3	584	68	11.6	SubName: Full=Toxin secretion ABC transporter ATP-binding pr...
d8f2h3	507	59	11.6	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d4qz1	580	67	11.6	SubName: Full=Diarrheal toxin/ftsk/spoiii family protein;
d4c5q8	439	51	11.6	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
c9mma2	483	56	11.6	SubName: Full=Toxin-antitoxin system, antitoxin component, X...
c6hh60	413	48	11.6	SubName: Full=Toxin biosynthesis protein;
c4k399	458	53	11.6	SubName: Full=Putative ABC associated RTX toxin transporter,...
c3ks19	490	57	11.6	SubName: Full=Toxin complex component ORF-X3;
b8cum8	552	64	11.6	SubName: Full=Toxin secretion ABC transporter protein, HlyB ...
b1qqf2	490	57	11.6	SubName: Full=Toxin complex component ORF-X3;
a71035	456	53	11.6	RecName: Full=Toxin CfTX-1; Short=Toxin 1; Flags: Precursor;...
a3xsh2	613	71	11.6	SubName: Full=Toxin;
q9rpm6	240	47	11.5	RecName: Full=Guanine nucleotide exchange factor SopE; AltNa...
q9f5r5	333	47	11.5	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
q8ktv6	319	47	11.5	SubName: Full=Shiga toxin 2 A subunit; SubName: Full=Shiga t...
q8ktu8	319	47	11.5	SubName: Full=Shiga toxin 2 A subunit; SubName: Full=Shiga t...
q8gnj7	273	47	11.5	SubName: Full=Exfoliative toxin ExhA;
q8ggk9	319	47	11.5	SubName: Full=Shiga toxin 2d activatable subunit A; SubName:...
q7n937	530	61	11.5	SubName: Full=Insecticidal toxin complex protein TcaZ;
q7bd17	240	47	11.5	RecName: Full=Guanine nucleotide exchange factor SopE; AltNa...
q6dwn9	319	47	11.5	SubName: Full=Shiga toxin 2 subunit A;
q6dwn7	319	47	11.5	SubName: Full=Shiga toxin 2 subunit A;
q6dwn5	319	47	11.5	SubName: Full=Shiga toxin 2 subunit A;
q6dwn3	319	47	11.5	SubName: Full=Shiga toxin 2 subunit A;
q5xhy4	308	47	11.5	RecName: Full=Ecto-ADP-ribosyltransferase 5; EC=2.4.2.31; Al...
q5pfi5	240	47	11.5	RecName: Full=Guanine nucleotide exchange factor SopE; AltNa...
q5mq71	265	47	11.5	SubName: Full=Beta2 toxin; SubName: Full=Beta2-toxin;
q5mq69	265	47	11.5	SubName: Full=Beta2 toxin;
q508i8	387	47	11.5	SubName: Full=Anthrax toxin receptor/neuroblastoma fusion pr...
q4wv05	346	47	11.5	SubName: Full=Toxin biosynthesis protein (GliH), putative;
q4wc23	409	47	11.5	SubName: Full=Toxin biosynthesis protein (Tri7), putative;
q47642	319	47	11.5	SubName: Full=Shiga-like toxin type IIvhc; Flags: Precursor;...
q3rgq1	444	51	11.5	SubName: Full=Zonular occludens toxin;
q3r0p5	444	51	11.5	SubName: Full=Zonular occludens toxin;
q2jag7	350	47	11.5	SubName: Full=Zeta toxin;
q081x8	284	47	11.5	SubName: Full=Cytolethal distending toxin B;
q03qw3	321	47	11.5	SubName: Full=VIP2 A family of actin-ADP-ribosylating toxin;...
p45776	221	47	11.5	RecName: Full=Type II secretion system protein J; Short=T2SS...
p04977	269	47	11.5	RecName: Full=Pertussis toxin subunit 1; Short=PTX S1; AltNa...
o85154	532	61	11.5	SubName: Full=Insecticidal toxin complex protein TcaZ; SubNa...
k9ikq7	488	56	11.5	SubName: Full=Putative anthrax toxin receptor 2;
k8zcv0	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
k8f8h1	350	47	11.5	SubName: Full=Membrane protein, toxin regulator, putative;
k6htw8	247	47	11.5	SubName: Full=Zeta toxin;
k4ib10	327	47	11.5	SubName: Full=Serine kinase toxin of HipAB toxin-antitoxin m...
k4ib84	399	47	11.5	SubName: Full>Addiction module toxin protein HipA;
k4hjn4	355	47	11.5	SubName: Full=Toxin secretion protein;
k3g287	319	47	11.5	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
k2nfm0	342	47	11.5	SubName: Full=Toxin regulator;
k01m55	353	47	11.5	SubName: Full=MW1800 protein; SubName: Full=Toxin regulatory...
j7m7h6	301	47	11.5	SubName: Full=Exfoliative toxin;
j7fsj2	269	47	11.5	SubName: Full=Pertussis toxin subunit 1;
j7fna7	269	47	11.5	SubName: Full=Pertussis toxin subunit 1;
j5tyc2	310	47	11.5	SubName: Full=Zeta toxin;

j4x295	280	47	11.5	SubName: Full=Zeta toxin;
j3jan1	243	47	11.5	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
j2rhm1	300	47	11.5	SubName: Full=Zeta toxin;
j0lsk6	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i8slx8	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i8s0t6	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i8q1b4	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i8p2a3	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i8nym7	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i8lyg5	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i8ksj3	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i8jxx6	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i8jef0	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i8j2y3	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i8h4l5	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i8g9m0	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i8g833	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i8fw85	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i8fcn1	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i8f8h7	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i8clt1	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i8b7y5	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i8ay95	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i8a962	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i8a5j1	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i7z5m0	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i7yjb2	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i7y5q8	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i7xyb9	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i7xx27	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i7x193	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i7wlg6	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i7w355	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i7vuv2	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i7vk00	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i7vey1	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i7v6e1	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i7uzr2	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i7uvt9	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i7unc0	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i7ua88	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i7u9u3	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i7t8p6	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i7src5	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i7sm92	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i7rw13	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i7qib0	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i7pte4	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i7pp02	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i7p2x5	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i7mvn6	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i7mv77	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i6y684	356	47	11.5	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
i6kn25	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i6km18	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i6jw54	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i6jsl1	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i6j356	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;

i6iyi4	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i6igr0	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i6i423	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i6hpx6	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
i3rtf3	273	47	11.5	SubName: Full=Exfoliative toxin ExhA;
i3d783	310	47	11.5	SubName: Full=Zeta toxin;
i2xz17	247	47	11.5	SubName: Full=Putative shiga-like toxin 2 subunit A;
i2xpk1	319	47	11.5	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
i2t9m9	319	47	11.5	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
i2rx93	319	47	11.5	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
i0tzj4	242	47	11.5	SubName: Full=Toxin, beta-grasp domain protein;
h7c8i0	269	47	11.5	SubName: Full=Cytolethal distending toxin B;
h5lf10	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
h5ktu1	341	47	11.5	SubName: Full=Zonular occludens toxin family protein;
h4h616	241	47	11.5	SubName: Full=Beta-grasp domain toxin protein;
h4h615	241	47	11.5	SubName: Full=Beta-grasp domain toxin protein;
h4h0n4	241	47	11.5	SubName: Full=Beta-grasp domain toxin protein;
h4gq11	241	47	11.5	SubName: Full=Beta-grasp domain toxin protein;
h4g4u2	242	47	11.5	SubName: Full=Toxin, beta-grasp domain protein;
h4edm0	241	47	11.5	SubName: Full=Beta-grasp domain toxin protein;
h4e6m5	241	47	11.5	SubName: Full=Beta-grasp domain toxin protein;
h4dz25	241	47	11.5	SubName: Full=Beta-grasp domain toxin protein;
h4di89	241	47	11.5	SubName: Full=Beta-grasp domain toxin protein;
h4d385	241	47	11.5	SubName: Full=Beta-grasp domain toxin protein;
h4cuq6	241	47	11.5	SubName: Full=Beta-grasp domain toxin protein;
h4cl69	241	47	11.5	SubName: Full=Beta-grasp domain toxin protein;
h4ccq8	241	47	11.5	SubName: Full=Beta-grasp domain toxin protein;
h4c656	241	47	11.5	SubName: Full=Beta-grasp domain toxin protein;
h4by58	241	47	11.5	SubName: Full=Beta-grasp domain toxin protein;
h4bg89	241	47	11.5	SubName: Full=Beta-grasp domain toxin protein;
h4a409	241	47	11.5	SubName: Full=Beta-grasp domain toxin protein;
h3yw84	242	47	11.5	SubName: Full=Toxin, beta-grasp domain protein;
h3yfy6	242	47	11.5	SubName: Full=Toxin, beta-grasp domain protein;
h3y8j0	242	47	11.5	SubName: Full=Toxin, beta-grasp domain protein;
h3x4r0	242	47	11.5	SubName: Full=Toxin, beta-grasp domain protein;
h3s694	241	47	11.5	SubName: Full=Beta-grasp domain toxin protein;
h3rx38	241	47	11.5	SubName: Full=Beta-grasp domain toxin protein;
h1uy49	318	47	11.5	SubName: Full=Zeta toxin;
h1tfe8	242	47	11.5	SubName: Full=Toxin, beta-grasp domain protein;
h1t7i6	242	47	11.5	SubName: Full=Toxin, beta-grasp domain protein;
h1snq7	242	47	11.5	SubName: Full=Toxin, beta-grasp domain protein;
h1rh48	242	47	11.5	SubName: Full=Pertussis toxin-like subunit ArtA;
h1lvt7	454	52	11.5	SubName: Full=Toxin-antitoxin system, toxin component domain...
h1gd69	173	47	11.5	SubName: Full=Toxin-antitoxin system, toxin component, GNAT ...
h0sf43	574	66	11.5	SubName: Full=Putative secretion ATP-binding protein (ABC-ty...
h0n8n2	242	47	11.5	SubName: Full=Pertussis toxin-like subunit ArtA;
h0mr56	242	47	11.5	SubName: Full=Pertussis toxin-like subunit ArtA;
h0mfj5	242	47	11.5	SubName: Full=Pertussis toxin-like subunit ArtA;
h0m606	242	47	11.5	SubName: Full=Pertussis toxin-like subunit ArtA;
h0lv12	242	47	11.5	SubName: Full=Pertussis toxin-like subunit ArtA;
h0lhf5	242	47	11.5	SubName: Full=Pertussis toxin-like subunit ArtA;
h0la32	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
h0cpz5	242	47	11.5	SubName: Full=Toxin, beta-grasp domain protein;
h0b0j0	242	47	11.5	SubName: Full=Toxin, beta-grasp domain protein;
g9vv39	242	47	11.5	SubName: Full=Pertussis toxin-like subunit ArtA;
g9vi22	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
g9uye4	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
g9usl2	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;

g9ubc4	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
g9u076	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
g9ts96	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
g9taq8	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
g8gwq0	319	47	11.5	SubName: Full=Shiga toxin 2 subunit A;
g7tn02	285	47	11.5	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
g6e6g6	358	47	11.5	SubName: Full=Zonular occludens toxin;
g5rwe4	240	47	11.5	SubName: Full=Cytolethal distending toxin subunit B;
g5qk51	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
g5mjj9	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
g5mjj6	289	47	11.5	SubName: Full=Cytolethal distending toxin subunit B;
g5m4l5	240	47	11.5	SubName: Full=Cytolethal distending toxin subunit B;
g5gvv1	184	47	11.5	SubName: Full=Toxin-antitoxin system, antitoxin component, X...
g5dsd0	265	47	11.5	SubName: Full=Beta2-toxin;
g1yal2	319	47	11.5	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
f9zg51	212	47	11.5	SubName: Full=Hemolysin-type calcium-binding toxin;
f9s7k3	315	47	11.5	SubName: Full=Zeta toxin family protein;
f9kcq7	242	47	11.5	SubName: Full=Toxin, beta-grasp domain protein;
f9k3x8	242	47	11.5	SubName: Full=Toxin, beta-grasp domain protein;
f8bf54	338	47	11.5	SubName: Full=Predicted membrane protein; putative toxin reg...
f5wm09	242	47	11.5	SubName: Full=Toxin, beta-grasp domain protein;
f5wgd2	242	47	11.5	SubName: Full=Toxin, beta-grasp domain protein;
f5w8g0	242	47	11.5	SubName: Full=Toxin, beta-grasp domain protein;
f4ugw8	244	47	11.5	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
f4lg55	269	47	11.5	SubName: Full=Toxin subunit 1;
f3zdw3	275	47	11.5	SubName: Full=Putative xre family toxin-antitoxin system, an...
f3the7	242	47	11.5	SubName: Full=Toxin, beta-grasp domain protein;
f2qqg6	529	61	11.5	SubName: Full=Multidrug and toxin extrusion protein 1;
f0cwz3	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
f0cvg6	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
f0cj52	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
f0cgy6	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
f0ceu3	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
f0c5c1	380	47	11.5	SubName: Full=Zonular occludens toxin (Zot);
e9uuu2	271	47	11.5	SubName: Full=Toxin-antitoxin system, antitoxin component, X...
e8grg3	242	47	11.5	SubName: Full=Pertussis toxin-like subunit ArtA;
e8gfi3	242	47	11.5	SubName: Full=Pertussis toxin-like subunit ArtA;
e8gci3	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
e8fwd5	242	47	11.5	SubName: Full=Pertussis toxin-like subunit ArtA;
e8fbf6	242	47	11.5	SubName: Full=Pertussis toxin-like subunit ArtA;
e8f4s7	242	47	11.5	SubName: Full=Pertussis toxin-like subunit ArtA;
e8etv7	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
e8ebi0	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
e8dit8	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
e8da22	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
e8cmq4	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
e8c873	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
e8bn42	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
e8ba17	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
e8b4e3	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
e8ajg7	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
e8af80	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
e8a0b8	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
e7zlj2	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
e7zd26	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
e7yx05	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
e7yl41	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
e7y928	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;

e7xzf6	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
e7xn53	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
e7x9t2	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
e7wlp7	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
e7wb85	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
e7v1x7	242	47	11.5	SubName: Full=Putative pertussis-like toxin subunit;
e7mwn5	268	47	11.5	SubName: Full=Staphylococcal toxin, beta-grasp domain protei...
e7c4p4	264	47	11.5	SubName: Full=RTX toxins and related Ca2+-binding proteins;
e5r7q7	242	47	11.5	SubName: Full=Staphylococcal/Streptococcal toxin, beta-grasp...
e5azk6	268	47	11.5	SubName: Full=Staphylococcal/Streptococcal toxin, beta-grasp...
e4iu95	261	47	11.5	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
e4imx1	380	47	11.5	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e1lbn6	256	47	11.5	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
d9y1d5	274	47	11.5	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9wtz2	286	47	11.5	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9wia0	308	47	11.5	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9wes2	364	47	11.5	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9wbu2	277	47	11.5	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9rxa5	315	47	11.5	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d9rm13	353	47	11.5	SubName: Full=Toxin regulatory protein;
d9rjj5	351	47	11.5	SubName: Full=Toxin regulatorly-like protein;
d9rdz4	351	47	11.5	SubName: Full=Toxin regulatorly-like protein;
d9rb40	353	47	11.5	SubName: Full=Toxin regulatory protein;
d6kau2	282	47	11.5	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d6k3z4	289	47	11.5	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d6k3t2	286	47	11.5	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d6hka4	346	47	11.5	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d5nwd3	286	47	11.5	SubName: Full=Putative toxin-antitoxin system, toxin compone...
d4wxh5	382	47	11.5	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d4wud1	305	47	11.5	SubName: Full=Toxin-antitoxin system, toxin component family...
d4wgh2	317	47	11.5	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d4vwj5	380	47	11.5	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
d4vss5	382	47	11.5	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d4vlj7	305	47	11.5	SubName: Full=Toxin-antitoxin system, toxin component family...
d4v8s7	332	47	11.5	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d4mbj6	350	47	11.5	SubName: Full=Predicted membrane protein, putative toxin reg...
d4bvk6	442	51	11.5	SubName: Full=RTX toxin transporter;
d4bvk5	234	47	11.5	SubName: Full=RTX toxin transporter;
d3pgm3	256	47	11.5	SubName: Full=Kunitz/BPTI-like toxin;
d3pg22	254	47	11.5	SubName: Full=Kunitz/BPTI-like toxin;
d3imn0	337	47	11.5	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d2yk22	340	47	11.5	SubName: Full=Toxin coregulated pilus biosynthesis protein E...
d0ys91	344	47	11.5	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d0fwh3	426	49	11.5	SubName: Full=Botulinum toxin-like protein;
c9m6w2	264	47	11.5	SubName: Full=Toxin-antitoxin system, antitoxin component, X...
c8m7q7	242	47	11.5	SubName: Full=Toxin beta-grasp domain-containing protein;
c8m0m0	242	47	11.5	SubName: Full=Toxin beta-grasp domain-containing protein;
c8lv20	242	47	11.5	SubName: Full=Toxin beta-grasp domain-containing protein;
c8lh30	242	47	11.5	SubName: Full=Toxin beta-grasp domain-containing protein;
c8l2z7	242	47	11.5	SubName: Full=Toxin beta-grasp domain-containing protein;
c7b1e8	258	47	11.5	SubName: Full=Cholera toxin A subunit;
c4hg10	341	47	11.5	SubName: Full=Zona occludens toxin;
c4h6e7	341	47	11.5	SubName: Full=Zona occludens toxin;
c3hbb5	353	47	11.5	SubName: Full=35.8-kilodalton mosquitocidal toxin;
c2lhp9	403	47	11.5	SubName: Full=Toxin;
c2jkg2	350	47	11.5	SubName: Full=Membrane protein, toxin regulator;
c2h4p6	350	47	11.5	SubName: Full=Membrane protein, toxin regulator;
c2dcj0	350	47	11.5	SubName: Full=Membrane protein, toxin regulator;

c0xhd1	328	47	11.5	SubName: Full=VIP2 family actin-ADP-ribosylating toxin;
c0x5p0	350	47	11.5	SubName: Full=Membrane protein, toxin regulator;
c0wrv9	328	47	11.5	SubName: Full=VIP2 family actin-ADP-ribosylating toxin;
c0mpk6	269	47	11.5	SubName: Full=Pertussis toxin subunit 1; SubName: Full=Toxin...
b9rcq4	343	47	11.5	SubName: Full=Nadhp hc toxin reductase, putative; EC=1.1.1.2...
b8cv11	353	47	11.5	SubName: Full=Toxin secretion, membrane fusion protein;
b6sd40	293	47	11.5	SubName: Full=Cytolethal distending toxin subunit B;
b6scy5	361	47	11.5	SubName: Full=Putative Shiga-like toxin alpha subunit;
b6k5h7	540	62	11.5	SubName: Full=Multidrug and toxin extrusion protein;
b5gfp6	291	47	11.5	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
b5cj27	242	47	11.5	SubName: Full=Pertussis toxin, subunit 1 subfamily protein;
b4ttl5	242	47	11.5	SubName: Full=Pertussis toxin, subunit 1 subfamily;
b4ez44	403	47	11.5	SubName: Full=Putative toxin;
b3ph10	418	48	11.5	SubName: Full=Putative toxin secretion, membrane fusion prot...
b3bq93	366	47	11.5	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
b2wc59	661	76	11.5	SubName: Full=Protoplast regeneration and killer toxin resis...
b1r976	265	47	11.5	SubName: Full=Beta2 toxin;
b1hmi9	326	47	11.5	SubName: Full=35.8-kilodalton mosquitocidal toxin protein;
b1bf62	265	47	11.5	SubName: Full=Beta-2 toxin;
b0y9m2	409	47	11.5	SubName: Full=Toxin biosynthesis protein (Tri7), putative;
b0y0n1	346	47	11.5	SubName: Full=Toxin biosynthesis protein (GliH), putative;
a7xs54	368	47	11.5	SubName: Full=42 kDa insecticidal toxin;
a7jzc6	323	47	11.5	SubName: Full=Leukocidin/Hemolysin toxin family;
a7hzs6	294	47	11.5	SubName: Full=Zeta toxin superfamily;
a6zsf9	313	47	11.5	SubName: Full=Killer toxin resistant protein;
a6u2t1	242	47	11.5	SubName: Full=Toxin beta-grasp domain protein;
a5txj1	363	47	11.5	SubName: Full=Possible zeta toxin;
a5ivz5	351	47	11.5	SubName: Full=Membrane protein putative toxin regulator-like...
a5itz3	242	47	11.5	SubName: Full=Toxin, beta-grasp domain protein;
a5eig3	573	66	11.5	SubName: Full=Putative toxin/protease secretion system;
a4yte1	598	69	11.5	SubName: Full=Putative secretion ATP-binding protein (ABC-ty...
a4f2c5	284	47	11.5	SubName: Full=Cytolethal distending toxin B;
a3sud4	418	48	11.5	SubName: Full=Putative toxin secretion transmembrane protein...
a2r6y0	539	62	11.5	SubName: Full=Remark: TOXA of Cochliobolus carbonum encodes ...
a2qu64	353	47	11.5	SubName: Full=Function: KTI12 of S. cerevisiae is involved i...
a0fkn6	264	47	11.5	RecName: Full=Astacin-like metalloprotease toxin; EC=3.4.24...
q6yix8	560	64	11.4	SubName: Full=Diphtheria toxin;
q5dz54	484	55	11.4	SubName: Full=Toxin coregulated pilus outer membrane protein...
q03vd0	412	47	11.4	SubName: Full=Predicted membrane protein, putative toxin reg...
q03562	455	52	11.4	RecName: Full=Beta-1,4-mannosyltransferase bre-3; EC=2.4.1.-...
k2v6r1	430	49	11.4	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
k2qif3	413	47	11.4	SubName: Full=Toxin biosynthesis protein (Tri7), putative;
k0yv43	464	53	11.4	SubName: Full=Multidrug and toxin extrusion (MATE) family ef...
k0ykt9	464	53	11.4	SubName: Full=Multidrug and toxin extrusion (MATE) family ef...
i7gr30	560	64	11.4	SubName: Full=Diphtheria toxin;
i4yl09	525	60	11.4	SubName: Full=Ca2+-binding protein, RTX toxin;
h2nvb8	553	63	11.4	SubName: Full=Multidrug and toxin extrusion protein 2;
g9b0x6	440	50	11.4	SubName: Full=Alpha-toxin;
g7vk45	412	47	11.4	SubName: Full=Membrane protein, putative toxin regulator;
g5bkm0	569	65	11.4	SubName: Full=Multidrug and toxin extrusion protein 1;
g4y0w0	458	52	11.4	SubName: Full=Putative ABC associated RTX toxin transporter;...
g4mkf0	501	57	11.4	SubName: Full=Multidrug and toxin extrusion protein 1;
f8xhl9	440	50	11.4	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
f1t1u0	560	64	11.4	SubName: Full=Diphtheria toxin;
f0u573	455	52	11.4	SubName: Full=Toxin biosynthesis protein;
e8vue2	455	52	11.4	SubName: Full=Zona occludens toxin;
d8p2h1	647	74	11.4	SubName: Full=Putative hemolysin-type Ca2+-binding protein-R...
d8n900	440	50	11.4	SubName: Full=Putative zonula occludens toxin;

d8ett5	440	50	11.4	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d4xeh8	446	51	11.4	SubName: Full=HipA family toxin-antitoxin system;
d1qmp6	430	49	11.4	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
c6h2h4	455	52	11.4	SubName: Full=Toxin biosynthesis protein;
c5ic92	560	64	11.4	SubName: Full=Diphtheria toxin;
a5ic10	718	82	11.4	SubName: Full=Toxin secretion ATP binding protein;
a2qc98	568	65	11.4	SubName: Full=Function: TOXA of C. carbonum exports the cycl...
q9ugn5	583	66	11.3	RecName: Full=Poly [ADP-ribose] polymerase 2; Short=PARP-2; ...
q93k92	319	46	11.3	SubName: Full=Shiga-like toxin 2A-subunit;
q93k91	319	46	11.3	SubName: Full=Shiga toxin 2e A; SubName: Full=Shiga toxin 2e...
q8n5y8	322	46	11.3	RecName: Full=Mono [ADP-ribose] polymerase PARP16; EC=2.4.2....
q8l356	258	46	11.3	SubName: Full=Cholera toxin A subunit;
q8ggk8	319	46	11.3	SubName: Full=Variant Shiga toxin type 2 A subunit;
q8ein5	453	51	11.3	SubName: Full=Multidrug and toxin efflux protein MATE family...
q7wuf4	319	46	11.3	SubName: Full=Shiga-like toxin IIe variant subunit A;
q7n2f4	462	52	11.3	SubName: Full=Similar to toxin secretion transporter;
q6upc2	269	46	11.3	SubName: Full=Cytolethal distending toxin B;
q6g140	355	46	11.3	SubName: Full=Hypothetical toxin secretion protein;
q60935	325	46	11.3	RecName: Full=GPI-linked NAD(P)(+)-arginine ADP-ribosyltran...
q5iqz5	258	46	11.3	SubName: Full=Cytolethal distending toxin A;
q5dz59	348	46	11.3	SubName: Full=Toxin coregulated pilus biosynthesis protein T...
q57478	319	46	11.3	SubName: Full=Shiga toxin 2e subunit A; SubName: Full=Slr-II...
q4mv79	476	54	11.3	RecName: Full=Putative ADP-ribosyltransferase Certhrax; EC=2...
q46050	320	46	11.3	SubName: Full=Shiga-like toxin;
q3j0s9	618	70	11.3	SubName: Full=Probable ABC drug/toxin efflux transporter; fu...
q3d3d5	305	46	11.3	SubName: Full=Exfoliative toxin A;
q306l1	362	46	11.3	SubName: Full=40kDa insecticidal toxin;
q1w695	305	46	11.3	RecName: Full=Sphingomyelin phosphodiesterase D LiSicTox-alp...
q0k3d6	462	52	11.3	SubName: Full=RTX toxin membrane fusion protein;
q04868	273	46	11.3	RecName: Full=Elongator complex protein 6; AltName: Full=Gam...
p71293	319	46	11.3	SubName: Full=Shiga-like toxin IIe variant A subunit;
p34182	478	54	11.3	RecName: Full=Zinc metalloproteinase/disintegrin; Contains: ...
p09807	249	46	11.3	RecName: Full=Killer toxin subunit gamma; AltName: Full=RF3 ...
o82881	346	46	11.3	RecName: Full=mRNA endoribonuclease LsoA; EC=3.1.-.-; AltNam...
k9ili5	564	64	11.3	SubName: Full=Putative anthrax toxin receptor 1;
k8w2i0	402	46	11.3	SubName: Full=Toxin XaxA;
k7s0d8	278	46	11.3	SubName: Full=Putative toxin-antitoxin system, toxin compone...
k4zbi8	268	46	11.3	SubName: Full=Zeta toxin;
k4ig64	364	46	11.3	SubName: Full=Antitoxin transcriptional regulator of toxin/a...
k4fe29	346	46	11.3	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
k2q3r6	304	46	11.3	SubName: Full=Rhizobiocin/RTX toxin;
k2bv13	258	46	11.3	SubName: Full=Zeta toxin family protein;
k1uld5	270	46	11.3	SubName: Full=Toxin-antitoxin system, antitoxin component, X...
k0ftu2	234	46	11.3	SubName: Full=Anthrax toxin A moiety lethal factor;
j9uff5	312	46	11.3	SubName: Full=Toxin A;
j9j599	304	46	11.3	SubName: Full=Multidrug and toxin extrusion protein 1;
j7rki9	269	46	11.3	SubName: Full=Pertussis toxin subunit 1; EC=2.4.2.-;
j4tz82	333	46	11.3	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
j2t815	300	46	11.3	SubName: Full=Zeta toxin;
i5pwy0	331	46	11.3	SubName: Full=Toxin B domain protein;
i3cx32	259	46	11.3	SubName: Full=Zeta toxin family protein;
i3cfh0	375	46	11.3	SubName: Full=Zonula occludens toxin; Flags: Precursor;
i3ce08	349	46	11.3	SubName: Full=Zonula occludens toxin;
i2xh57	319	46	11.3	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
i1zp90	301	46	11.3	SubName: Full=Exfoliative toxin, putative;
i0zrp1	433	49	11.3	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
h7c8g7	269	46	11.3	SubName: Full=Cytolethal distending toxin B;
h4vw07	353	46	11.3	SubName: Full=Zonula occludens toxin;

h4u2z6	341	46	11.3	SubName: Full=Zonular occludens toxin family protein;
h4n3v8	387	46	11.3	SubName: Full=Toxin B domain protein;
h4m865	331	46	11.3	SubName: Full=Toxin B domain protein;
h4kxg8	352	46	11.3	SubName: Full=Zonular occludens toxin family protein;
h4jln9	352	46	11.3	SubName: Full=Zonular occludens toxin family protein;
h4hfc9	241	46	11.3	SubName: Full=Beta-grasp domain toxin protein;
h4g3m4	250	46	11.3	SubName: Full=Toxin, beta-grasp domain protein;
h4evy4	241	46	11.3	SubName: Full=Beta-grasp domain toxin protein;
h4en48	241	46	11.3	SubName: Full=Beta-grasp domain toxin protein;
h4ds01	241	46	11.3	SubName: Full=Beta-grasp domain toxin protein;
h4d9h0	241	46	11.3	SubName: Full=Beta-grasp domain toxin protein;
h4bpq6	241	46	11.3	SubName: Full=Toxin beta-grasp domain protein;
h4b0z9	241	46	11.3	SubName: Full=Beta-grasp domain toxin protein;
h4atj2	241	46	11.3	SubName: Full=Beta-grasp domain toxin protein;
h4ake9	241	46	11.3	SubName: Full=Beta-grasp domain toxin protein;
h4ac75	241	46	11.3	SubName: Full=Beta-grasp domain toxin protein;
h3u7x3	242	46	11.3	SubName: Full=Toxin, beta-grasp domain protein;
h3u297	250	46	11.3	SubName: Full=Toxin, beta-grasp domain protein;
h3tsb6	242	46	11.3	SubName: Full=Toxin, beta-grasp domain protein;
h1t1u4	242	46	11.3	SubName: Full=Toxin, beta-grasp domain protein;
h1l1l3	336	46	11.3	SubName: Full=Clostridial binary toxin A;
h0pql3	591	67	11.3	SubName: Full=ADP-ribosylating toxin CARDS;
h0ek52	380	46	11.3	SubName: Full=Putative HC-toxin efflux carrier TOXA;
g9zxk5	331	46	11.3	SubName: Full=Toxin-antitoxin system, toxin component, GNAT ...
g8qy33	346	46	11.3	SubName: Full=Putative membrane protein, putative toxin regu...
g7uze6	356	46	11.3	SubName: Full=Toxin anion resistance protein TelA;
g6dys5	350	46	11.3	SubName: Full=Aerolysin/hemolysin/leukocidin toxin; Flags: P...
g6c780	341	46	11.3	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
g6c706	253	46	11.3	SubName: Full=Zeta toxin;
g6aur6	335	46	11.3	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
g4cn33	296	46	11.3	SubName: Full=Zeta-toxin;
g3jnv8	356	46	11.3	SubName: Full=Killer toxin sensitivity protein;
g2cjh6	319	46	11.3	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
g1yrf0	319	46	11.3	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
g0fda0	319	46	11.3	SubName: Full=Shiga-like toxin 2 subunit A;
f9rse3	442	50	11.3	SubName: Full=Zonular occludens toxin;
f9rba8	346	46	11.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
f9pyf1	336	46	11.3	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
f9jnz6	242	46	11.3	SubName: Full=Toxin, beta-grasp domain protein;
f8grg1	462	52	11.3	SubName: Full=RTX toxin membrane fusion protein RtxD;
f8d2d7	235	46	11.3	SubName: Full=Anthrax toxin A moiety lethal factor; Flags: P...
f4v217	459	52	11.3	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
f4tg28	459	52	11.3	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
f4sz77	459	52	11.3	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
f1zha4	319	46	11.3	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
f0p6u2	310	46	11.3	SubName: Full=Synergohymenotropic toxin;
f0hgz5	396	46	11.3	SubName: Full=Putative toxin-antitoxin system toxin componen...
e7p651	423	48	11.3	SubName: Full=Zonular occludens toxin;
e7ecw1	362	46	11.3	SubName: Full=40kDa insecticidal toxin;
e7b8i9	292	46	11.3	SubName: Full=Toxin subunit S1;
e6l7p0	265	46	11.3	SubName: Full=Cytolethal distending toxin B;
e6i716	387	46	11.3	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e6hv88	387	46	11.3	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e6evc6	393	46	11.3	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e5x3x3	288	46	11.3	SubName: Full=Zeta toxin;
e5ray3	241	46	11.3	SubName: Full=Staphylococcal/Streptococcal toxin, beta-grasp...
e4w0m8	288	46	11.3	SubName: Full=Zeta toxin family protein;
e4jl17	329	46	11.3	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...

e4jgb3	393	46	11.3	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e4jbq1	329	46	11.3	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e4j8y8	393	46	11.3	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e4ixi1	393	46	11.3	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e4ih95	393	46	11.3	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e4ig18	329	46	11.3	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e4i9w5	329	46	11.3	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e4i7b3	393	46	11.3	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e3ypt7	177	46	11.3	SubName: Full=Toxin-antitoxin system, toxin component, gnat ...
e3lex3	235	46	11.3	SubName: Full=Anthrax toxin A moiety lethal factor; Flags: P...
e3e6w4	706	80	11.3	SubName: Full=Toxin secretion ABC transporter, ATP-binding/p...
e1qcc1	591	67	11.3	SubName: Full=ADP-ribosylating toxin CARDS; EC=2.4.2.-;
e0wtr5	342	46	11.3	SubName: Full=Putative ABC associated RTX toxin transporter;...
e0hhw5	387	46	11.3	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e0h811	218	46	11.3	SubName: Full=Putative toxin-antitoxin system, toxin compone...
e0fzj6	218	46	11.3	SubName: Full=Putative toxin-antitoxin system, toxin compone...
d9xzd1	279	46	11.3	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9xy74	260	46	11.3	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9xt06	292	46	11.3	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9wtn2	291	46	11.3	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9rt09	331	46	11.3	SubName: Full=Toxin-antitoxin system, toxin component, Fic d...
d8bs75	341	46	11.3	SubName: Full=Zonula occludens toxin;
d7w2u6	292	46	11.3	SubName: Full=Fic family toxin-antitoxin system;
d7j695	305	46	11.3	SubName: Full=Toxin-antitoxin system toxin component;
d7ikg9	285	46	11.3	SubName: Full=Toxin-antitoxin system, antitoxin component, X...
d7iag2	305	46	11.3	SubName: Full=Toxin-antitoxin system, toxin component;
d6t5n8	311	46	11.3	SubName: Full=Leukocidin/hemolysin toxin family protein;
d6le14	476	54	11.3	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d4x8f5	199	46	11.3	SubName: Full=GNAT family toxin-antitoxin system;
d4x5p2	196	46	11.3	SubName: Full=Fic family toxin-antitoxin system;
d4w3k8	396	46	11.3	SubName: Full=Toxin-antitoxin system toxin component, PIN fa...
d4ue98	311	46	11.3	SubName: Full=Leukocidin/hemolysin toxin family protein;
d4u919	311	46	11.3	SubName: Full=Leukocidin/hemolysin toxin family protein;
d3v104	350	46	11.3	SubName: Full=Toxin XaxB;
d3uxc2	451	51	11.3	SubName: Full=RTX toxin ABC transporter protein (MFP) RtxD;
d3kzy5	297	46	11.3	SubName: Full=Putative toxin-antitoxin system, toxin compone...
d2yjt8	503	57	11.3	SubName: Full=Toxin coregulated pilus biosynthesis protein I...
d2una2	311	46	11.3	SubName: Full=Leukocidin/hemolysin toxin family protein;
d2fn03	311	46	11.3	SubName: Full=Leukocidin/hemolysin toxin family protein;
d2fn02	327	46	11.3	SubName: Full=Leukocidin/hemolysin toxin family protein;
d1vv17	224	46	11.3	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d1qjx4	311	46	11.3	SubName: Full=Leukocidin/hemolysin toxin family protein;
d1pb70	345	46	11.3	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d1p465	372	46	11.3	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d0gpm9	332	46	11.3	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
c9n133	370	46	11.3	SubName: Full=Toxin-antitoxin system, antitoxin component, X...
c8vq72	479	54	11.3	SubName: Full=Toxin biosynthesis regulatory protein AflJ, pu...
c8rrj6	265	46	11.3	SubName: Full=Toxin-antitoxin system, toxin component;
c8mig4	241	46	11.3	SubName: Full=Toxin beta-grasp domain-containing protein;
c8m8z1	241	46	11.3	SubName: Full=Toxin beta-gncated TagFrasp domain-containing ...
c8m2g3	241	46	11.3	SubName: Full=Toxin beta-grasp domain-containing protein;
c8lkq0	241	46	11.3	SubName: Full=Toxin beta-grasp domain-containing protein;
c8l4c5	241	46	11.3	SubName: Full=Toxin beta-grasp domain-containing protein;
c7tqg2	319	46	11.3	SubName: Full=Shiga toxin 2e subunit A;
c7tqf8	319	46	11.3	SubName: Full=Shiga toxin 2e subunit A;
c7tqf6	319	46	11.3	SubName: Full=Shiga toxin 2g subunit A; SubName: Full=Stx2gA...
c7tqe6	319	46	11.3	SubName: Full=Shiga toxin 2e subunit A;
c6lb00	326	46	11.3	SubName: Full=Toxin-antitoxin system, antitoxin component, X...

c6bku5	276	46	11.3	SubName: Full=Zonular occludens toxin;
c4tiq6	258	46	11.3	SubName: Full=Cytolethal distending toxin A;
c4l4z6	352	46	11.3	SubName: Full=Membrane protein putative toxin regulator-like...
c4i0k8	322	46	11.3	SubName: Full=Translocated cysteine protease/Rho GTPase toxi...
c4hb61	322	46	11.3	SubName: Full=Translocated cysteine protease/Rho GTPase toxi...
c3wyh0	300	46	11.3	SubName: Full=Zeta-toxin;
c3wiu3	269	46	11.3	SubName: Full=Zeta-toxin;
c3jr21	289	46	11.3	SubName: Full=Putative zeta toxin protein;
c3htd7	353	46	11.3	SubName: Full=35.8-kilodalton mosquitocidal toxin;
c2khj0	425	48	11.3	SubName: Full=Membrane protein, toxin regulator;
c2d4w6	325	46	11.3	SubName: Full=VIP2 family actin-ADP-ribosylating toxin;
c0awj0	359	46	11.3	SubName: Full=Anthrax toxin LF subunit;
b8qgz7	318	46	11.3	SubName: Full=Delta toxin;
b5gie7	199	46	11.3	SubName: Full=PIN family toxin-antitoxin system, toxin compo...
b5gia4	271	46	11.3	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
b5g8z0	273	46	11.3	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
b2vd51	259	46	11.3	SubName: Full=Probable toxin transcriptional activator ToxR;...
b1be44	286	46	11.3	SubName: Full=Non-toxin haemagglutinin HA-33;
b0tsz7	415	47	11.3	SubName: Full=Toxin secretion, membrane fusion protein;
a9d923	415	47	11.3	SubName: Full=Toxin secretion, membrane fusion protein;
a6u0y6	241	46	11.3	SubName: Full=Toxin beta-grasp domain protein; Flags: Precur...
a6mts3	319	46	11.3	SubName: Full=Shiga toxin 2 A subunit;
a6m3u9	322	46	11.3	SubName: Full=Translocated cysteine protease/Rho GTPase toxi...
a6apn4	378	46	11.3	SubName: Full=Insecticidal toxin, SepC/Tcc class;
a5kv82	310	46	11.3	SubName: Full=RTX (Repeat in toxin) cytotoxin;
a5is52	241	46	11.3	SubName: Full=Toxin, beta-grasp domain protein; Flags: Precu...
a4usb4	307	46	11.3	RecName: Full=Sphingomyelin phosphodiesterase D LiSicTox-alp...
a4jw81	513	58	11.3	SubName: Full=Zeta toxin family protein;
a3usg7	239	46	11.3	SubName: Full=Cholera toxin transcriptional activator;
a3elq5	247	46	11.3	SubName: Full=Toxin secretion transporter, putative;
a3eid1	278	46	11.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
a3d4m2	381	46	11.3	SubName: Full=Zonular occludens toxin;
a3cq47	305	46	11.3	SubName: Full=Exfoliative toxin, putative;
a2r356	521	59	11.3	SubName: Full=Function: initial oxygenation step in trichoth...
a1d5u9	325	46	11.3	SubName: Full=Toxin biosynthesis proten (Fum3), putative;
q8pak3	563	63	11.2	SubName: Full=Toxin secretion ABC transporter ATP-binding pr...
q8efq1	501	56	11.2	SubName: Full=Multidrug and toxin efflux protein MATE family...
q7wuh3	427	48	11.2	SubName: Full=Binary ADP-ribosyltransferase CDT toxin;
q5nv03	605	68	11.2	SubName: Full=Hypothetical Toxin coregulated pilus biosynth...
q5nv02	411	46	11.2	SubName: Full=Hypothetical Toxin coregulated pilus biosynth...
q508i6	410	46	11.2	SubName: Full=Anthrax toxin receptor/neuroblastoma fusion pr...
q508i5	411	46	11.2	SubName: Full=Anthrax toxin receptor/neuroblastoma fusion pr...
q4ut18	563	63	11.2	SubName: Full=Toxin secretion ABC transporter ATP-binding pr...
p75409	591	66	11.2	RecName: Full=ADP-ribosylating toxin CARDS; EC=2.4.2.-; AltN...
p32461	534	60	11.2	RecName: Full=Diphthamide biosynthesis protein 2; AltName: F...
k9bpf3	491	55	11.2	SubName: Full=Zonula occludens toxin;
k8wa10	590	66	11.2	SubName: Full=Insecticidal toxin complex protein TccC3;
k5exv9	491	55	11.2	SubName: Full=Zonula occludens toxin;
k4su70	457	51	11.2	SubName: Full=Multidrug and toxin extrusion (MATE) family ef...
k4seg3	457	51	11.2	SubName: Full=Multidrug and toxin extrusion (MATE) family ef...
k4ryg4	457	51	11.2	SubName: Full=Multidrug and toxin extrusion (MATE) family ef...
j2jm71	587	66	11.2	SubName: Full=Ca2+-binding protein, RTX toxin;
h0edv3	591	66	11.2	SubName: Full=Putative HC-toxin efflux carrier TOXA;
g4t4y4	511	57	11.2	SubName: Full=Related to DPH2-diphtheria toxin resistance pr...
f9ri70	695	78	11.2	SubName: Full=Toxin secretion ABC transporter, transmembrane...
e2yrv0	410	46	11.2	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
d5vus2	750	84	11.2	SubName: Full=Toxin complex component ORF-X2;
d5rx44	463	52	11.2	SubName: Full=Iota toxin component Ia; EC=2.4.2.31;

d5q240	463	52	11.2	SubName: Full=Iota toxin component Ia; EC=2.4.2.31;
d3v915	429	48	11.2	SubName: Full=JHE-like toxin, ''Photorhabdus insecticidal re...
d0yu51	436	49	11.2	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
c9nyc0	616	69	11.2	SubName: Full=Cytolysin and hemolysin HlyA Pore-forming toxi...
c8tbn4	410	46	11.2	SubName: Full=Xre family toxin-antitoxin system;
c8n925	420	47	11.2	SubName: Full=Toxin secretion ABC superfamily ATP binding ca...
c6hn43	412	46	11.2	SubName: Full=Toxin-insensitive protein;
c5jv20	418	47	11.2	SubName: Full=Toxin-insensitive protein;
c4s4a0	650	73	11.2	SubName: Full=RTX toxin and Ca2+-binding protein;
b5x306	635	71	11.2	SubName: Full=Multidrug and toxin extrusion protein 1;
b4f0p6	690	77	11.2	SubName: Full=Putative toxin transporter;
b0i1u1	560	63	11.2	SubName: Full=Diphtheria toxin;
a7gbf8	750	84	11.2	SubName: Full=Toxin complex component ORF-X2;
q9ric3	532	59	11.1	SubName: Full=Toxin;
q9f5q7	276	45	11.1	SubName: Full=Toxin co-regulated pilus virulence regulatory ...
q93tt2	338	45	11.1	SubName: Full=Toxin-coregulated pilus biosynthesis protein F...
q93ey5	319	45	11.1	SubName: Full=Stx2-NV206 toxin A subunit;
q8z6a7	269	45	11.1	RecName: Full=Cytolethal distending toxin subunit B homolog;...
q8nju1	238	45	11.1	SubName: Full=Killer toxin zygocin;
q8g8k7	319	45	11.1	SubName: Full=Shiga toxin 2 A subunit; SubName: Full=Shiga t...
q878k3	292	45	11.1	SubName: Full=Putative exfoliative toxin;
q75qq5	686	76	11.1	SubName: Full=Putative mosquitocidal toxin;
q6zje8	341	45	11.1	SubName: Full=Os07g0598000 protein; SubName: Full=Putative N...
q5wv7	319	45	11.1	SubName: Full=Shiga toxin 2g subunit A; SubName: Full=Verocy...
q5u2q4	322	45	11.1	RecName: Full=Mono [ADP-ribose] polymerase PARP16; EC=2.4.2....
q5pmi6	242	45	11.1	SubName: Full=Putative pertussis-like toxin subunit;
q5mq75	265	45	11.1	SubName: Full=Beta2 toxin;
q5iqz8	258	45	11.1	SubName: Full=Cytolethal distending toxin A;
q5iqz3	258	45	11.1	SubName: Full=Cytolethal distending toxin A;
q5hx87	265	45	11.1	SubName: Full=Cytolethal distending toxin, subunit B;
q5f1k5	265	45	11.1	SubName: Full=Cytolethal distending toxin B;
q5e000	394	45	11.1	SubName: Full=Zona occludens toxin;
q5dkx4	277	45	11.1	SubName: Full=Exfoliative toxin ExhB;
q4wqz1	263	45	11.1	SubName: Full=Toxin biosynthesis protein, putative;
q306l2	362	45	11.1	SubName: Full=40kDa insecticidal toxin;
q1i6g2	449	50	11.1	SubName: Full=Putative type I toxin efflux outer membrane pr...
q0hji0	238	45	11.1	SubName: Full=Zeta toxin family protein;
q039a3	382	45	11.1	SubName: Full=Predicted membrane protein, putative toxin reg...
q03037	319	45	11.1	SubName: Full=Shiga toxin 2d subunit A; SubName: Full=Shiga-...
q02908	557	62	11.1	RecName: Full=Elongator complex protein 3; EC=2.3.1.48; AltN...
p32566	505	56	11.1	RecName: Full=Cell wall assembly regulator SMI1; AltName: Fu...
p29491	278	45	11.1	RecName: Full=Toxin coregulated pilus biosynthesis protein D...
p23874	440	49	11.1	RecName: Full=Serine/threonine-protein kinase HipA; Short=Se...
p0c6q5	338	45	11.1	RecName: Full=Toxin coregulated pilus biosynthesis protein F...
o32586	269	45	11.1	SubName: Full=Cytolethal distending toxin B; SubName: Full=C...
k7a6q3	407	45	11.1	SubName: Full=RTX toxin, putative;
k5ugv1	338	45	11.1	SubName: Full=Toxin coregulated pilus biosynthesis protein F...
k5u3m8	338	45	11.1	SubName: Full=Toxin coregulated pilus biosynthesis protein F...
k5rhx7	338	45	11.1	SubName: Full=Toxin coregulated pilus biosynthesis protein F...
k5qra5	338	45	11.1	SubName: Full=Toxin coregulated pilus biosynthesis protein F...
k5nim9	338	45	11.1	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
k5l3u1	338	45	11.1	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
k5k6j3	338	45	11.1	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
k5id39	319	45	11.1	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
k4rfw7	255	45	11.1	SubName: Full=ArsR family toxin-antitoxin system, antitoxin ...
k4im55	342	45	11.1	SubName: Full=Antitoxin transcriptional regulator of toxin-a...
k4fw70	235	45	11.1	SubName: Full=Zeta toxin family protein;
k3hvg5	319	45	11.1	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;

k3hq53	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B; EC=3.1....
k2xrj7	338	45	11.1	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
k2wn46	338	45	11.1	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
k2w8k1	338	45	11.1	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
k2u4s7	338	45	11.1	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
k2pm82	310	45	11.1	SubName: Full=Exfoliative toxin A;
k2jbw1	279	45	11.1	SubName: Full=Putative Hemolysin-type calcium-binding RTX to...
k0g684	308	45	11.1	SubName: Full=35.8-kilodalton mosquitocidal toxin;
j5w1v5	345	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
j5vna7	312	45	11.1	SubName: Full=Zeta toxin;
j5kgw5	206	45	11.1	SubName: Full=Putative toxin-antitoxin system, toxin compone...
j5bjz7	259	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, GNAT ...
j2w4e9	440	49	11.1	SubName: Full=HipA family toxin-antitoxin system;
j2v1i9	440	49	11.1	SubName: Full=HipA family toxin-antitoxin system;
j2m8v2	319	45	11.1	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
j2k4a0	440	49	11.1	SubName: Full=HipA family toxin-antitoxin system;
j1zrl5	338	45	11.1	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
j1z6q4	338	45	11.1	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
j1xr30	338	45	11.1	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
j1wgs6	338	45	11.1	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
j1lpd1	338	45	11.1	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
j1kf44	338	45	11.1	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
j1fjz7	338	45	11.1	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
j1ffe8	338	45	11.1	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
j1cbt3	338	45	11.1	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
i9wqq0	221	45	11.1	SubName: Full=Zeta toxin family protein;
i8iqr1	422	47	11.1	SubName: Full=Toxin biosynthesis protein;
i7gyv8	278	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
i5pdi9	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B; EC=3.1....
i3rtf5	273	45	11.1	SubName: Full=Exfoliative toxin ExhA;
i3d9c3	345	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
i2t6v2	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B; EC=3.1....
i2r9w7	319	45	11.1	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
i2nct7	246	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
i2j6r1	346	45	11.1	SubName: Full=Zonula occludens toxin;
i2fc55	278	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
i2e2g1	370	45	11.1	SubName: Full=Binary toxin A;
i1bb96	433	48	11.1	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
i0vzn0	333	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
i0vmm6	440	49	11.1	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
i0vkv8	269	45	11.1	SubName: Full=Type III cytolethal distending toxin protein C...
i0sx66	333	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
i0nwh0	252	45	11.1	SubName: Full=Zeta toxin family protein;
i0nqq9	252	45	11.1	SubName: Full=Zeta toxin family protein;
i0n969	252	45	11.1	SubName: Full=Zeta toxin family protein;
h8l7m2	258	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
h7ud26	267	45	11.1	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h7u7d5	267	45	11.1	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h7trs2	267	45	11.1	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h7t912	267	45	11.1	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h6rwj1	194	45	11.1	SubName: Full=Putative secreted Ca2+-binding toxin;
h6nu27	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
h5j0f5	352	45	11.1	SubName: Full=Zonular occludens toxin family protein;
h4p1p3	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B; EC=3.1....
h4fsg6	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit CdtB;
h4b859	241	45	11.1	SubName: Full=Beta-grasp domain toxin protein;
h2d740	226	45	11.1	SubName: Full=Putative zeta toxin;
h1w5z2	260	45	11.1	SubName: Full=Putative Hemolysin-type calcium-binding toxin,...

h1ski9	250	45	11.1	SubName: Full=Toxin, beta-grasp domain protein;
h1rh51	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit CdtB;
h1lf10	247	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
h0udd3	317	45	11.1	SubName: Full=Clostridium epsilon toxin ETX/Bacillus mosquit...
h0u5b4	362	45	11.1	SubName: Full=Clostridium epsilon toxin ETX/Bacillus mosquit...
h0n8n5	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit CdtB;
h0mr59	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit CdtB;
h0mfj2	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit CdtB;
h0m603	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit CdtB;
h0lv15	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit CdtB;
h0lhf2	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit CdtB;
h0la29	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B protein;...
h0cbb8	250	45	11.1	SubName: Full=Toxin, beta-grasp domain protein;
h0avl6	250	45	11.1	SubName: Full=Toxin, beta-grasp domain protein;
g9ydc2	222	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, Bro d...
g9vv42	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit CdtB;
g9vi19	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
g9uye7	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
g9usl5	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
g9ubc7	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
g9u073	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
g9ts99	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
g9tar1	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
g8pyb9	246	45	11.1	SubName: Full=Zeta toxin;
g8nsi7	247	45	11.1	SubName: Full=Zeta toxin family protein;
g7y1c6	274	45	11.1	SubName: Full=HC-toxin synthetase;
g7xxq8	403	45	11.1	SubName: Full=Cercosporin toxin biosynthesis protein;
g7tn03	338	45	11.1	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
g7iar1	540	60	11.1	SubName: Full=Multidrug and toxin extrusion protein;
g7bua6	338	45	11.1	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
g7av76	338	45	11.1	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
g7alp5	338	45	11.1	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
g7aaj7	338	45	11.1	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
g7alc1	338	45	11.1	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
g6zqt9	338	45	11.1	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
g6zd90	338	45	11.1	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
g5rwe7	242	45	11.1	SubName: Full=Putative pertussis-like toxin subunit;
g5qk48	270	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
g5p6a2	270	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
g5gyq5	379	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
g5bk19	496	55	11.1	SubName: Full=Multidrug and toxin extrusion protein 2;
g4ca95	431	48	11.1	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
g3iyt3	362	45	11.1	SubName: Full=Zonular occludens toxin;
g2j4u6	389	45	11.1	SubName: Full=Zonula occludens toxin family protein;
g2c3l1	240	45	11.1	SubName: Full=Pertussis toxin, subunit 1 family protein;
g1y8g7	260	45	11.1	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
g0st31	258	45	11.1	SubName: Full=Toxin, cholera;
g0slw3	338	45	11.1	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
g0dj07	381	45	11.1	SubName: Full=Zonular occludens toxin;
f9rny8	442	49	11.1	SubName: Full=Zonular occludens toxin;
f9n0y9	360	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
f9c565	338	45	11.1	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
f9b8s7	338	45	11.1	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
f9a328	338	45	11.1	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
f8ztz4	338	45	11.1	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
f8zj47	338	45	11.1	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
f8z7r0	338	45	11.1	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
f8ywt0	338	45	11.1	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...

f7nbg0	265	45	11.1	SubName: Full=RTX toxin Ca2+-binding protein;
f5rrs2	258	45	11.1	SubName: Full=Toxin transcriptional activator ToxR;
f5rhd4	384	45	11.1	SubName: Full=Zonular occludens toxin;
f5kxt4	432	48	11.1	SubName: Full=Toxin-antitoxin system toxin component, PIN fa...
f4xfr5	308	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
f4xa11	275	45	11.1	SubName: Full=Toxin-antitoxin system, antitoxin component, X...
f4una7	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B (CDT B);...
f4uml6	440	49	11.1	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
f4u8i7	440	49	11.1	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
f2t6g2	415	46	11.1	SubName: Full=Toxin-insensitive protein;
f2q003	366	45	11.1	SubName: Full=Killer toxin sensitivity protein;
f2g314	606	67	11.1	SubName: Full=RTX toxin, putative;
f0xft7	388	45	11.1	SubName: Full=Killer toxin sensitivity protein;
f0scp7	470	52	11.1	SubName: Full=Binary exotoxin B/Anthrax toxin B moiety prote...
f0qff7	568	63	11.1	SubName: Full=RTX toxin;
f0ljr2	358	45	11.1	SubName: Full=Diphtheria toxin resistance protein;
f0cwz0	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
f0cvg3	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
f0cj49	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
f0cgy3	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B protein;...
f0ceu6	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B protein;...
e9v3r2	388	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
e9trs2	440	49	11.1	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
e9tb78	440	49	11.1	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
e9fjv2	329	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
e9e8q4	414	46	11.1	SubName: Full=Toxin biosynthesis protein, putative;
e9dv19	249	45	11.1	SubName: Full=TRI7-like toxin biosynthesis protein;
e8grg6	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit CdtB;
e8gfi6	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit CdtB;
e8gci6	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
e8fwd8	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit CdtB;
e8f4s4	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit CdtB;
e8etv4	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
e8ebi3	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
e8diu1	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
e8cmq1	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
e8c870	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
e8bn44	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
e8ba20	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
e8b4e6	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit;
e8ajh0	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
e8af83	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
e8a0b5	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
e7zli9	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
e7zd29	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
e7yx02	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
e7yl44	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
e7y931	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
e7xzf9	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
e7xn56	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
e7x9t5	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
e7wlq0	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
e7wbt3	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
e7vlx4	269	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
e7mwn7	268	45	11.1	SubName: Full=Staphylococcal toxin, beta-grasp domain protei...
e6rt81	265	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
e6l5i8	352	45	11.1	SubName: Full=Toxin secretion ATP-binding protein;
e6itw7	393	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...

e6emj7	393	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e6bp89	440	49	11.1	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
e6asa0	440	49	11.1	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
e5zx56	440	49	11.1	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
e5rq11	277	45	11.1	SubName: Full=Exfoliative toxin;
e4zte0	548	61	11.1	SubName: Full=Similar to MFS toxin efflux pump (AflT);
e4imv7	393	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e3zfr0	227	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
e3yzx0	259	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
e2z9s9	329	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
e2yzp0	393	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e2sl20	248	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
e2csk7	305	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
e1vvw6	310	45	11.1	SubName: Full=Zeta toxin-like protein;
e1tq15	364	45	11.1	SubName: Full=Possible toxin regulator;
e1ng91	280	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
e1mea3	309	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, Fic d...
e1j966	440	49	11.1	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
e1hyb0	440	49	11.1	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
e1hfw3	440	49	11.1	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
e0hba4	393	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e0gq32	393	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e0gga0	387	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
d9y153	295	45	11.1	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9ww10	253	45	11.1	SubName: Full=ArsR family toxin-antitoxin system, antitoxin ...
d9wqw2	277	45	11.1	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9wcm9	289	45	11.1	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9w941	279	45	11.1	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d8ggq7	382	45	11.1	SubName: Full=Predicted membrane protein, putative toxin reg...
d8ea14	268	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d8buc8	440	49	11.1	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d8be79	440	49	11.1	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d8b9r9	440	49	11.1	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d8au28	440	49	11.1	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d7zrj6	440	49	11.1	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d7z993	440	49	11.1	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d7yrt0	440	49	11.1	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d7y252	440	49	11.1	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d7xlq2	440	49	11.1	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d7vd09	364	45	11.1	SubName: Full=Possible toxin regulator;
d7jyc0	305	45	11.1	SubName: Full=Putative toxin-antitoxin system, toxin compone...
d7j5y0	288	45	11.1	SubName: Full=Zeta toxin superfamily;
d7hla9	278	45	11.1	SubName: Full=Toxin coregulated pilus biosynthesis protein D...
d7hla5	338	45	11.1	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
d7hjn9	258	45	11.1	SubName: Full=Cholera toxin A protein;
d6lfk4	269	45	11.1	SubName: Full=Zeta-toxin;
d6kle4	256	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
d6kgw4	306	45	11.1	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d6k5m5	280	45	11.1	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d5l5r4	224	45	11.1	SubName: Full=Toxin co-regulated pilus;
d4m327	347	45	11.1	SubName: Full=Predicted membrane protein, putative toxin reg...
d4dk35	433	48	11.1	SubName: Full=TRI7-like toxin biosynthesis protein, putative...
d4cwb0	271	45	11.1	SubName: Full=Zeta-toxin;
d4cne1	506	56	11.1	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d3v902	372	45	11.1	SubName: Full=Txp40, 40kDa insecticidal toxin (Previously na...
d3lwe4	330	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d3lqb7	261	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
d3ikr6	422	47	11.1	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...

d3ieg4	335	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d2yk23	338	45	11.1	SubName: Full=Toxin coregulated pilus biosynthesis protein F...
d2yk20	273	45	11.1	SubName: Full=Toxin coregulated pilus biosynthesis protein T...
d2utu2	262	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
d2una1	326	45	11.1	SubName: Full=Leukocidin/hemolysin toxin family protein;
d2nta5	324	45	11.1	SubName: Full=RTX toxins;
d1ylh0	386	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
d1yhl6	261	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
d1yg78	241	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
d0ys52	451	50	11.1	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d0whw8	371	45	11.1	SubName: Full=Toxin-antitoxin system, antitoxin component, A...
d0wb02	329	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d0w4t6	239	45	11.1	SubName: Full=Putative zeta-toxin;
d0hgy5	215	45	11.1	SubName: Full=RTX toxin transporter;
d0h643	338	45	11.1	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
d0h262	332	45	11.1	SubName: Full=Cytolysin and hemolysin HlyA Pore-forming toxi...
c9kj89	249	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
c8vq62	265	45	11.1	SubName: Full=Toxin biosynthesis protein, putative (AFU_orth...
c8tah8	193	45	11.1	SubName: Full=Xre family toxin-antitoxin system;
c8ru35	255	45	11.1	SubName: Full=Bro family toxin-antitoxin system, toxin compo...
c8p7k5	307	45	11.1	SubName: Full=Xre family toxin-antitoxin system;
c8m6y6	229	45	11.1	SubName: Full=Toxin beta-grasp domain-containing protein;
c7n1m0	357	45	11.1	SubName: Full=Predicted membrane protein, putative toxin reg...
c6yew4	338	45	11.1	SubName: Full=Toxin-coregulated pilus biosynthesis protein F...
c6yew0	278	45	11.1	SubName: Full=Toxin coregulated pilus biosynthesis protein D...
c6yc25	258	45	11.1	SubName: Full=Cholera toxin A protein;
c6rw18	338	45	11.1	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
c6m4h5	323	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
c6m3i7	325	45	11.1	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
c6dh63	348	45	11.1	SubName: Full=Zonular occludens toxin; Flags: Precursor;
c5zzp9	269	45	11.1	SubName: Full=Type III cytolethal distending toxin protein C...
c5tns4	324	45	11.1	SubName: Full=Putative RTX toxin exported protein;
c5h0f2	224	45	11.1	SubName: Full=Toxin co-regulated pilus A variant;
c3q8h1	288	45	11.1	SubName: Full=Anititoxin/toxin system zeta toxin;
c3nt65	278	45	11.1	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
c3nt61	338	45	11.1	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
c3lt88	338	45	11.1	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
c3lt84	278	45	11.1	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
c2ja17	278	45	11.1	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
c2ja13	338	45	11.1	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
c2ign4	338	45	11.1	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
c2ign0	278	45	11.1	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
c2ffk1	382	45	11.1	SubName: Full=Membrane protein, toxin regulator;
c1c1c5	195	45	11.1	SubName: Full=Ras-related C3 botulinum toxin substrate 1;
b9lab8	389	45	11.1	SubName: Full=Zonular occludens toxin (Zot) family;
b9kp49	280	45	11.1	SubName: Full=Hemolysin-type calcium-binding toxin;
b9jje1	479	53	11.1	SubName: Full=Rhizobiocin/RTX toxin and hemolysin-type calci...
b8zk83	252	45	11.1	SubName: Full=Zeta toxin;
b8neg2	422	47	11.1	SubName: Full=Toxin biosynthesis protein, putative;
b8maj2	248	45	11.1	SubName: Full=Toxin biosynthesis ketoreductase, putative;
b7lkz6	311	45	11.1	SubName: Full=Putative zeta toxin poison-antidote element;
b6sd13	329	45	11.1	SubName: Full=Cytolethal distending toxin subunit B;
b6qk83	381	45	11.1	SubName: Full=Toxin biosynthesis protein, putative;
b5nit8	269	45	11.1	SubName: Full=Cytolethal distending toxin B;
b5nit5	242	45	11.1	SubName: Full=Pertussis toxin, subunit 1 subfamily;
b5ghl4	558	62	11.1	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
b5g8z8	379	45	11.1	SubName: Full=Fic family toxin-antitoxin system, toxin compo...
b5cj30	269	45	11.1	SubName: Full=Cytolethal distending toxin B;

b5bad3	242	45	11.1	SubName: Full=Putative pertussis-like toxin subunit;
b4ttl8	269	45	11.1	SubName: Full=Cytolethal distending toxin B;
b4apr7	345	45	11.1	SubName: Full=Zeta toxin family protein;
b3c673	288	45	11.1	SubName: Full=Zeta toxin;
b2vi07	488	54	11.1	SubName: Full=General secretion pathway protein E (Type II t...
b2n4h4	269	45	11.1	SubName: Full=Cytolethal distending toxin B;
b1er33	258	45	11.1	SubName: Full=Cytolethal distending toxin A;
b0y588	263	45	11.1	SubName: Full=Toxin biosynthesis protein, putative;
a6mtu5	317	45	11.1	SubName: Full=Shiga toxin 2d A subunit;
a6mts1	319	45	11.1	SubName: Full=Shiga toxin 2 A subunit;
a6m446	532	59	11.1	SubName: Full=Toxin;
a6dwi8	611	68	11.1	SubName: Full=Rhizobiocin/RTX toxin;
a5vlv0	369	45	11.1	SubName: Full=Membrane protein putative toxin regulator-like...
a5f397	278	45	11.1	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
a5f383	338	45	11.1	RecName: Full=Toxin coregulated pilus biosynthesis protein F...
a4f283	265	45	11.1	SubName: Full=Cytolethal distending toxin B;
a3png2	280	45	11.1	SubName: Full=Hemolysin-type calcium-binding toxin;
a3jrr9	574	64	11.1	SubName: Full=ABC protein toxin exporter, fused ATPase and i...
a3gys4	338	45	11.1	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
a3gys0	278	45	11.1	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
a3gmd8	278	45	11.1	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
a3gmd4	338	45	11.1	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
a1f0z2	338	45	11.1	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
a1f0y8	278	45	11.1	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
a1eic0	278	45	11.1	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
a1eib6	338	45	11.1	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
a0y7q9	452	50	11.1	SubName: Full=Putative toxin secretion transmembrane protein...
q9h6x2	564	62	11.0	RecName: Full=Anthrax toxin receptor 1; AltName: Full=Tumor ...
q8ech2	455	50	11.0	SubName: Full=Toxin-antitoxin system toxin HipA family;
q508i7	419	46	11.0	SubName: Full=Anthrax toxin receptor/neuroblastoma fusion pr...
q2k908	700	77	11.0	SubName: Full=Putative RTX toxin hemolysin-type calcium-bind...
p21454	591	65	11.0	RecName: Full=Mono(ADP-ribosyl)transferase SpvB; Short=mADPR...
p17450	591	65	11.0	RecName: Full=Mono(ADP-ribosyl)transferase SpvB; Short=mADPR...
k8ze19	520	57	11.0	SubName: Full=Toxin-antitoxin toxin pin family;
k8ga89	562	62	11.0	SubName: Full=Toxin secretion ABC transporter ATP-binding pr...
k8g3n9	562	62	11.0	SubName: Full=Toxin secretion ABC transporter ATP-binding pr...
j9ef80	509	56	11.0	SubName: Full=Multidrug and toxin extrusion protein 2;
i8t555	583	64	11.0	SubName: Full=Antitoxin, type II toxin-antitoxin system fami...
i4e2p0	408	45	11.0	SubName: Full=General secretion pathway protein E Type II tr...
i3xwf0	420	46	11.0	SubName: Full=Zonular occludens toxin (Zot);
i0gvi9	408	45	11.0	SubName: Full=Putative HipA-like toxin protein;
h1vbg3	619	68	11.0	SubName: Full=Cercosporin toxin biosynthesis protein;
g7ji94	600	66	11.0	SubName: Full=Multidrug and toxin extrusion protein;
g6b169	456	50	11.0	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
f4vuy8	438	48	11.0	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
e7nas9	572	63	11.0	SubName: Full=Toxin secretion/phage lysis holin;
d8jjl9	707	78	11.0	SubName: Full=RTX toxin;
d1p7e4	445	49	11.0	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d0jug8	809	89	11.0	SubName: Full=Insecticidal toxin;
c4b6b3	721	79	11.0	SubName: Full=C2 toxin, component II;
b6qbs9	572	63	11.0	SubName: Full=MFS toxin efflux pump (AflT), putative;
a8xac4	455	50	11.0	RecName: Full=Beta-1,4-mannosyltransferase bre-3; EC=2.4.1.-...
a71036	462	51	11.0	RecName: Full=Toxin CfTX-2; Short=Toxin 2; Flags: Precursor;...
a7dv93	453	50	11.0	SubName: Full=RTX toxin transporter;
a2pse3	455	50	11.0	SubName: Full=Zonular occludens toxin (Zot) family;
a1cww7	500	55	11.0	SubName: Full=Toxin biosynthesis cytochrome P450 monooxygenase...
q9gv72	450	49	10.9	RecName: Full=Toxin CrTX-A; AltName: Full=CRT-1; AltName: Fu...
q90392	414	45	10.9	RecName: Full=Snake venom metalloproteinase atrolysin-C; Sho...

q6nk15	560	61	10.9	SubName: Full=Diphtheria toxin; EC=2.4.2.36;
q5il09	560	61	10.9	SubName: Full=Diphtheria toxin;
q56977	531	58	10.9	SubName: Full=Toxin;
p26761	477	52	10.9	RecName: Full=RTX-I toxin determinant D; AltName: Full=APX-I...
p18568	448	49	10.9	RecName: Full=Larvicidal toxin 51 kDa protein; AltName: Full...
p10565	448	49	10.9	RecName: Full=Larvicidal toxin 51 kDa protein; AltName: Full...
o32299	448	49	10.9	SubName: Full=BinB4 protein; SubName: Full=P51 component of ...
k8wda5	442	48	10.9	SubName: Full=RTX toxin transporter;
k1i4b1	486	53	10.9	SubName: Full=ADP-ribosyltransferase toxin AexT;
i8s175	460	50	10.9	SubName: Full=Putative toxin subunit;
i8pwg5	460	50	10.9	SubName: Full=Putative toxin subunit;
i8nkq3	460	50	10.9	SubName: Full=Putative toxin subunit;
i8mvz9	460	50	10.9	SubName: Full=Putative toxin subunit;
i8lkt7	460	50	10.9	SubName: Full=Putative toxin subunit;
i8lds6	460	50	10.9	SubName: Full=Putative toxin subunit;
i8kkr9	460	50	10.9	SubName: Full=Putative toxin subunit;
i8iqi1	460	50	10.9	SubName: Full=Putative toxin subunit;
i8h014	460	50	10.9	SubName: Full=Putative toxin subunit;
i8fx03	460	50	10.9	SubName: Full=Putative toxin subunit;
i8ewz2	460	50	10.9	SubName: Full=Putative toxin subunit;
i8ewi7	460	50	10.9	SubName: Full=Putative toxin subunit;
i8ev54	460	50	10.9	SubName: Full=Putative toxin subunit;
i8esh6	460	50	10.9	SubName: Full=Putative toxin subunit;
i8c132	460	50	10.9	SubName: Full=Putative toxin subunit;
i8azj9	460	50	10.9	SubName: Full=Putative toxin subunit;
i8a893	460	50	10.9	SubName: Full=Putative toxin subunit;
i7zrx5	460	50	10.9	SubName: Full=Putative toxin subunit;
i7ysl2	460	50	10.9	SubName: Full=Putative toxin subunit;
i7ys19	460	50	10.9	SubName: Full=Putative toxin subunit;
i7y4l8	460	50	10.9	SubName: Full=Putative toxin subunit;
i7xwk2	460	50	10.9	SubName: Full=Putative toxin subunit;
i7xsk2	460	50	10.9	SubName: Full=Putative toxin subunit;
i7xbw4	460	50	10.9	SubName: Full=Putative toxin subunit;
i7w809	460	50	10.9	SubName: Full=Putative toxin subunit;
i7vmz4	460	50	10.9	SubName: Full=Putative toxin subunit;
i7utl3	460	50	10.9	SubName: Full=Putative toxin subunit;
i7ut25	460	50	10.9	SubName: Full=Putative toxin subunit;
i7tzn1	460	50	10.9	SubName: Full=Putative toxin subunit;
i7t2x1	460	50	10.9	SubName: Full=Putative toxin subunit;
i7t0u5	460	50	10.9	SubName: Full=Putative toxin subunit;
i7sy31	460	50	10.9	SubName: Full=Putative toxin subunit;
i7s5d3	460	50	10.9	SubName: Full=Putative toxin subunit;
i7rpb6	460	50	10.9	SubName: Full=Putative toxin subunit;
i7q9r2	460	50	10.9	SubName: Full=Putative toxin subunit;
i7q5l3	460	50	10.9	SubName: Full=Putative toxin subunit;
i7pmj0	460	50	10.9	SubName: Full=Putative toxin subunit;
i7nn17	460	50	10.9	SubName: Full=Putative toxin subunit;
i7n188	460	50	10.9	SubName: Full=Putative toxin subunit;
i7n0w6	460	50	10.9	SubName: Full=Putative toxin subunit;
i7msf1	460	50	10.9	SubName: Full=Putative toxin subunit;
i6kea5	460	50	10.9	SubName: Full=Putative toxin subunit;
i6kd89	460	50	10.9	SubName: Full=Putative toxin subunit;
i6jle0	460	50	10.9	SubName: Full=Putative toxin subunit;
i6jk47	460	50	10.9	SubName: Full=Putative toxin subunit;
i6iuq2	460	50	10.9	SubName: Full=Putative toxin subunit;
i6ich3	460	50	10.9	SubName: Full=Putative toxin subunit;
i6hzip9	460	50	10.9	SubName: Full=Putative toxin subunit;
i6hkj1	460	50	10.9	SubName: Full=Putative toxin subunit;

i6a753	479	52	10.9	SubName: Full=Zeta toxin family protein;
i4jxl0	560	61	10.9	SubName: Full=Diphtheria toxin;
h5amh3	633	69	10.9	SubName: Full=Toxin B domain protein;
h2hx71	560	61	10.9	SubName: Full=Diphtheria toxin; EC=2.4.2.36;
h2h1k3	560	61	10.9	SubName: Full=Diphtheria toxin; EC=2.4.2.36;
h2gu79	560	61	10.9	SubName: Full=Diphtheria toxin; EC=2.4.2.36;
h2g4h1	560	61	10.9	SubName: Full=Diphtheria toxin; EC=2.4.2.36;
h1wkd1	663	72	10.9	SubName: Full=Putative haemolysin-type calcium-binding toxin...
h0rpv7	644	70	10.9	SubName: Full=Putative secretion protein (HlyD family); toxi...
h0esh3	487	53	10.9	SubName: Full=Putative HC-toxin synthetase;
h0erf8	568	62	10.9	SubName: Full=Putative HC-toxin efflux carrier TOXA;
g5ekg4	560	61	10.9	SubName: Full=Diphtheria toxin;
g3jhi2	585	64	10.9	SubName: Full=MFS toxin efflux pump (AflT);
g3i1l1	487	53	10.9	SubName: Full=Anthrax toxin receptor 2;
f7mit2	431	47	10.9	SubName: Full=C2 toxin, component I;
f4u2g4	422	46	10.9	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
f4t804	422	46	10.9	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
f4abp4	725	79	10.9	SubName: Full=C2 toxin, component II;
e9uj84	422	46	10.9	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
e6amt1	422	46	10.9	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
e5zr09	422	46	10.9	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
e0wuj8	432	47	10.9	SubName: Full=Putative RTX-like toxin;
e0eli0	477	52	10.9	SubName: Full=RTX-III toxin determinant D;
e0efd5	477	52	10.9	SubName: Full=RTX-III toxin determinant D;
d9pbq5	477	52	10.9	SubName: Full=RTX-III toxin determinant D;
d9p6i4	477	52	10.9	SubName: Full=RTX-III toxin determinant D;
d8cih8	440	48	10.9	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d7n3r4	532	58	10.9	SubName: Full=RTX toxin;
d5b3t2	460	50	10.9	SubName: Full=Toxin subunit;
d1p0x0	421	46	10.9	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d0jsn5	460	50	10.9	SubName: Full=Toxin subunit;
d0ji45	460	50	10.9	SubName: Full=Toxin subunit;
c7bmr0	530	58	10.9	SubName: Full=Insecticidal toxin complex; Flags: Precursor;
c6dxy2	431	47	10.9	SubName: Full=C2 toxin, component I;
c4hdj1	460	50	10.9	SubName: Full=Putative toxin subunit;
c4ham1	460	50	10.9	SubName: Full=Putative toxin subunit;
c4b698	431	47	10.9	SubName: Full=C2 toxin, component I; SubName: Full=C2 toxin,...
b1hq59	448	49	10.9	SubName: Full=Larvicidal toxin 51 kDa protein;
b0luq9	448	49	10.9	SubName: Full=Binary toxin B;
b0bqr5	477	52	10.9	SubName: Full=RTX-III toxin determinant D;
a6w1l7	430	47	10.9	SubName: Full=Aerolysin/hemolysin/leukocidin toxin; Flags: P...
a1cmu4	587	64	10.9	SubName: Full=MFS toxin efflux pump, putative;
q9mbz8	319	44	10.8	SubName: Full=Shiga toxin 2e A-subunit; SubName: Full=StxA2e...
q9fd43	319	44	10.8	SubName: Full=Shiga-like toxin type 2 subunit A;
q99qj1	273	44	10.8	SubName: Full=Toxin-coregulated pilus biosynthesis protein D...
q95us5	322	44	10.8	RecName: Full=Beta-1,3-galactosyltransferase bre-5; EC=2.4.1...
q93gv6	319	44	10.8	SubName: Full=Shiga toxin type 2 variant A subunit;
q8z6a4	242	44	10.8	SubName: Full=Putative pertussis-like toxin subunit; EC=2.4....
q8xbv2	319	44	10.8	SubName: Full=Shiga toxin 2 A subunit; SubName: Full=Shiga t...
q8vv70	319	44	10.8	SubName: Full=Shiga toxin 2 A-subunit;
q8vv65	319	44	10.8	SubName: Full=Shiga toxin 2 A-subunit;
q8ku16	319	44	10.8	SubName: Full=Shiga toxin 2A subunit;
q8ha14	319	44	10.8	SubName: Full=Shiga toxin 2, subunit A;
q83xj1	464	50	10.8	SubName: Full=Insecticidal toxin complex protein TcbA;
q7tmm8	322	44	10.8	RecName: Full=Mono [ADP-ribose] polymerase PARP16; EC=2.4.2....
q7n5h8	573	62	10.8	SubName: Full=Similar to Yersinia pestis murine toxin Ymt pr...
q7di68	319	44	10.8	SubName: Full=Shiga toxin 2 A-subunit; SubName: Full=Shiga t...
q7b5l0	319	44	10.8	SubName: Full=Shiga toxin 2 subunit A;

q79eb3	319	44	10.8	SubName: Full=Variant shiga-like toxin type II A subunit; Fl...
q77ch9	319	44	10.8	SubName: Full=Shiga toxin 2 subunit A;
q77ch6	319	44	10.8	SubName: Full=Shiga toxin 2 A subunit;
q776q3	319	44	10.8	SubName: Full=Shiga toxin 2 subunit A;
q776g1	319	44	10.8	SubName: Full=Shiga toxin2 subunit A;
q776e1	319	44	10.8	SubName: Full=Shiga toxin2 subunit A;
q6yii8	319	44	10.8	SubName: Full=Shiga toxin 2 subunit A;
q6wrx0	408	44	10.8	SubName: Full=Alveicin A bacteriocin toxin;
q6mdt7	362	44	10.8	SubName: Full=Putative RTX-toxin, partial length;
q6dwn1	319	44	10.8	SubName: Full=Shiga toxin 2 subunit A;
q6dwm9	319	44	10.8	SubName: Full=Shiga toxin 2 subunit A;
q6dwm7	319	44	10.8	SubName: Full=Shiga toxin 2 subunit A;
q6dwm5	319	44	10.8	SubName: Full=Shiga toxin 2 subunit A;
q6dwm3	319	44	10.8	SubName: Full=Shiga toxin 2 subunit A;
q6dwm1	319	44	10.8	SubName: Full=Shiga toxin 2 subunit A;
q6dw19	319	44	10.8	SubName: Full=Shiga toxin 2 subunit A;
q6dw17	319	44	10.8	SubName: Full=Shiga toxin 2 subunit A;
q6dw15	319	44	10.8	SubName: Full=Shiga toxin 2 subunit A;
q6dw13	319	44	10.8	SubName: Full=Shiga toxin 2 subunit A;
q6dw11	319	44	10.8	SubName: Full=Shiga toxin 2 subunit A;
q6dwk9	319	44	10.8	SubName: Full=Shiga toxin 2 subunit A;
q6dwk7	319	44	10.8	SubName: Full=Shiga toxin 2 subunit A;
q5xci2	316	44	10.8	SubName: Full=Putative exfoliative toxin;
q5tjl6	319	44	10.8	SubName: Full=Shiga toxin 2A-subunit; SubName: Full=Shiga-li...
q5r7e4	581	63	10.8	RecName: Full=Multidrug and toxin extrusion protein 2; Short...
q5py51	536	58	10.8	SubName: Full=Diphtheria toxin;
q5pmh6	269	44	10.8	SubName: Full=Putative toxin-like protein;
q5dz52	445	48	10.8	SubName: Full=Toxin coregulated pilus biosynthesis protein T...
q4wbi0	591	64	10.8	SubName: Full=TR17-like toxin biosynthesis protein, putative...
q4hhh8	204	44	10.8	SubName: Full=Toxin-like outer membrane protein, putative;
q48tz3	366	44	10.8	SubName: Full=Putative exfoliative toxin;
q48jb2	288	44	10.8	SubName: Full=Insecticidal toxin complex protein, putative;
q47v15	418	45	10.8	SubName: Full=Putative toxin secretion protein;
q47643	319	44	10.8	SubName: Full=Shiga-like toxin II A subunit;
q47636	319	44	10.8	SubName: Full=Shiga toxin 2 A subunit; SubName: Full=Shiga t...
q46101	265	44	10.8	SubName: Full=CdtB; SubName: Full=Cytolethal distending toxi...
q3dcj5	242	44	10.8	SubName: Full=Exfoliative toxin A;
q2wcv4	352	44	10.8	SubName: Full=Putative insecticidal toxin complex protein;
q219b4	319	44	10.8	SubName: Full=Shiga toxin II subunit A;
q2acg6	319	44	10.8	SubName: Full=Shiga toxin 2 A subunit;
q2acg0	319	44	10.8	SubName: Full=Shiga toxin 2 A subunit;
q2acf4	319	44	10.8	SubName: Full=Shiga toxin 2 A subunit;
q2acf1	319	44	10.8	SubName: Full=Shiga toxin 2 A subunit; SubName: Full=Shiga t...
q2ace8	319	44	10.8	SubName: Full=Shiga toxin 2 A subunit;
q25bx4	319	44	10.8	SubName: Full=Shiga toxin 2 variant e A-subunit; SubName: Fu...
q1w694	305	44	10.8	RecName: Full=Sphingomyelin phosphodiesterase D LiSicTox-bet...
q1elx7	319	44	10.8	SubName: Full=Shiga toxin II subunit A; Flags: Precursor;
q0pc57	265	44	10.8	SubName: Full=Cytolethal distending toxin B; Flags: Precurso...
q08ja4	319	44	10.8	SubName: Full=Shiga toxin 2 subunit A;
p38874	309	44	10.8	RecName: Full=Elongator complex protein 5; AltName: Full=Gam...
p17260	313	44	10.8	RecName: Full=Protein KRE1; AltName: Full=Killer toxin-resis...
p09385	319	44	10.8	RecName: Full=Shiga-like toxin 2 subunit A; Short=SLT-2 A su...
o86171	721	78	10.8	SubName: Full=C2 toxin (Component-II);
k9gj79	247	44	10.8	SubName: Full=MFS toxin efflux pump (AflT), putative;
k9fp20	247	44	10.8	SubName: Full=MFS toxin efflux pump (AflT), putative;
k9a101	344	44	10.8	SubName: Full=Toxin-antitoxin antitoxin xre family;
k7rgz8	724	78	10.8	SubName: Full=Toxin secretion ABC transporter ATP-binding su...
k6gzw3	360	44	10.8	SubName: Full=Zeta toxin family protein;

k5ugn9	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
k5ug21	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
k5sl34	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
k5rt82	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
k5msn9	331	44	10.8	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
k5iqw3	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
k5i9x4	319	44	10.8	SubName: Full=Shiga toxin 2, subunit A; EC=3.2.2.22;
k5hxr5	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
k5hsj8	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
k5h154	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
k5fk95	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
k4x5i3	319	44	10.8	SubName: Full=Shiga toxin 2 subunit A;
k4tg32	269	44	10.8	SubName: Full=Pertussis toxin subunit 1; EC=2.4.2.-;
k4iit6	553	60	10.8	SubName: Full=Antimicrobial or toxin export ABC-type transpo...
k3ulc5	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
k3t131	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
k3s9m2	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
k3lqq6	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
k3le80	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
k3km98	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
k3k026	319	44	10.8	SubName: Full=Shiga toxin 2, subunit A; EC=3.2.2.22;
k3glp7	319	44	10.8	SubName: Full=Shiga toxin 2, subunit A; EC=3.2.2.22;
k3gfi7	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
k3fkf6	319	44	10.8	SubName: Full=Shiga toxin 2, subunit A; EC=3.2.2.22;
k3f6c9	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
k3ejv5	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
k3e0h9	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
k3cq70	319	44	10.8	SubName: Full=Shiga toxin 2, subunit A; EC=3.2.2.22;
k3bjr9	319	44	10.8	SubName: Full=Shiga toxin 2, subunit A; EC=3.2.2.22;
k3az48	319	44	10.8	SubName: Full=Shiga toxin 2, subunit A; EC=3.2.2.22;
k3ayk4	284	44	10.8	SubName: Full=Pre-toxin domain with VENN motif family protei...
k3agb4	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
k2zj63	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
k2zgq1	284	44	10.8	SubName: Full=Pre-toxin domain with VENN motif family protei...
k2yhy1	319	44	10.8	SubName: Full=Shiga toxin 2, subunit A; EC=3.2.2.22;
k2y8n8	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
k2xv13	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
k2xbv1	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
k2wya8	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
k2wqr7	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
k2v4z2	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
k2un46	331	44	10.8	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
k2ul65	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
k1ppc1	591	64	10.8	SubName: Full=Multidrug and toxin extrusion protein 1;
k0jd26	319	44	10.8	SubName: Full=Shiga toxin 2 subunit A;
k0hgs3	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit CdtB;
k0bgu8	319	44	10.8	SubName: Full=Shiga toxin 2 subunit A;
k0aqr0	319	44	10.8	SubName: Full=Shiga toxin 2 subunit A;
j9zmp2	319	44	10.8	SubName: Full=Shiga toxin 2 subunit A;
j9yx72	288	44	10.8	SubName: Full=Zeta toxin;
j9gm92	656	71	10.8	SubName: Full=Zonular occludens toxin;
j8xmd2	361	44	10.8	SubName: Full=Zonula occludens toxin family protein;
j7udl3	243	44	10.8	SubName: Full=Zeta toxin;
j7s0h8	265	44	10.8	SubName: Full=Cytolethal distending toxin B;
j5k398	638	69	10.8	SubName: Full=Multidrug and toxin extrusion protein;
j2ce59	280	44	10.8	SubName: Full=RelE family toxin-antitoxin system;
j2c890	280	44	10.8	SubName: Full=RelE family toxin-antitoxin system;
j2bth4	280	44	10.8	SubName: Full=RelE family toxin-antitoxin system;

j2a4n0	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
j2a0t2	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
j1yzm4	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
j1yvi2	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
j1xie9	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
j1wp06	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
j1nx23	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
j1l5s2	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
j1kp39	331	44	10.8	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
j1ki58	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
j1glv9	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
j1e0l2	331	44	10.8	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
j1dx28	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
j1ch63	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
j1c8j2	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
j0hh46	346	44	10.8	SubName: Full=Killer toxin sensitivity protein;
i9fxv2	147	44	10.8	SubName: Full=Toxin;
i8zls9	147	44	10.8	SubName: Full=Toxin;
i8zkt9	147	44	10.8	SubName: Full=Toxin;
i8u920	147	44	10.8	SubName: Full=Toxin;
i8u8h9	147	44	10.8	SubName: Full=Toxin;
i8rjy6	147	44	10.8	SubName: Full=Toxin;
i8qk69	147	44	10.8	SubName: Full=Toxin;
i8qfx1	147	44	10.8	SubName: Full=Toxin;
i8htm8	147	44	10.8	SubName: Full=Toxin;
i8hs42	147	44	10.8	SubName: Full=Toxin;
i7iw01	245	44	10.8	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
i6yzt3	147	44	10.8	SubName: Full=Toxin;
i5ynu5	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
i5y4p3	319	44	10.8	SubName: Full=Shiga toxin 2, subunit A; EC=3.2.2.22;
i5xkq2	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
i5wv10	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
i5v8v9	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
i5ugi8	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
i5u5g9	319	44	10.8	SubName: Full=Shiga toxin 2, subunit A; EC=3.2.2.22;
i5u3l8	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
i5szy9	319	44	10.8	SubName: Full=Shiga toxin 2, subunit A; EC=3.2.2.22;
i5r5j3	319	44	10.8	SubName: Full=Shiga toxin 2, subunit A; EC=3.2.2.22;
i5r1j1	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
i5pu99	319	44	10.8	SubName: Full=Shiga toxin 2, subunit A; EC=3.2.2.22;
i5ptv9	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
i5n6w7	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
i5n6n8	319	44	10.8	SubName: Full=Shiga toxin 2, subunit A; EC=3.2.2.22;
i5me70	319	44	10.8	SubName: Full=Shiga toxin 2, subunit A; EC=3.2.2.22;
i5li41	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
i5l7a1	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
i5l6f3	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
i5j183	319	44	10.8	SubName: Full=Shiga toxin 2, subunit A; EC=3.2.2.22;
i5i6b2	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
i5grx2	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
i5gjj0	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
i5fe17	319	44	10.8	SubName: Full=Shiga toxin 2, subunit A; EC=3.2.2.22;
i5fbh5	319	44	10.8	SubName: Full=Shiga toxin 2, subunit A; EC=3.2.2.22;
i5f790	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
i5dwa8	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
i5dv52	319	44	10.8	SubName: Full=Shiga toxin 2, subunit A; EC=3.2.2.22;
i5dub5	319	44	10.8	SubName: Full=Shiga toxin 2, subunit A; EC=3.2.2.22;
i4qul4	319	44	10.8	SubName: Full=Shiga toxin 2 subunit A;

i4qnf7	319	44	10.8	SubName: Full=Shiga toxin 2 subunit A;
i3dp65	235	44	10.8	SubName: Full=Zeta toxin;
i2xtm3	300	44	10.8	SubName: Full=Putative shiga-like toxin 2 subunit A;
i2wmh1	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
i2vte8	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
i2vn45	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
i2uu46	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
i2sjc0	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
i1zt41	319	44	10.8	SubName: Full=Shiga toxin 2 subunit A;
i0xcz1	242	44	10.8	SubName: Full=Toxin, beta-grasp domain protein;
i0h0g8	326	44	10.8	SubName: Full=Putative zeta toxin;
h9cjj3	510	55	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
h8nya8	232	44	10.8	SubName: Full=Toxin-coregulated pilus subunit TcpA;
h8jv60	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
h8f7z5	244	44	10.8	SubName: Full=RTX toxin transporter, ATP-binding protein;
h8cun4	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h8clw1	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h8ch31	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h8ced0	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h8c801	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h8c236	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h8byi3	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h8bq00	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h8bpj7	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h8bgr7	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h8bdn4	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h8b731	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h8b0u9	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h8axd8	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h8anx1	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h8amf3	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit CdtB;
h8agv4	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h8abu7	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h8a4r8	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h8a2p0	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h7zxx9	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h7zs76	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h7zn44	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h7zfx4	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h7z907	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h7z7e9	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h7z2m4	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit CdtB;
h7ynn3	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h7yi88	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h7y8x5	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h7y023	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h7xxc5	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h7xsi1	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h7xn80	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit CdtB;
h7xgi5	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h7x6v1	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h7wzb9	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h7wj54	267	44	10.8	SubName: Full=Cytolethal distending toxin subunit CdtB;
h7w750	267	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h7vvy0	267	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h7vp51	267	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h7vjd6	267	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h7vcp7	267	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...

h7vb44	267	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h7tiu7	267	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h7tcc5	267	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h7qyq6	267	44	10.8	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h5ewr9	324	44	10.8	SubName: Full=Toxin B domain protein;
h4qh29	355	44	10.8	SubName: Full=Toxin B domain protein;
h4g0y3	203	44	10.8	SubName: Full=Toxin, beta-grasp domain protein;
h3yqt5	242	44	10.8	SubName: Full=Toxin, beta-grasp domain protein;
h3xuu8	242	44	10.8	SubName: Full=Toxin, beta-grasp domain protein;
h3upn0	649	70	10.8	SubName: Full=Zonula occludens toxin domain protein;
h3ubt8	649	70	10.8	SubName: Full=Zonula occludens toxin domain protein;
h3sng7	493	53	10.8	SubName: Full=Toxin complex component ORF-X3;
h3sam9	338	44	10.8	SubName: Full=Mtx2/3 toxin-like protein;
h1ttm6	250	44	10.8	SubName: Full=Toxin, beta-grasp domain protein;
h0s1r2	574	62	10.8	SubName: Full=Putative secretion ATP-binding protein (ABC-ty...
h0ew22	313	44	10.8	SubName: Full=Putative Killer toxin subunits alpha/beta;
g9y6n3	283	44	10.8	SubName: Full=Toxin-antitoxin system, toxin component, Bro d...
g9l6i9	319	44	10.8	SubName: Full=Shiga toxin 2 subunit A;
g8tnj7	473	51	10.8	SubName: Full=Binary exotoxin B/Anthrax toxin B moiety prote...
g8gwp8	319	44	10.8	SubName: Full=Shiga toxin 2 subunit A;
g8gwp6	319	44	10.8	SubName: Full=Shiga toxin 2 subunit A;
g8gwp4	319	44	10.8	SubName: Full=Shiga toxin 2 subunit A;
g8fee8	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit CdtB;
g8fah9	265	44	10.8	SubName: Full=Cytolethal distending toxin subunit CdtB;
g7tmz9	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
g7kdh1	539	58	10.8	SubName: Full=Multidrug and toxin extrusion protein;
g7g462	320	44	10.8	SubName: Full=Exfoliative toxin A/B;
g7c4v4	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
g7bg11	331	44	10.8	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
g7b5r5	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
g7av72	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
g7alp1	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
g7aaj3	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
g7a1b7	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
g6zqt5	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
g6zd86	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
g6z4q3	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
g6e6f5	310	44	10.8	SubName: Full=Zonular occludens toxin;
g6bnu0	275	44	10.8	SubName: Full=Toxin-antitoxin system, toxin component, Bro d...
g5yek4	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A;
g5xup9	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A;
g5xpi9	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A;
g5x5s1	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A;
g5wqh6	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A;
g5whw1	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A;
g5w193	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A;
g5vlk2	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A;
g5up99	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A;
g5uk40	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A;
g5vtv4	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A;
g5tgu1	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A;
g5am48	198	44	10.8	SubName: Full=Anthrax toxin receptor-like protein;
g2x6g5	326	44	10.8	SubName: Full=Zeta toxin family protein;
g2a7d1	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
g1yy82	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
g0vxc1	317	44	10.8	SubName: Full=Elongator complex protein 3 Gamma-toxin target...
g0slx5	573	62	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
g0slw7	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...

f9hw98	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; SubName: Full=St...
f9ct70	319	44	10.8	SubName: Full=Shiga toxin 2 subunit A;
f9c561	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
f9b8s3	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
f9a324	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
f8ztz0	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
f8zj43	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
f8yrc5	319	44	10.8	SubName: Full=Shiga toxin 2 subunit A;
f8gy52	408	44	10.8	SubName: Full=Toxin coregulated pilus biosynthesis protein ...
f5lzs5	280	44	10.8	SubName: Full=Hemolysin-type calcium-binding toxin;
f5lc85	247	44	10.8	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
f5jud8	360	44	10.8	SubName: Full=Zeta toxin family protein;
f4uzh7	305	44	10.8	SubName: Full=Insecticidal toxin;
f4bb58	339	44	10.8	SubName: Full=Toxin secretion ABC transporter ATP-binding pr...
f4ac06	289	44	10.8	SubName: Full=Putative epsilon-toxin type B;
f3zep3	279	44	10.8	SubName: Full=Putative xre family toxin-antitoxin system, an...
f3p8l3	572	62	10.8	SubName: Full=Toxin secretion/phage lysis holin;
f3lgk1	406	44	10.8	SubName: Full=Zona occludens toxin;
f2tij9	277	44	10.8	SubName: Full=Toxin biosynthesis ketoreductase;
f1y8u7	319	44	10.8	SubName: Full=Shiga-like toxin II subunit A; EC=3.2.2.22;
f1xiq2	319	44	10.8	SubName: Full=Shiga-like toxin II subunit A; EC=3.2.2.22;
f0xgw6	372	44	10.8	SubName: Full=Zeta toxin;
f0r966	286	44	10.8	SubName: Full=Zeta toxin family protein;
f0qps4	360	44	10.8	SubName: Full=Zeta toxin family protein;
e9txx2	373	44	10.8	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
e9tkd4	308	44	10.8	SubName: Full=Zeta toxin;
e9fnu5	333	44	10.8	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
e9d375	346	44	10.8	SubName: Full=Killer toxin sensitivity protein;
e8xvt8	232	44	10.8	SubName: Full=Toxin-coregulated pilus subunit TcpA;
e7s5b6	255	44	10.8	SubName: Full=Zeta-toxin;
e7iv56	319	44	10.8	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
e7dyu8	319	44	10.8	SubName: Full=Shiga toxin 2 A subunit;
e6rzc6	265	44	10.8	SubName: Full=Cytotolethal distending toxin;
e6fa39	397	44	10.8	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e6f8b3	387	44	10.8	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e6atp3	373	44	10.8	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
e4w7w5	319	44	10.8	SubName: Full=Shiga toxin 2 A-subunit;
e4vl66	268	44	10.8	SubName: Full=Cytotolethal distending toxin B subunit;
e4hmw9	264	44	10.8	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
e3r3r7	265	44	10.8	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
e3q380	318	44	10.8	SubName: Full=Zeta toxin;
e3chm5	223	44	10.8	SubName: Full=Zeta toxin;
e2y819	397	44	10.8	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e2y6k9	387	44	10.8	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e2sra7	281	44	10.8	SubName: Full=Toxin-antitoxin system, antitoxin component, X...
e2mpz6	345	44	10.8	SubName: Full=Zeta toxin family protein;
e2jx82	319	44	10.8	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
e2cn81	192	44	10.8	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e2cm83	368	44	10.8	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
e1m3h2	299	44	10.8	SubName: Full=Exfoliative toxin A;
e1l933	249	44	10.8	SubName: Full=Toxin-antitoxin system, toxin component, Fic d...
e1jnr2	328	44	10.8	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
e1ciu9	267	44	10.8	SubName: Full=Cytotolethal distending toxin B;
e0mth4	407	44	10.8	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
e0mrs3	296	44	10.8	SubName: Full=RTX toxins and related Ca ²⁺ -binding protein;
e0h0v5	387	44	10.8	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
d9yhr6	264	44	10.8	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
d9xpi7	291	44	10.8	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...

d9wii8	283	44	10.8	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9rst3	342	44	10.8	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d8n3i8	395	44	10.8	SubName: Full=Putative zeta toxin of the postsegregational k...
d8fq9	307	44	10.8	SubName: Full=Putative toxin-antitoxin system, antitoxin com...
d8bk17	373	44	10.8	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d7vt65	292	44	10.8	SubName: Full=Fic family toxin-antitoxin system;
d7av36	350	44	10.8	SubName: Full=Zeta toxin family protein;
d6m0s8	321	44	10.8	SubName: Full=Leukocidin/hemolysin toxin family protein;
d6lix5	256	44	10.8	SubName: Full=Fic family toxin-antitoxin system toxin compon...
d6l9w6	334	44	10.8	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d6l823	380	44	10.8	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d6k5i8	286	44	10.8	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d6hcb3	321	44	10.8	SubName: Full=Leukocidin/hemolysin toxin family protein;
d6fwr1	547	59	10.8	SubName: Full=Toxin;
d5p0n3	339	44	10.8	SubName: Full=Toxin-antitoxin system, antitoxin component, X...
d4j1s0	361	44	10.8	SubName: Full=Predicted membrane protein, putative toxin reg...
d4bse6	256	44	10.8	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d4brt7	259	44	10.8	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
d3fl55	265	44	10.8	SubName: Full=Cytolethal distending toxin B;
d2yk19	273	44	10.8	SubName: Full=Toxin coregulated pilus biosynthesis protein D...
d2rb82	149	44	10.8	SubName: Full=Toxin-antitoxin system, antitoxin component, X...
d2ght9	351	44	10.8	SubName: Full=Leukocidin/hemolysin toxin subunit S;
d2gbc9	351	44	10.8	SubName: Full=Leukocidin/hemolysin toxin subunit S;
d2g2w6	351	44	10.8	SubName: Full=Leukocidin/hemolysin toxin subunit S;
d2fgc4	321	44	10.8	SubName: Full=Leukocidin/hemolysin toxin family protein;
d2f9y4	321	44	10.8	SubName: Full=Leukocidin/hemolysin toxin family protein;
d1qjp5	321	44	10.8	SubName: Full=Leukocidin/hemolysin toxin family protein;
d1q723	321	44	10.8	SubName: Full=Leukocidin/hemolysin toxin family protein;
d0iwp5	436	47	10.8	SubName: Full=Zonular occludens toxin;
d0hrr0	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
d0h647	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
c9qi56	232	44	10.8	SubName: Full=Cholera toxin transcriptional activator;
c9nxu3	203	44	10.8	SubName: Full=Cholera toxin transcriptional activator;
c9l7t6	219	44	10.8	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
c9kur5	316	44	10.8	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
c8uc22	319	44	10.8	SubName: Full=Shiga toxin 2 subunit A;
c8u7k7	319	44	10.8	SubName: Full=Shiga toxin 2 subunit A;
c7tqm6	319	44	10.8	SubName: Full=Shiga toxin 2e subunit A;
c7hry3	301	44	10.8	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
c7fpw8	319	44	10.8	SubName: Full=Shiga toxin 2 A subunit; SubName: Full=Shiga t...
c7bnh6	280	44	10.8	SubName: Full=Insecticidal toxin complex protein tccc3;
c6uzn1	319	44	10.8	SubName: Full=Shiga-like toxin II subunit A;
c6up09	319	44	10.8	SubName: Full=Shiga toxin II subunit A;
c6rw14	273	44	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
c6l1n0	319	44	10.8	SubName: Full=Shiga toxin 2 variant f A-subunit;
c5kpg1	264	44	10.8	SubName: Full=Diphtheria toxin resistance protein 2, dph2, pu...
c5j4y3	319	44	10.8	SubName: Full=Shiga toxin 2A;
c5gte8	277	44	10.8	SubName: Full=Toxin biosynthesis ketoreductase;
c4u9t0	424	46	10.8	SubName: Full=RTX toxin and Ca2+-binding protein;
c4ryb6	650	70	10.8	SubName: Full=RTX toxin and Ca2+-binding protein;
c3xie2	267	44	10.8	SubName: Full=Cytolethal distending toxin b;
c3ib67	374	44	10.8	SubName: Full=41.9 kDa insecticidal toxin;
c0wv69	376	44	10.8	SubName: Full=Possible toxin regulator;
b9z8i2	356	44	10.8	SubName: Full=Zonular occludens toxin; Flags: Precursor;
b8nrq4	346	44	10.8	SubName: Full=Toxin biosynthesis protein, putative;
b6zcd1	252	44	10.8	SubName: Full=Zeta toxin;
b5yyr1	319	44	10.8	SubName: Full=Shiga toxin subunit A;
b5yti3	319	44	10.8	SubName: Full=Shiga toxin subunit A;

b5gks8	314	44	10.8	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
b5gcj6	277	44	10.8	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
b5g7j6	282	44	10.8	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
b5bad0	269	44	10.8	SubName: Full=Putative toxin-like protein;
b3q3r0	436	47	10.8	SubName: Full=Putative toxin secretion protein;
b3bug4	319	44	10.8	SubName: Full=Shiga toxin A-chain; EC=3.2.2.22;
b3ali1	319	44	10.8	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
b3a622	319	44	10.8	SubName: Full=Shiga toxin A-chain; EC=3.2.2.22;
b2za51	224	44	10.8	SubName: Full=Toxin-coregulated pilin;
b2ubw7	382	44	10.8	SubName: Full=Zonular occludens toxin;
b2p389	319	44	10.8	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
b2nm92	319	44	10.8	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
b1l2f9	490	53	10.8	SubName: Full=Toxin complex component ORF-X3;
b0yac9	591	64	10.8	SubName: Full=TRI7-like toxin biosynthesis protein, putative...
b0nfz7	248	44	10.8	SubName: Full=Putative toxin-antitoxin system, toxin compone...
b0fyx0	360	44	10.8	SubName: Full=NADPH HC toxin reductase-like protein;
b0fee0	319	44	10.8	SubName: Full=Shiga toxin 2 subunit A;
a9zmr8	319	44	10.8	SubName: Full=Shiga toxin 2 A subunit;
a8y3h3	365	44	10.8	RecName: Full=Beta-1,3-galactosyltransferase bre-2; EC=2.4.1...
a7umy0	319	44	10.8	SubName: Full=Shiga toxin 2A; SubName: Full=Shiga toxin 2c s...
a6zt93	309	44	10.8	SubName: Full=Insensitive to killer toxin;
a6qe82	234	44	10.8	SubName: Full=Staphylococcal enterotoxin-like toxin;
a6ae97	455	49	10.8	SubName: Full=Zonular occludens toxin (Zot) family;
a5khz7	265	44	10.8	SubName: Full=Cytolethal distending toxin;
a5f2t8	294	44	10.8	SubName: Full=Cholera toxin transcriptional activator;
a4f298	267	44	10.8	SubName: Full=Cytolethal distending toxin B;
a4f274	265	44	10.8	SubName: Full=Cytolethal distending toxin B;
a3zks3	265	44	10.8	SubName: Full=Cytolethal distending toxin, subunit B;
a3yq19	265	44	10.8	SubName: Full=Cytolethal distending toxin, subunit B;
a3ykt6	265	44	10.8	SubName: Full=Cytolethal distending toxin, subunit B;
a3upp1	453	49	10.8	SubName: Full=RTX toxin transporter;
a3gly2	455	49	10.8	SubName: Full=Zonular occludens toxin (Zot) family;
a3eic9	489	53	10.8	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
a2qc92	445	48	10.8	SubName: Full=Function: Colicins are polypeptide toxins prod...
a1vxg3	265	44	10.8	SubName: Full=Cytolethal distending toxin, subunit B;
a1enq2	294	44	10.8	SubName: Full=Cholera toxin transcriptional activator;
a0zhv9	526	57	10.8	SubName: Full=RTX toxin transporter;
q95wy5	580	62	10.7	SubName: Full=Binary toxin-binding alpha-glucosidase;
q7x3f7	666	71	10.7	SubName: Full=Putative mosquitocidal toxin;
q7n4e0	568	61	10.7	SubName: Full=Similarities with C-terminal region of dermone...
q6dfx2	487	52	10.7	RecName: Full=Anthrax toxin receptor 2; Flags: Precursor;
q1ni34	562	60	10.7	SubName: Full=Toxin secretion ABC transporter ATP-binding pr...
q08633	477	51	10.7	RecName: Full=RTX-III toxin determinant D; AltName: Full=APX...
q02884	456	49	10.7	RecName: Full=Elongator complex protein 4; AltName: Full=Gam...
p12964	448	48	10.7	RecName: Full=Larvicidal toxin 51 kDa protein; AltName: Full...
o69275	431	46	10.7	SubName: Full=C2 toxin (Component I);
k7rqk8	606	65	10.7	SubName: Full=RTX toxin;
i3vas1	486	52	10.7	SubName: Full=Toxin TX1;
i3i9e0	703	75	10.7	SubName: Full=Toxin secretion ATP-binding protein;
i0kns9	430	46	10.7	SubName: Full=Zona occludens toxin;
h4r146	582	62	10.7	SubName: Full=Toxin B domain protein;
g6cmi4	458	49	10.7	SubName: Full=Diphtheria toxin resistance protein;
g0dq05	430	46	10.7	SubName: Full=Aerolysin/hemolysin/leukocidin toxin; Flags: P...
g0ath5	430	46	10.7	SubName: Full=Aerolysin/hemolysin/leukocidin toxin; Flags: P...
e7s0f3	420	45	10.7	SubName: Full=HipA family toxin-antitoxin system;
e4zfy5	560	60	10.7	SubName: Full=Similar to MFS toxin efflux pump (AflT);
e1gxx0	514	55	10.7	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
e0sng2	439	47	10.7	SubName: Full=Toxin;

d8mr58	410	44	10.7	SubName: Full=Putative toxin secretion, membrane fusion prot...
d7x0x5	440	47	10.7	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d5tdb2	661	71	10.7	SubName: Full=Toxin secretion ATP binding protein;
d4wsd8	421	45	10.7	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d4vep4	421	45	10.7	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d4bg54	431	46	10.7	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d0yqq5	428	46	10.7	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d0i736	588	63	10.7	SubName: Full=RTX cytolytic toxin;
c4b699	721	77	10.7	SubName: Full=C2 toxin, component II; SubName: Full=C2 toxin...
c3x7d9	721	77	10.7	SubName: Full=Toxin ABC transporter ATPase and permease;
c3bc84	419	45	10.7	SubName: Full=Mosquitocidal toxin protein;
c3avr9	419	45	10.7	SubName: Full=Mosquitocidal toxin protein;
b8mhp6	568	61	10.7	SubName: Full=MFS toxin efflux pump (AflT), putative;
b3raw2	460	49	10.7	SubName: Full=Type I protease secretion protein, haemolytica...
a8tbf9	525	56	10.7	SubName: Full=RTX toxin RtxA;
a3yg33	634	68	10.7	SubName: Full=Toxin;
a3d2w6	430	46	10.7	SubName: Full=Aerolysin/hemolysin/leukocidin toxin; Flags: P...
a1cse4	458	49	10.7	SubName: Full=Toxin biosynthesis protein, putative;
a1cgf7	487	52	10.7	SubName: Full=Toxin biosynthesis cytochrome P450 monooxygena...
q9s5j2	319	43	10.6	SubName: Full=Shiga toxin 2 A-subunit; SubName: Full=Stx1 A ...
q9a061	302	43	10.6	SubName: Full=Putative exfoliative toxin;
q96115	291	43	10.6	RecName: Full=Ecto-ADP-ribosyltransferase 5; EC=2.4.2.31; Al...
q8vv72	319	43	10.6	SubName: Full=Shiga toxin 2 A-subunit;
q8vv71	319	43	10.6	SubName: Full=Shiga toxin 2 A-subunit;
q8vv62	319	43	10.6	SubName: Full=Shiga toxin 2 A-subunit;
q8vlk6	319	43	10.6	SubName: Full=Shiga toxin 2 A-subunit;
q8vld2	319	43	10.6	SubName: Full=Shiga toxin 2 A-subunit; SubName: Full=Shiga t...
q8l168	315	43	10.6	SubName: Full=Shiga toxin 1 A subunit;
q8gj12	181	43	10.6	SubName: Full=Cytolethal distending toxin C;
q87020	362	43	10.6	SubName: Full=K2 killer toxin; Flags: Precursor;
q83xk3	315	43	10.6	SubName: Full=Shiga toxin 1 variant A subunit; SubName: Full...
q7w9a2	241	43	10.6	SubName: Full=Putative toxin;
q7w2u8	269	43	10.6	RecName: Full=Pertussis toxin subunit 1 homolog; Flags: Prec...
q7vyq9	241	43	10.6	SubName: Full=Putative toxin;
q7n656	340	43	10.6	SubName: Full=Similarities with C-terminal region of insecti...
q7bgd0	620	66	10.6	SubName: Full=Toxin-coregulated pilus biosynthesis protein I...
q7bgc5	489	52	10.6	SubName: Full=Toxin-coregulated pilus biosynthesis outer mem...
q76b45	282	43	10.6	RecName: Full=Blarina toxin; Short=BLTX; EC=3.4.21.-; Flags:...
q6dwp7	319	43	10.6	SubName: Full=Shiga toxin 2 subunit A;
q6dwp5	319	43	10.6	SubName: Full=Shiga toxin 2 subunit A;
q6dwp3	319	43	10.6	SubName: Full=Shiga toxin 2 subunit A;
q6dwp1	319	43	10.6	SubName: Full=Shiga toxin 2 subunit A;
q5wpw9	319	43	10.6	SubName: Full=Shiga toxin 2 A subunit; SubName: Full=Verocyt...
q5dz60	286	43	10.6	SubName: Full=Toxin coregulated pilus biosynthesis protein T...
q58ci5	371	43	10.6	SubName: Full=Zona occludens toxin homologue;
q54326	310	43	10.6	SubName: Full=Synergohymenotropic toxin;
q4wyy7	363	43	10.6	SubName: Full=Toxin biosynthesis proten (Fum3), putative;
q4w8a6	267	43	10.6	SubName: Full=Cytolethal distending toxin B; SubName: Full=C...
q4jv96	240	43	10.6	RecName: Full=Diphtheria toxin repressor; AltName: Full=Iron...
q3qza9	354	43	10.6	SubName: Full=Zonular occludens toxin;
q3iyt5	280	43	10.6	SubName: Full=Hemolysin-type calcium-binding toxin;
q3hr44	258	43	10.6	SubName: Full=Truncated alpha toxin;
q3dqk9	305	43	10.6	SubName: Full=Exfoliative toxin A;
q00357	548	58	10.6	RecName: Full=Putative HC-toxin efflux carrier TOXA;
p29481	489	52	10.6	RecName: Full=Toxin coregulated pilus biosynthesis outer mem...
p15167	414	44	10.6	RecName: Full=Snake venom metalloproteinase atrolysin-D; Sho...
p0c6d8	620	66	10.6	RecName: Full=Toxin coregulated pilus biosynthesis protein I...
p0a4m2	287	43	10.6	RecName: Full=Toxin zeta; AltName: Full=UDP-N-acetylglucosam...

p0a4m1	287	43	10.6	RecName: Full=Toxin zeta; AltName: Full=UDP-N-acetylglucosam...
k7b8r2	333	43	10.6	SubName: Full=Anthrax toxin receptor 1;
k5k2c1	433	46	10.6	SubName: Full=TcdB toxin N-terminal helical domain protein;
k5izl7	433	46	10.6	SubName: Full=TcdB toxin N-terminal helical domain protein;
k5hvg2	433	46	10.6	SubName: Full=TcdB toxin N-terminal helical domain protein;
k5gh15	433	46	10.6	SubName: Full=TcdB toxin N-terminal helical domain protein;
k5g408	433	46	10.6	SubName: Full=TcdB toxin N-terminal helical domain protein;
k5f1z4	433	46	10.6	SubName: Full=TcdB toxin N-terminal helical domain protein;
k4ivs1	344	43	10.6	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
k3udh9	319	43	10.6	SubName: Full=Shiga toxin 2, subunit A; EC=3.2.2.22;
k2xey3	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
k2wrt4	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
k2wj76	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
k2vxa8	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
k2vus7	273	43	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
k2ttp9	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
k2me39	264	43	10.6	SubName: Full=Putative Hemolysin-type calcium-binding RTX to...
k2gtp1	276	43	10.6	SubName: Full=Zeta toxin family protein;
k1ydm3	318	43	10.6	SubName: Full=Zonular occludens toxin;
k1ss91	290	43	10.6	SubName: Full=Toxin-antitoxin system, antitoxin component, X...
k1b9w6	268	43	10.6	SubName: Full=Toxin subunit S1;
k0d7d2	575	61	10.6	SubName: Full=Toxin secretion ABC transporter ATP-binding pr...
j8xwd5	295	43	10.6	SubName: Full=RTX toxin protein;
j7qn60	241	43	10.6	SubName: Full=Putative toxin;
j7kf88	528	56	10.6	SubName: Full=Anthrax toxin receptor 1 transcript variant 4;...
j7i8z7	319	43	10.6	SubName: Full=Shiga toxin 2A subunit;
j6bt54	287	43	10.6	SubName: Full=Zeta toxin;
j5wzm8	201	43	10.6	SubName: Full=Zeta toxin;
j5avn3	183	43	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
j4vvx5	549	58	10.6	SubName: Full=Multidrug and toxin extrusion protein;
j3kss8	316	43	10.6	SubName: Full=Multidrug and toxin extrusion protein 1;
j3k735	335	43	10.6	SubName: Full=Toxin biosynthesis protein;
j3jaa5	261	43	10.6	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
j2tfn8	302	43	10.6	SubName: Full=Zeta toxin;
j2lk80	355	43	10.6	SubName: Full=Zonula occludens toxin; Flags: Precursor;
j2a4b8	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
j2a0g6	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
j1wzv9	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
j1wpf5	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
j1w0m7	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
j1vs20	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
j1nq07	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
j1nkx2	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
j1m890	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
j1khw5	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
j1gdr8	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
j1fg05	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
j1dxf9	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
j1cnw6	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
j0mnf8	336	43	10.6	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
j0lwc6	337	43	10.6	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
i9i9l1	147	43	10.6	SubName: Full=Toxin;
i9gz36	147	43	10.6	SubName: Full=Toxin;
i9euq2	147	43	10.6	SubName: Full=Toxin;
i9dn47	147	43	10.6	SubName: Full=Toxin;
i9b285	147	43	10.6	SubName: Full=Toxin;
i9a7v4	147	43	10.6	SubName: Full=Toxin;
i8z066	147	43	10.6	SubName: Full=Toxin;

i8xyj7	147	43	10.6	SubName: Full=Toxin;
i8qik8	147	43	10.6	SubName: Full=Toxin;
i8n0b7	147	43	10.6	SubName: Full=Toxin;
i8m1p3	147	43	10.6	SubName: Full=Toxin;
i8lqn6	147	43	10.6	SubName: Full=Toxin;
i8l0h9	147	43	10.6	SubName: Full=Toxin;
i8k7z1	147	43	10.6	SubName: Full=Toxin;
i8iw97	147	43	10.6	SubName: Full=Toxin;
i8f7i2	147	43	10.6	SubName: Full=Toxin;
i8bsd2	147	43	10.6	SubName: Full=Toxin;
i8bpb0	147	43	10.6	SubName: Full=Toxin;
i7h361	226	43	10.6	SubName: Full=Diphtheria toxin repressor;
i4mkb6	351	43	10.6	SubName: Full=Zonula occludens toxin;
i4j1f9	373	43	10.6	SubName: Full=Toxin YeeV;
i4auc1	226	43	10.6	SubName: Full=Diphtheria toxin repressor;
i3qy03	226	43	10.6	SubName: Full=Diphtheria toxin repressor;
i3i257	302	43	10.6	SubName: Full=Exfoliative toxin;
i3ck66	347	43	10.6	SubName: Full=Zonula occludens toxin;
i3au29	178	43	10.6	SubName: Full=Toxin-antitoxin system, antitoxin component, X...
i2wbf6	360	43	10.6	SubName: Full=Hemolysin toxin protein A domain protein;
i2v5k8	224	43	10.6	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
i2smd8	319	43	10.6	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
i2qh86	239	43	10.6	SubName: Full=Putative toxin-antitoxin system antitoxin comp...
i2cqq4	188	43	10.6	SubName: Full=Ras-related C3 botulinum toxin substrate 1;
i0svj2	333	43	10.6	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
i0at63	226	43	10.6	SubName: Full=Diphtheria toxin repressor;
h9cjpg1	277	43	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
h8lte6	226	43	10.6	SubName: Full=Diphtheria toxin repressor;
h8jv58	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
h8jv52	620	66	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
h7wp33	267	43	10.6	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h7twh5	267	43	10.6	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h7qws3	267	43	10.6	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h6m2x9	226	43	10.6	SubName: Full=Diphtheria toxin repressor;
h5ewt3	652	69	10.6	SubName: Full=Toxin B domain protein;
h5alt9	290	43	10.6	SubName: Full=Zeta toxin family protein;
h4rd58	373	43	10.6	SubName: Full=Toxin B domain protein;
h4qh28	658	70	10.6	SubName: Full=Toxin B domain protein;
h4q814	373	43	10.6	SubName: Full=Toxin B domain protein;
h4nu51	373	43	10.6	SubName: Full=Toxin B domain protein;
h4ng95	183	43	10.6	SubName: Full=Toxin B domain protein;
h4hd22	614	65	10.6	SubName: Full=ADP-ribosylating toxin;
h4el02	614	65	10.6	SubName: Full=ADP-ribosylating toxin;
h4dnp3	614	65	10.6	SubName: Full=ADP-ribosylating toxin;
h4d7l0	614	65	10.6	SubName: Full=ADP-ribosylating toxin;
h4blv1	614	65	10.6	SubName: Full=ADP-ribosylating toxin;
h4b858	241	43	10.6	SubName: Full=Beta-grasp domain toxin protein;
h4ar75	614	65	10.6	SubName: Full=ADP-ribosylating toxin;
h4ahk2	614	65	10.6	SubName: Full=ADP-ribosylating toxin;
h4a9w6	614	65	10.6	SubName: Full=ADP-ribosylating toxin;
h3knb6	319	43	10.6	SubName: Full=Zonular occludens toxin family protein;
h2fmh4	226	43	10.6	SubName: Full=Diphtheria toxin repressor;
h1snu5	282	43	10.6	SubName: Full=Toxin, beta-grasp domain protein;
h0edz9	236	43	10.6	SubName: Full=Putative HC-toxin efflux carrier TOXA;
h0cc66	282	43	10.6	SubName: Full=Toxin, beta-grasp domain protein;
h0aqi5	240	43	10.6	SubName: Full=Toxin, beta-grasp domain protein;
g7tzj1	226	43	10.6	SubName: Full=Diphtheria toxin repressor;
g7tmz7	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...

g7tmz1	620	66	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
g7c4v8	327	43	10.6	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
g7c4v2	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
g7bu99	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
g7bgk5	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
g7b5r9	327	43	10.6	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
g7av70	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
g7aln9	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
g7aaj1	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
g7a1b5	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
g6zqt3	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
g6zd84	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
g6z4q7	327	43	10.6	SubName: Full=Vibrio cholerae toxin co-regulated pilus biosy...
g6z4q1	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
g6itz5	380	43	10.6	SubName: Full=Membrane protein, toxin regulator-like protein...
g6axk4	313	43	10.6	SubName: Full=Toxin-antitoxin system, toxin component, Fic d...
g5sqz7	301	43	10.6	SubName: Full=Toxin-antitoxin system, toxin component, GNAT ...
g5nag3	243	43	10.6	SubName: Full=Putative pertussis-like toxin subunit;
g4qzr8	226	43	10.6	SubName: Full=Diphtheria toxin repressor;
g4qqq0	226	43	10.6	SubName: Full=Diphtheria toxin repressor;
g3kgv3	472	50	10.6	SubName: Full=RTX toxin-related Ca2+-binding protein;
g3j0d4	372	43	10.6	SubName: Full=Zonular occludens toxin;
g2ykk4	622	66	10.6	SubName: Full=Similar to MFS toxin efflux pump (AflT);
g2ycb0	256	43	10.6	SubName: Full=Similar to cercosporin toxin biosynthesis prot...
g2nhr3	204	43	10.6	SubName: Full=Transcriptional modulator of MazE/toxin, MazF;...
g2c5z1	315	43	10.6	SubName: Full=Shiga-like toxin 1 subunit A; EC=3.2.2.22;
g2aeu0	319	43	10.6	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
g0i491	226	43	10.6	SubName: Full=Diphtheria toxin repressor;
f9xux9	264	43	10.6	SubName: Full=Cytolethal distending toxin;
f9kwt9	219	43	10.6	SubName: Full=Toxin, beta-grasp domain protein;
f9kpd9	635	67	10.6	SubName: Full=Toxin-antitoxin system toxin component, PIN fa...
f9kh92	240	43	10.6	SubName: Full=Toxin, beta-grasp domain protein;
f9jwd6	282	43	10.6	SubName: Full=Toxin, beta-grasp domain protein;
f9c559	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
f9b8s1	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
f9a322	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
f8zty8	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
f8zj41	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
f8z7q3	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
f8yws3	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
f8vem7	272	43	10.6	SubName: Full=Putative toxin;
f7n2z0	353	43	10.6	SubName: Full=Antitoxin of the YeeV-YeeU toxin-antitoxin sys...
f4xfn6	248	43	10.6	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
f4xe31	255	43	10.6	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
f4u2u9	442	47	10.6	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
f4lh04	241	43	10.6	SubName: Full=Putative toxin;
f3xz81	301	43	10.6	SubName: Full=Toxin-antitoxin system, toxin component, GNAT ...
f3l839	249	43	10.6	SubName: Full=Clostridial binary toxin A;
f2uwj8	404	43	10.6	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
f2g6c1	724	77	10.6	SubName: Full=Toxin secretion ABC transporter, ATP-binding s...
f2ace2	614	65	10.6	SubName: Full=Putative RTX toxin hemolysin-type calcium-bind...
f0jn72	311	43	10.6	SubName: Full=Zeta toxin; poison-antidote element;
e9zb75	309	43	10.6	SubName: Full=Zeta toxin protein;
e8jt30	256	43	10.6	SubName: Full=Zeta toxin; SubName: Full=Zeta-toxin;
e8fbf9	197	43	10.6	SubName: Full=Cytolethal distending toxin subunit CdtB;
e8da25	216	43	10.6	SubName: Full=Cytolethal distending toxin subunit B;
e7nvs5	257	43	10.6	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
e7az29	315	43	10.6	SubName: Full=Putative toxin subunit;

e6y409	256	43	10.6	SubName: Full=Toxin PezT;
e6y3z8	252	43	10.6	SubName: Full=Toxin PezT; SubName: Full=Zeta toxin;
e5rm62	189	43	10.6	SubName: Full=Cytolethal distending toxin C;
e5azk4	258	43	10.6	SubName: Full=Staphylococcal/Streptococcal toxin, beta-grasp...
e5av21	390	43	10.6	SubName: Full=Pfam: Zeta toxin::PF06414;
e5au95	379	43	10.6	SubName: Full=INSECTICIDAL TOXIN COMPLEX PROTEIN TCCC;
e5arl1	648	69	10.6	SubName: Full=Insecticidal toxin complex protein TccB;
e3zmu7	381	43	10.6	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e3yuk4	257	43	10.6	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
e3fbw3	226	43	10.6	SubName: Full=Diphtheria toxin repressor;
e3ddq8	282	43	10.6	SubName: Full=Insecticidal toxin protein;
e2sxv9	298	43	10.6	SubName: Full=Toxin-antitoxin system, antitoxin component, X...
e2sk5	246	43	10.6	SubName: Full=Putative toxin-antitoxin system, toxin compone...
e2csd3	229	43	10.6	SubName: Full=Toxin-antitoxin system, antitoxin component, X...
e2cls6	270	43	10.6	SubName: Full=Toxin-antitoxin system, antitoxin component, X...
e1vm56	402	43	10.6	SubName: Full=Putative Zeta toxin of the postsegregational k...
e1lpb9	253	43	10.6	SubName: Full=Zeta toxin family protein;
e1jkj3	384	43	10.6	SubName: Full=Putative toxin-antitoxin system, toxin compone...
e0qlv3	303	43	10.6	SubName: Full=MazF family toxin-antitoxin system;
e0fp20	473	50	10.6	SubName: Full=RTX-III toxin determinant D;
e0fi02	473	50	10.6	SubName: Full=RTX-III toxin determinant D;
e0fc13	473	50	10.6	SubName: Full=RTX-III toxin determinant D;
e0f5n7	473	50	10.6	SubName: Full=RTX-III toxin determinant D;
e0ezm0	473	50	10.6	SubName: Full=RTX-III toxin determinant D;
e0etc9	473	50	10.6	SubName: Full=RTX-III toxin determinant D;
e0elv1	473	50	10.6	SubName: Full=RTX-III toxin determinant D;
e0efk0	473	50	10.6	SubName: Full=RTX-III toxin determinant D;
e0e9q2	473	50	10.6	SubName: Full=RTX-III toxin determinant D;
d9y255	176	43	10.6	SubName: Full=Toxin-antitoxin system, toxin component;
d9xwd4	281	43	10.6	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9xu76	300	43	10.6	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9wu32	276	43	10.6	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9wqr0	160	43	10.6	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9wni8	290	43	10.6	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9wmw3	287	43	10.6	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9wcu8	291	43	10.6	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9rux5	311	43	10.6	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d9qaw1	226	43	10.6	SubName: Full=Diphtheria toxin repressor;
d9q8v1	226	43	10.6	SubName: Full=Diphtheria toxin repressor;
d7ixm3	529	56	10.6	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d7ixm1	509	54	10.6	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d7ied8	293	43	10.6	SubName: Full=Insecticidal toxin complex protein TccC6;
d7h1b7	620	66	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
d7h1b1	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
d7hxx1	288	43	10.6	SubName: Full=Cholera toxin transcriptional activator;
d6t5n9	327	43	10.6	SubName: Full=Leukocidin/hemolysin toxin family protein;
d6rlr8	369	43	10.6	SubName: Full=Toxin biosynthesis protein;
d6k9y3	274	43	10.6	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d4ue97	327	43	10.6	SubName: Full=Leukocidin/hemolysin toxin family protein;
d4s2q2	511	54	10.6	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d4rxy4	308	43	10.6	SubName: Full=Toxin-antitoxin system, antitoxin component, X...
d3ank0	248	43	10.6	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
d3a650	394	43	10.6	SubName: Full=Zonula occludens toxin family protein;
d2zqn0	239	43	10.6	SubName: Full=Putative toxin-antitoxin system, toxin compone...
d2u4e3	271	43	10.6	SubName: Full=Insecticidal toxin complex protein;
d1w920	375	43	10.6	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d1w1g9	424	45	10.6	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d1qye7	327	43	10.6	SubName: Full=Leukocidin/hemolysin toxin family protein;

d1qjx3	327	43	10.6	SubName: Full=Leukocidin/hemolysin toxin family protein;
d1qen2	614	65	10.6	SubName: Full=ADP-ribosylating toxin;
d1p021	405	43	10.6	SubName: Full=RTX toxin transporter;
d0wlr9	179	43	10.6	SubName: Full=Toxin-antitoxin system, toxin component, GNAT ...
d0hrr8	620	66	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
d0hrr2	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
d0fpp9	249	43	10.6	SubName: Full=Probable toxin transcriptional activator ToxR;...
c9m6s7	258	43	10.6	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
c9lwd8	482	51	10.6	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
c9lmw5	347	43	10.6	SubName: Full=Zeta toxin family protein;
c7tjc4	380	43	10.6	SubName: Full=Membrane protein, toxin regulator-like protein...
c7tck4	380	43	10.6	SubName: Full=Membrane protein, toxin regulator-like protein...
c7h633	347	43	10.6	SubName: Full=Toxin-antitoxin system, toxin component, MazF ...
c7gi73	277	43	10.6	SubName: Full=Toxin-antitoxin system, antitoxin component, X...
c7g7a6	254	43	10.6	SubName: Full=Putative toxin-antitoxin system, toxin compone...
c7bns0	601	64	10.6	SubName: Full=Similar to yersinia pestis murine toxin ymt pr...
c7big4	327	43	10.6	SubName: Full=Insecticidal toxin complex protein tccc3;
c6yev8	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
c6yev2	620	66	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
c6xeu5	386	43	10.6	SubName: Full=Zonular occludens toxin;
c6udk4	353	43	10.6	SubName: Full=Antitoxin of the YeeV-YeeU toxin-antitoxin sys...
c6rw12	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
c6rw06	620	66	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
c6dxy7	434	46	10.6	SubName: Full=Alpha-toxin;
c5uy11	748	79	10.6	SubName: Full=Toxin complex component ORF-X2;
c5r8n8	382	43	10.6	SubName: Full=Membrane protein, toxin regulator;
c5jls1	277	43	10.6	SubName: Full=Toxin biosynthesis ketoreductase;
c5fxk2	603	64	10.6	SubName: Full=Multidrug and toxin extrusion protein 1;
c4u9t1	231	43	10.6	SubName: Full=RTX toxin and Ca2+-binding protein;
c4k4z6	242	43	10.6	SubName: Full=ADP-ribosyltransferase toxin-1;
c3nt73	620	66	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
c3nt67	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
c3lt82	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
c3lt76	620	66	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
c2jx72	380	43	10.6	SubName: Full=Possible membrane protein, probable toxin regu...
c2ja24	620	66	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
c2ja19	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
c2igm8	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
c2igm2	620	66	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
c0xm23	325	43	10.6	SubName: Full=VIP2 family actin-ADP-ribosylating toxin;
c0wtv2	325	43	10.6	SubName: Full=VIP2 family actin-ADP-ribosylating toxin;
b8m6b8	358	43	10.6	SubName: Full=Killer toxin sensitivity protein (Iki1), putat...
b6vmw2	451	48	10.6	SubName: Full=RTX toxin ABC transporter protein;
b5qqv4	380	43	10.6	SubName: Full=Predicted membrane protein, putative toxin reg...
b5gja6	284	43	10.6	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
b5g7c8	243	43	10.6	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
b2u9y2	376	43	10.6	SubName: Full=Zonular occludens toxin;
b1mx04	349	43	10.6	SubName: Full=Predicted membrane protein, putative toxin reg...
b0xzv5	363	43	10.6	SubName: Full=Toxin biosynthesis proten (Fum3), putative;
a8ax66	298	43	10.6	SubName: Full=Exfoliative toxin A;
a6g818	336	43	10.6	SubName: Full=RTX toxins and related Ca2+-binding protein;
a6aes3	294	43	10.6	SubName: Full=Cholera toxin transcriptional activator;
a3gyr8	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
a3gyr2	620	66	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
a3gme6	620	66	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
a3eic4	620	66	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
a2qlz8	282	43	10.6	SubName: Full=Similarity to hypothetical host-specific AK-to...
a2pu44	601	64	10.6	RecName: Full=NAD(+)-arginine ADP-ribosyltransferase Chelt;...

a2pbr6	294	43	10.6	SubName: Full=Cholera toxin transcriptional activator;
a1jv41	287	43	10.6	SubName: Full=Putative zeta toxin; SubName: Full=Zeta toxin;...
a1f0y6	489	52	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
a1f0y0	620	66	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
a1eic8	620	66	10.6	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
a0rpj1	264	43	10.6	SubName: Full=Cytolethal distending toxin;
a0b4q4	659	70	10.6	SubName: Full=Zeta toxin family protein;
q9y6f1	533	56	10.5	RecName: Full=Poly [ADP-ribose] polymerase 3; Short=PARP-3; ...
q93tt7	620	65	10.5	SubName: Full=Toxin-coregulated pilus biosynthesis protein I...
q6khu2	677	71	10.5	SubName: Full=Unspecified toxin/drug ABC transporter ATP-bin...
q4wks5	421	44	10.5	SubName: Full=Toxin biosynthesis protein, putative;
q46237	553	58	10.5	SubName: Full=Lambda toxin;
q44636	475	50	10.5	RecName: Full=Anthrax toxin expression trans-acting positive...
q0mqm8	448	47	10.5	SubName: Full=Binary toxin B;
p38179	458	48	10.5	RecName: Full=Dol-P-Man:Man(5)GlcNAc(2)-PP-Dol alpha-1,3-man...
j4kkz7	590	62	10.5	SubName: Full=MFS toxin efflux pump (AflT);
i4z0z7	712	75	10.5	SubName: Full=Ca2+-binding protein, RTX toxin;
i0dbm4	475	50	10.5	SubName: Full=Anthrax toxin expression trans-acting positive...
g7xzf8	429	45	10.5	SubName: Full=Toxin biosynthesis protein;
g6tiy9	636	67	10.5	SubName: Full=CylM , cytolytic toxin system domain protein;
g6fs2	645	68	10.5	SubName: Full=CylM , cytolytic toxin system domain protein;
g5bnz0	543	57	10.5	SubName: Full=Anthrax toxin receptor 1;
g3jhi5	427	45	10.5	SubName: Full=Toxin biosynthesis protein, putative;
g0djh5	455	48	10.5	SubName: Full=Zonular occludens toxin;
f2puc1	418	44	10.5	SubName: Full=Cercosporin toxin biosynthesis protein;
f0v1d0	721	76	10.5	SubName: Full=Putative RTX toxin secretion ATP-binding prote...
e7az33	590	62	10.5	SubName: Full=Putative toxin subunit;
e3fkl8	555	58	10.5	SubName: Full=RTX toxin transporter;
d9pc78	478	50	10.5	SubName: Full=RTX-I toxin secretion component;
d9p4p6	478	50	10.5	SubName: Full=RTX-I toxin secretion component;
d0h655	620	65	10.5	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
d0fpk2	488	51	10.5	SubName: Full=General secretion pathway protein E (Type II t...
c9pid0	717	75	10.5	SubName: Full=Cytolysin and hemolysin HlyA Pore-forming toxi...
c5tjt1	569	60	10.5	SubName: Full=Putative RTX toxins and related Ca2+-binding p...
c4sz10	668	70	10.5	SubName: Full=Toxin ABC transporter, ATP-binding/permease pr...
c3pe22	475	50	10.5	SubName: Full=Anthrax toxin expression trans-acting positive...
c31lb8	475	50	10.5	SubName: Full=Anthrax toxin expression trans-acting positive...
c1eka0	475	50	10.5	SubName: Full=Anthrax toxin expression trans-acting positive...
b3jdc2	475	50	10.5	SubName: Full=Anthrax toxin expression trans-acting positive...
b3gyh6	478	50	10.5	SubName: Full=RTX-I toxin secretion component;
b1uyh4	475	50	10.5	SubName: Full=Anthrax toxin expression trans-acting positive...
b1r9k9	553	58	10.5	SubName: Full=Lambda toxin;
b1l2g0	750	79	10.5	SubName: Full=Toxin complex component ORF-X2;
b1gr73	475	50	10.5	SubName: Full=Anthrax toxin expression trans-acting positive...
b1f6t2	475	50	10.5	SubName: Full=Anthrax toxin expression trans-acting positive...
b1bsw2	553	58	10.5	SubName: Full=Lambda toxin;
b0qqp4	475	50	10.5	SubName: Full=Anthrax toxin expression trans-acting positive...
b0qay8	475	50	10.5	SubName: Full=Anthrax toxin expression trans-acting positive...
b0ayx5	475	50	10.5	SubName: Full=Anthrax toxin expression trans-acting positive...
a7kau3	601	63	10.5	RecName: Full=Multidrug and toxin extrusion protein 2; Short...
a6fg05	437	46	10.5	SubName: Full=Toxin secretion transporter, putative;
a5f389	620	65	10.5	RecName: Full=Toxin coregulated pilus biosynthesis protein I...
a3n290	478	50	10.5	SubName: Full=RTX-I toxin secretion component;
a3d4m9	455	48	10.5	SubName: Full=Zonular occludens toxin;
a2qqt5	552	58	10.5	SubName: Full=Function: TOXA of C. carbonum exports the cycl...
a1wdl4	560	59	10.5	SubName: Full=Zeta toxin family protein;
a1tpt2	478	50	10.5	SubName: Full=Zonular occludens toxin;
q9p5j4	412	43	10.4	SubName: Full=Related to host-specific AK-toxin Akt2;

q9gnn8	463	48	10.4	RecName: Full=Toxin CaTX-A; Short=Toxin A; AltName: Full=CAT...
q90391	414	43	10.4	RecName: Full=Snake venom metalloproteinase atrolysin-B; Sho...
q7n731	451	47	10.4	SubName: Full=RTX toxin ABC transporter protein (MFP) RtxD;
q4r7b7	557	58	10.4	RecName: Full=Anthrax toxin receptor-like; Flags: Precursor;...
q45847	431	45	10.4	SubName: Full=C2 toxin (Component-I);
q0k8a6	460	48	10.4	SubName: Full=Putative drug or toxin secretion protein;
o05102	618	64	10.4	RecName: Full=Pesticidal crystal-like protein cry17Aa; AltNa...
j6rpa5	463	48	10.4	SubName: Full=Toxin secretion/phage lysis holin;
j6q7m8	463	48	10.4	SubName: Full=Toxin secretion/phage lysis holin;
j6pgm9	463	48	10.4	SubName: Full=Toxin secretion/phage lysis holin;
j6p9g9	463	48	10.4	SubName: Full=Toxin secretion/phage lysis holin;
j6mha3	463	48	10.4	SubName: Full=Toxin secretion/phage lysis holin;
j6mfq0	463	48	10.4	SubName: Full=Toxin secretion/phage lysis holin;
j6hbw9	463	48	10.4	SubName: Full=Toxin secretion/phage lysis holin;
j6eqh5	463	48	10.4	SubName: Full=Toxin secretion/phage lysis holin;
j6eje8	463	48	10.4	SubName: Full=Toxin secretion/phage lysis holin;
j6d062	463	48	10.4	SubName: Full=Toxin secretion/phage lysis holin;
j6cxc1	463	48	10.4	SubName: Full=Toxin secretion/phage lysis holin;
j6crj2	463	48	10.4	SubName: Full=Toxin secretion/phage lysis holin;
j6bzi4	463	48	10.4	SubName: Full=Toxin secretion/phage lysis holin;
j5jpk7	463	48	10.4	SubName: Full=Toxin secretion/phage lysis holin;
j5ii34	463	48	10.4	SubName: Full=Toxin secretion/phage lysis holin;
j5gfv6	463	48	10.4	SubName: Full=Toxin secretion/phage lysis holin;
i0zdu9	604	63	10.4	SubName: Full=Toxin-like outer membrane protein;
i0di06	560	58	10.4	SubName: Full=Diphtheria toxin;
h3zfp4	441	46	10.4	SubName: Full=Toxin;
h0esf2	451	47	10.4	SubName: Full=Putative HC-toxin efflux carrier TOXA;
g6vbr1	645	67	10.4	SubName: Full=CylM , cytolytic toxin system domain protein;
g6uku5	645	67	10.4	SubName: Full=CylM , cytolytic toxin system domain protein;
g6m3y4	645	67	10.4	SubName: Full=CylM , cytolytic toxin system domain protein;
f8kh44	441	46	10.4	SubName: Full=Putative toxin biosynthesis associated enzyme;...
f7mm82	434	45	10.4	SubName: Full=Alpha-toxin;
f2py33	443	46	10.4	SubName: Full=Cercosporin toxin biosynthesis protein;
e7hia7	480	50	10.4	SubName: Full=Toxin B domain protein;
e6zz25	653	68	10.4	SubName: Full=Related to DPH2-diphtheria toxin resistance pr...
e2xtz5	776	81	10.4	SubName: Full=Type I toxin efflux ATP-binding protein;
e2t5j1	560	58	10.4	SubName: Full=Zeta toxin superfamily;
d5eun3	482	50	10.4	SubName: Full=Toxin domain protein;
c5fga5	614	64	10.4	SubName: Full=Protoplast regeneration and killer toxin resis...
c4ihl6	748	78	10.4	SubName: Full=Toxin complex component ORF-X2;
b5fdl8	585	61	10.4	SubName: Full=TcpI, toxin-coregulated pilus biosynthesis pro...
a9ydv2	588	61	10.4	SubName: Full=Alpha-glucosidase binding-toxin receptor;
a3y550	441	46	10.4	SubName: Full=Putative toxin secretion transmembrane protein...
a3xf19	442	46	10.4	SubName: Full=Putative toxin secretion transmembrane protein...
a1cgg2	412	43	10.4	SubName: Full=Toxin biosynthesis protein, putative;
q9kwh0	268	42	10.3	SubName: Full=Exfoliative toxin B;
q9fbi2	315	42	10.3	RecName: Full=Shiga toxin subunit A; EC=3.2.2.22; Flags: Pre...
q9f655	319	42	10.3	SubName: Full=Shiga toxin II A subunit;
q9f5r0	336	42	10.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
q94m00	315	42	10.3	SubName: Full=Shiga toxin 1A variant OX3;
q93cm1	286	42	10.3	RecName: Full=Toxin zeta; AltName: Full=UDP-N-acetylglucosam...
q8x696	315	42	10.3	SubName: Full=Shiga toxin 1 A subunit; SubName: Full=Shiga t...
q8vv67	315	42	10.3	SubName: Full=Shiga toxin 1 A subunit; SubName: Full=Shiga t...
q8vv64	315	42	10.3	SubName: Full=Shiga toxin 1 A-subunit;
q8p1b0	302	42	10.3	SubName: Full=Putative exfoliative toxin;
q8l170	315	42	10.3	SubName: Full=Shiga toxin 1 A subunit;
q8k7u0	302	42	10.3	SubName: Full=Putative exfoliative toxin;
q8dz95	305	42	10.3	SubName: Full=Exfoliative toxin A, putative;

q7wzi8	313	42	10.3	SubName: Full=Shiga toxin 1 variant A subunit;
q7wzi7	315	42	10.3	SubName: Full=Shiga toxin 1 variant A subunit;
q7ayi8	315	42	10.3	SubName: Full=Shiga toxin 1 Stx1, A-subunit;
q7ak38	315	42	10.3	SubName: Full=Shiga toxin 1 subunit A;
q77yb9	315	42	10.3	SubName: Full=Shiga-like toxin A subunit;
q779k4	315	42	10.3	RecName: Full=Shiga toxin subunit A; EC=3.2.2.22; Flags: Pre...
q777w4	315	42	10.3	SubName: Full=Shiga toxin 1, subunit A;
q776e8	315	42	10.3	SubName: Full=Shiga toxin1 subunit A;
q6p6p7	630	65	10.3	RecName: Full=Poly [ADP-ribose] polymerase 6; Short=PARP-6; ...
q6ldt4	315	42	10.3	SubName: Full=Shiga toxin-like subunit A; Flags: Precursor;
q6h9w4	315	42	10.3	SubName: Full=Shiga toxin 1 subunit A;
q5dz56	259	42	10.3	SubName: Full=Toxin coregulated pilus biosynthesis protein T...
q5bd08	418	43	10.3	SubName: Full=Toxin biosynthesis protein (Tri7), putative (A...
q4wsi8	551	57	10.3	SubName: Full=MFS toxin efflux pump (AflT), putative;
q47647	315	42	10.3	SubName: Full=Shiga-like toxin type-I alpha subunit; Flags: ...
q47640	315	42	10.3	SubName: Full=SLT-I A subunit coding region; SubName: Full=S...
q47089	273	42	10.3	SubName: Full=CdtB; SubName: Full=Cytolethal distending toxi...
q45882	613	63	10.3	RecName: Full=Pesticidal crystal-like protein cry16Aa; AltNa...
q3lzzq8	329	42	10.3	SubName: Full=Cytolethal distending toxin subunit B;
q32gm1	315	42	10.3	RecName: Full=Shiga toxin subunit A; EC=3.2.2.22; Flags: Pre...
q2yxe9	315	42	10.3	SubName: Full=Probable exfoliative toxin;
q2nl67	630	65	10.3	RecName: Full=Poly [ADP-ribose] polymerase 6; Short=PARP-6; ...
q1ciy2	333	42	10.3	SubName: Full=Putative ABC associated RTX toxin transporter,...
q0fsh1	175	42	10.3	SubName: Full=RTX toxins and related Ca2+-binding protein;
p45784	252	42	10.3	RecName: Full=Type II secretion system protein N; Short=T2SS...
p45777	305	42	10.3	RecName: Full=Type II secretion system protein C; Short=T2SS...
p10149	315	42	10.3	RecName: Full=Shiga-like toxin 1 subunit A; Short=SLT-1 A su...
p09331	280	42	10.3	RecName: Full=Exfoliative toxin A; EC=3.4.21.-; AltName: Ful...
p08026	315	42	10.3	RecName: Full=Shiga-like toxin 1 subunit A; Short=SLT-1 A su...
o35975	289	42	10.3	RecName: Full=T-cell ecto-ADP-ribosyltransferase 2; EC=2.4.2...
k9ggp7	347	42	10.3	SubName: Full=Killer toxin sensitivity protein (Iki1), putat...
k9fuj9	347	42	10.3	SubName: Full=Killer toxin sensitivity protein (Iki1), putat...
k5the3	536	55	10.3	SubName: Full=Toxin RTX-I translocation ATP-binding protein;...
k5hh14	355	42	10.3	SubName: Full=Toxin co-regulated pilus biosynthesis Q family...
k5h4b1	315	42	10.3	SubName: Full=Shiga-like toxin 1 subunit A; EC=3.2.2.22;
k5fxm0	315	42	10.3	SubName: Full=Shiga-like toxin 1 subunit A; EC=3.2.2.22;
k5c2s8	254	42	10.3	SubName: Full=Zeta toxin;
k4xjd7	315	42	10.3	SubName: Full=Shiga toxin 1 subunit A;
k4x433	315	42	10.3	SubName: Full=Shiga toxin 1 subunit A;
k4x157	315	42	10.3	SubName: Full=Shiga toxin 1 subunit A;
k4w0t0	315	42	10.3	SubName: Full=Shiga toxin 1 subunit A;
k4vx12	315	42	10.3	SubName: Full=Shiga toxin 1 subunit A;
k4uyv4	315	42	10.3	SubName: Full=Shiga toxin 1 subunit A;
k4uxp9	315	42	10.3	SubName: Full=Shiga toxin I subunit A;
k4uqw0	315	42	10.3	SubName: Full=Shiga toxin 1 subunit A;
k4qhn4	269	42	10.3	SubName: Full=Pertussis toxin subunit 1; EC=2.4.2.-;
k3umm3	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
k3ttz6	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
k3t4g9	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
k3qrw9	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
k3h152	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
k3giq1	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
k3ffk1	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
k3f5h7	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
k3dqq7	315	42	10.3	SubName: Full=Shiga-like toxin 1 subunit A; EC=3.2.2.22;
k3d7t9	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
k3b7a9	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
k3axb4	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;

k3a764	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
k2z6d9	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
k2ypg6	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
k2yei3	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
k2wsg4	536	55	10.3	SubName: Full=Toxin RTX-I translocation ATP-binding protein;...
k2vz13	336	42	10.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
k2ucq4	477	49	10.3	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
k1x5u3	419	43	10.3	SubName: Full=Toxin biosynthesis protein;
k0ki74	564	58	10.3	SubName: Full=Multidrug and toxin extrusion protein 1;
k0g047	478	49	10.3	SubName: Full=RTX-I toxin secretion component;
j9jek1	338	42	10.3	SubName: Full=Putative zeta toxin protein;
j8xbd3	361	42	10.3	SubName: Full=Zonula occludens toxin family protein;
j8v338	361	42	10.3	SubName: Full=Zonula occludens toxin family protein;
j7kt05	653	67	10.3	SubName: Full=Multidrug/toxin efflux protein, ATP binding an...
j4x0g4	339	42	10.3	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
j4w8j9	344	42	10.3	SubName: Full=Membrane protein, putative toxin regulator;
j4w696	344	42	10.3	SubName: Full=Membrane protein, putative toxin regulator;
j4uz83	348	42	10.3	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
j1iax4	242	42	10.3	SubName: Full=Toxin secretion protein;
j1dgy0	275	42	10.3	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
i9paq9	270	42	10.3	SubName: Full=Zeta toxin;
i8yim3	147	42	10.3	SubName: Full=Toxin;
i8ya87	147	42	10.3	SubName: Full=Toxin;
i8xj86	147	42	10.3	SubName: Full=Toxin;
i8wyz3	147	42	10.3	SubName: Full=Toxin;
i8lqf8	147	42	10.3	SubName: Full=Toxin;
i8icd0	147	42	10.3	SubName: Full=Toxin;
i8en53	147	42	10.3	SubName: Full=Toxin;
i8cbn1	147	42	10.3	SubName: Full=Toxin;
i7jgv9	324	42	10.3	SubName: Full=Exfoliative toxin A;
i7at43	269	42	10.3	SubName: Full=Putative zeta-toxin;
i6gcx7	310	42	10.3	SubName: Full=Zeta toxin family protein;
i5v6p5	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
i5ueb1	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
i5sy39	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
i5qiy5	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
i5p687	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
i5l9p6	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
i5j337	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
i5i2n7	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
i5h0k1	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
i5fac7	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
i5dtp1	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
i5drt6	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
i5dpt9	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
i4rzv5	315	42	10.3	SubName: Full=Shiga toxin 1 subunit A;
i4rw57	315	42	10.3	SubName: Full=Shiga toxin 1 subunit A;
i4qxi9	315	42	10.3	SubName: Full=Shiga toxin 1 subunit A;
i4qt46	315	42	10.3	SubName: Full=Shiga toxin 1 subunit A;
i4qfa3	315	42	10.3	SubName: Full=Shiga toxin 1 subunit A;
i4ps51	315	42	10.3	SubName: Full=Shiga toxin 1 subunit A;
i4np13	315	42	10.3	SubName: Full=Shiga toxin 1 subunit A;
i4njp7	315	42	10.3	SubName: Full=Shiga toxin 1 subunit A;
i4jum8	226	42	10.3	SubName: Full=Diphtheria toxin repressor;
i3add7	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
i3a880	308	42	10.3	SubName: Full=Zeta toxin;
i2xz62	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
i2xqa4	308	42	10.3	SubName: Full=Zeta toxin;

i2wgi8	308	42	10.3	SubName: Full=Zeta toxin;
i2wdm6	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
i2w9m8	319	42	10.3	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
i2vzk4	308	42	10.3	SubName: Full=Zeta toxin;
i2v9e0	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
i2uz63	308	42	10.3	SubName: Full=Zeta toxin;
i2uri7	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
i2ubj3	308	42	10.3	SubName: Full=Zeta toxin;
i2u8r2	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
i2trs0	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
i2ssv1	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
i2s7a2	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
i2rqq0	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
i2rl67	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
i1zxm5	315	42	10.3	SubName: Full=Shiga toxin I subunit A;
i0xl60	239	42	10.3	SubName: Full=Insecticide toxin TcdB middle/N-terminal domai...
i0vxx6	308	42	10.3	SubName: Full=Zeta toxin family protein;
i0tzip3	239	42	10.3	SubName: Full=Toxin, beta-grasp domain protein;
i0swi5	253	42	10.3	SubName: Full=Zeta toxin;
i0b573	315	42	10.3	SubName: Full=Shiga toxin 1 subunit A;
h8xbn0	235	42	10.3	SubName: Full=Diphtheria toxin repressor;
h8f766	302	42	10.3	SubName: Full=Exfoliative toxin A;
h8f552	354	42	10.3	SubName: Full=RTX toxin transporter, ATP-binding protein;
h8d1b8	265	42	10.3	SubName: Full=Cytolethal distending toxin subunit CdtB;
h7yaj4	265	42	10.3	SubName: Full=Cytolethal distending toxin subunit B-like pro...
h7d048	226	42	10.3	SubName: Full=Beta2-toxin;
h7c8h9	249	42	10.3	SubName: Full=Cytolethal distending toxin A;
h5pch3	308	42	10.3	SubName: Full=Zeta toxin family protein;
h5npx2	308	42	10.3	SubName: Full=Zeta toxin family protein;
h5nhh7	308	42	10.3	SubName: Full=Zeta toxin family protein;
h5n1w9	308	42	10.3	SubName: Full=Zeta toxin family protein;
h5mna1	310	42	10.3	SubName: Full=Zeta toxin family protein;
h5m8w5	308	42	10.3	SubName: Full=Zeta toxin family protein;
h5lv24	308	42	10.3	SubName: Full=Zeta toxin family protein;
h5le17	304	42	10.3	SubName: Full=Zeta toxin family protein;
h5l1s7	308	42	10.3	SubName: Full=Zeta toxin family protein;
h5km21	308	42	10.3	SubName: Full=Zeta toxin family protein;
h5k6t7	308	42	10.3	SubName: Full=Zeta toxin family protein;
h5jbx4	308	42	10.3	SubName: Full=Zeta toxin family protein;
h5j9m6	308	42	10.3	SubName: Full=Zeta toxin family protein;
h5is23	308	42	10.3	SubName: Full=Zeta toxin family protein;
h5ibm3	308	42	10.3	SubName: Full=Zeta toxin family protein;
h5hxx4	308	42	10.3	SubName: Full=Zeta toxin family protein;
h5hj80	272	42	10.3	SubName: Full=Toxin B domain protein;
h5hi69	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
h5h003	308	42	10.3	SubName: Full=Zeta toxin family protein;
h5gkd8	308	42	10.3	SubName: Full=Zeta toxin family protein;
h5g555	308	42	10.3	SubName: Full=Zeta toxin family protein;
h5fmp7	308	42	10.3	SubName: Full=Zeta toxin family protein;
h5f7d7	308	42	10.3	SubName: Full=Zeta toxin family protein;
h5es84	310	42	10.3	SubName: Full=Zeta toxin family protein;
h5ea86	308	42	10.3	SubName: Full=Zeta toxin family protein;
h5dsi9	308	42	10.3	SubName: Full=Zeta toxin family protein;
h5d0y4	308	42	10.3	SubName: Full=Zeta toxin family protein;
h5cuw4	308	42	10.3	SubName: Full=Zeta toxin family protein;
h5c4i5	308	42	10.3	SubName: Full=Zeta toxin family protein;
h5bz12	308	42	10.3	SubName: Full=Zeta toxin family protein;
h5bi90	308	42	10.3	SubName: Full=Zeta toxin family protein;

h5b217	308	42	10.3	SubName: Full=Zeta toxin family protein;
h5a539	308	42	10.3	SubName: Full=Zeta toxin family protein;
h4zm47	308	42	10.3	SubName: Full=Zeta toxin family protein;
h4z4c0	308	42	10.3	SubName: Full=Zeta toxin family protein;
h4yrs6	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
h4ird6	291	42	10.3	SubName: Full=Zonular occludens toxin family protein;
h4hc83	231	42	10.3	SubName: Full=Enterotoxin-like toxin;
h4g7s4	221	42	10.3	SubName: Full=Toxin, beta-grasp domain protein;
h4g774	208	42	10.3	SubName: Full=Toxin, beta-grasp domain protein;
h4ep57	231	42	10.3	SubName: Full=Enterotoxin-like toxin;
h4dp64	231	42	10.3	SubName: Full=Enterotoxin-like toxin;
h4d7x1	231	42	10.3	SubName: Full=Enterotoxin-like toxin;
h4bm62	231	42	10.3	SubName: Full=Enterotoxin-like toxin;
h4ayw9	231	42	10.3	SubName: Full=Enterotoxin-like toxin;
h4ayc9	614	63	10.3	SubName: Full=ADP-ribosylating toxin;
h4ari5	231	42	10.3	SubName: Full=Enterotoxin-like toxin;
h4ahw3	231	42	10.3	SubName: Full=Enterotoxin-like toxin;
h4aa77	231	42	10.3	SubName: Full=Enterotoxin-like toxin;
h4a241	232	42	10.3	SubName: Full=Enterotoxin-like toxin;
h3yw83	239	42	10.3	SubName: Full=Toxin, beta-grasp domain protein;
h3y8j1	239	42	10.3	SubName: Full=Toxin, beta-grasp domain protein;
h3x4q9	239	42	10.3	SubName: Full=Toxin, beta-grasp domain protein;
h3tx75	280	42	10.3	SubName: Full=Exfoliative toxin A; EC=3.4.21.-;
h2i5g8	226	42	10.3	SubName: Full=Diphtheria toxin repressor;
h2i233	226	42	10.3	RecName: Full=Diphtheria toxin repressor; AltName: Full=Iron...
h2hu09	226	42	10.3	SubName: Full=Diphtheria toxin repressor;
h2hlx9	226	42	10.3	SubName: Full=Diphtheria toxin repressor;
h2hex0	226	42	10.3	SubName: Full=Diphtheria toxin repressor;
h2h7z7	226	42	10.3	SubName: Full=Diphtheria toxin repressor;
h2h108	226	42	10.3	SubName: Full=Diphtheria toxin repressor;
h2gud3	226	42	10.3	SubName: Full=Diphtheria toxin repressor;
h2gs97	226	42	10.3	SubName: Full=Diphtheria toxin repressor;
h2ghu3	226	42	10.3	SubName: Full=Diphtheria toxin repressor;
h2gbz2	226	42	10.3	SubName: Full=Diphtheria toxin repressor;
h2g4i9	226	42	10.3	SubName: Full=Diphtheria toxin repressor;
h1tr69	356	42	10.3	SubName: Full=Toxin, beta-grasp domain protein;
h1tn64	221	42	10.3	SubName: Full=Toxin, beta-grasp domain protein;
h1t7i7	239	42	10.3	SubName: Full=Toxin, beta-grasp domain protein;
h1ste7	240	42	10.3	SubName: Full=Toxin, beta-grasp domain protein;
h1snq8	239	42	10.3	SubName: Full=Toxin, beta-grasp domain protein;
h0tf61	649	67	10.3	SubName: Full=Putative secretion protein (HlyD family) toxin...
h0i6s3	147	42	10.3	SubName: Full=Toxin;
h0cq85	227	42	10.3	SubName: Full=Toxin, beta-grasp domain protein;
h0cpz6	239	42	10.3	SubName: Full=Toxin, beta-grasp domain protein;
h0cnd9	280	42	10.3	SubName: Full=Exfoliative toxin A; EC=3.4.21.-;
h0ckc8	221	42	10.3	SubName: Full=Toxin, beta-grasp domain protein;
h0c7f3	239	42	10.3	SubName: Full=Toxin, beta-grasp domain protein;
g8uuf8	474	49	10.3	SubName: Full=Toxin production / other pathogen functions;
g7xwm9	435	45	10.3	SubName: Full=Toxin biosynthesis protein;
g7b5r3	477	49	10.3	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
g5k5h8	269	42	10.3	SubName: Full=Toxin-antitoxin system, toxin component, MazF ...
g5jyy4	224	42	10.3	SubName: Full=Zeta toxin;
g4sw05	689	71	10.3	SubName: Full=Putative toxin secretion ABC transporter ATP-b...
g2bx87	308	42	10.3	SubName: Full=Zeta toxin family protein;
g2ans0	308	42	10.3	SubName: Full=Zeta toxin family protein;
g2agj6	315	42	10.3	SubName: Full=Shiga-like toxin 1 subunit A; EC=3.2.2.22;
g2a7e9	308	42	10.3	SubName: Full=Zeta toxin family protein;
g2a0g5	315	42	10.3	SubName: Full=Shiga-like toxin 1 subunit A; EC=3.2.2.22;

g1zrs0	304	42	10.3	SubName: Full=Zeta toxin family protein;
g1zct1	304	42	10.3	SubName: Full=Zeta toxin family protein;
g1yy42	315	42	10.3	SubName: Full=Shiga-like toxin 1 subunit A; EC=3.2.2.22;
f9zkg5	324	42	10.3	SubName: Full=Zonular occludens toxin;
f9xw43	266	42	10.3	SubName: Full=Cytolethal distending toxin B;
f9nr78	232	42	10.3	SubName: Full=Diphtheria toxin repressor;
f9ncu7	232	42	10.3	SubName: Full=Diphtheria toxin repressor;
f9khh1	239	42	10.3	SubName: Full=Toxin, beta-grasp domain protein;
f9k3x7	239	42	10.3	SubName: Full=Toxin, beta-grasp domain protein;
f9jxt2	239	42	10.3	SubName: Full=Toxin, beta-grasp domain protein;
f9j0v1	360	42	10.3	SubName: Full=Zeta toxin family protein;
f9h053	342	42	10.3	SubName: Full=Putative zeta toxin, P-loop nucleoside triphos...
f8x810	308	42	10.3	SubName: Full=Zeta toxin family protein;
f7mis9	288	42	10.3	SubName: Full=Putative epsilon-toxin type B;
f5wm10	239	42	10.3	SubName: Full=Toxin, beta-grasp domain protein;
f5wgd3	239	42	10.3	SubName: Full=Toxin, beta-grasp domain protein;
f5w8g1	239	42	10.3	SubName: Full=Toxin, beta-grasp domain protein;
f5tt36	232	42	10.3	SubName: Full=Diphtheria toxin repressor;
f5tle0	232	42	10.3	SubName: Full=Diphtheria toxin repressor;
f4xh68	320	42	10.3	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
f4wku9	195	42	10.3	SubName: Full=Ras-related C3 botulinum toxin substrate 1;
f4vm09	310	42	10.3	SubName: Full=Putative zeta-toxin;
f4vfb0	283	42	10.3	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
f4uw17	304	42	10.3	SubName: Full=Putative zeta-toxin;
f4abd8	436	45	10.3	SubName: Full=Alpha-toxin;
f3xtk2	399	42	10.3	SubName: Full=Toxin-antitoxin system toxin component, PIN fa...
f3the8	239	42	10.3	SubName: Full=Toxin, beta-grasp domain protein;
f3puk2	514	53	10.3	SubName: Full=Toxin secretion/phage lysis holin;
f3ly88	281	42	10.3	SubName: Full=Toxin secretion/phage lysis holin;
f2pdw1	706	73	10.3	SubName: Full=Toxin secretion ATP-binding protein;
f1la22	192	42	10.3	SubName: Full=Ras-related C3 botulinum toxin substrate 1;
f0z3g5	248	42	10.3	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
f0p944	304	42	10.3	SubName: Full=Exfoliative toxin A;
f0p6u1	326	42	10.3	SubName: Full=Synergohymenotropic toxin;
f0n9r7	361	42	10.3	SubName: Full=Zonula occludens toxin family protein;
f0n4p1	361	42	10.3	SubName: Full=Zonula occludens toxin family protein;
f0mph7	361	42	10.3	SubName: Full=Zonula occludens toxin family protein;
f0iiv1	585	60	10.3	SubName: Full=Diarrheal toxin/FtsK/SpoIIIE family protein;
f0hbr7	253	42	10.3	SubName: Full=Putative toxin-antitoxin system, toxin compone...
f0gn05	281	42	10.3	SubName: Full=Toxin secretion/phage lysis holin;
f0b333	361	42	10.3	SubName: Full=Zonula occludens toxin family protein;
f0aut8	361	42	10.3	SubName: Full=Zonula occludens toxin family protein;
f0aim6	361	42	10.3	SubName: Full=Zonula occludens toxin family protein;
f0ad33	361	42	10.3	SubName: Full=Zonula occludens toxin family protein;
f0a1q5	361	42	10.3	SubName: Full=Zonula occludens toxin family protein;
e9w155	304	42	10.3	SubName: Full=Zeta toxin protein;
e9fmm8	258	42	10.3	SubName: Full=Toxin-antitoxin system, antitoxin component, X...
e9fgw3	303	42	10.3	SubName: Full=Putative exfoliative toxin;
e9d1x5	363	42	10.3	SubName: Full=Toxin biosynthesis protein;
e8zxr2	400	42	10.3	SubName: Full=General secretion pathway protein F Cholera to...
e7sx12	273	42	10.3	SubName: Full=Cytolethal distending toxin subunit B;
e7ncn3	161	42	10.3	SubName: Full=Toxin-antitoxin system, antitoxin component, M...
e7jbk8	304	42	10.3	SubName: Full=Zeta toxin family protein;
e7itx5	304	42	10.3	SubName: Full=Zeta toxin family protein;
e7ij10	315	42	10.3	SubName: Full=Shiga-like toxin 1 subunit A; EC=3.2.2.22;
e7hv18	304	42	10.3	SubName: Full=Zeta toxin family protein;
e7hdh6	308	42	10.3	SubName: Full=Zeta toxin family protein;
e7h9n7	257	42	10.3	SubName: Full=Toxin B domain protein;

e7h8m7	315	42	10.3	SubName: Full=Shiga-like toxin 1 subunit A; EC=3.2.2.22;
e6mvz6	361	42	10.3	SubName: Full=Zonula occludens toxin family protein; SubName...
e6hdc1	384	42	10.3	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e6ey36	212	42	10.3	SubName: Full=Putative toxin-antitoxin system, toxin compone...
e5r7q8	239	42	10.3	SubName: Full=Staphylococcal/Streptococcal toxin, beta-grasp...
e5r7f7	231	42	10.3	SubName: Full=Staphylococcal/Streptococcal toxin, beta-grasp...
e4lc29	355	42	10.3	SubName: Full=Zeta toxin;
e4jl45	381	42	10.3	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e4jcg9	381	42	10.3	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e4iyq6	381	42	10.3	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e4ilz2	381	42	10.3	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e4iaa5	381	42	10.3	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e3r8x9	261	42	10.3	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
e3r6x2	265	42	10.3	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
e3c0r1	281	42	10.3	SubName: Full=Toxin secretion/phage lysis holin;
e2z121	384	42	10.3	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e2ylb9	384	42	10.3	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e2yfq1	384	42	10.3	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e2xjz9	258	42	10.3	SubName: Full=Type I toxin efflux ATP-binding protein; EC=3....
e2xh95	315	42	10.3	SubName: Full=Shiga-like toxin 1 subunit A; EC=3.2.2.22;
e2nw43	221	42	10.3	SubName: Full=Toxin-antitoxin system, toxin component domain...
e2g058	226	42	10.3	SubName: Full=Diphtheria toxin repressor; SubName: Full=Dipt...
e2bnn7	195	42	10.3	SubName: Full=Ras-related C3 botulinum toxin substrate 1;
e2aud8	195	42	10.3	SubName: Full=Ras-related C3 botulinum toxin substrate 1;
e1yrn7	276	42	10.3	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
e1pnv6	265	42	10.3	SubName: Full=Cytolethal distending toxin subunit B-like pro...
e1nr52	281	42	10.3	SubName: Full=Toxin secretion/phage lysis holin;
e1nke6	281	42	10.3	SubName: Full=Toxin secretion/phage lysis holin;
e1nfk1	281	42	10.3	SubName: Full=Toxin secretion/phage lysis holin;
e1isa9	308	42	10.3	SubName: Full=Zeta toxin;
e1gkx8	343	42	10.3	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
e0nwu1	273	42	10.3	SubName: Full=Zeta-toxin;
e0j0h3	308	42	10.3	SubName: Full=Putative zeta toxin; SubName: Full=Uncharacter...
e0h195	384	42	10.3	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e0gk38	384	42	10.3	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
d9yal7	369	42	10.3	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d9xxz2	284	42	10.3	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9xui4	285	42	10.3	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9wtr8	283	42	10.3	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9wcy4	280	42	10.3	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9wc06	270	42	10.3	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9wbk0	313	42	10.3	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d8unl1	168	42	10.3	SubName: Full=Toxin-antitoxin system, antitoxin component, X...
d8epb6	308	42	10.3	SubName: Full=Zeta toxin;
d8ea82	308	42	10.3	SubName: Full=Zeta toxin;
d8abm1	214	42	10.3	SubName: Full=Toxin-antitoxin system, toxin component, GNAT ...
d7yiq3	308	42	10.3	SubName: Full=Zeta toxin;
d7wvz9	299	42	10.3	SubName: Full=Zeta toxin;
d7k6x6	428	44	10.3	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d7j3j8	428	44	10.3	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d5d4z7	273	42	10.3	SubName: Full=Cytolethal distending toxin, subunit B;
d4v7p4	276	42	10.3	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d4s2r8	274	42	10.3	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d4ew07	384	42	10.3	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
d4en34	384	42	10.3	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
d4cxb9	285	42	10.3	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
d4cle9	184	42	10.3	SubName: Full=Toxin-antitoxin system, antitoxin component, H...
d3vj06	330	42	10.3	SubName: Full=Positive transcriptional regulator for motilit...

d3anr6	279	42	10.3	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
d3ahp0	487	50	10.3	SubName: Full=Putative toxin-antitoxin system, antitoxin com...
d2psw5	311	42	10.3	SubName: Full=Zeta toxin family protein;
d1w3i5	343	42	10.3	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d1pg45	335	42	10.3	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
d1pe45	201	42	10.3	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d0sgw4	389	42	10.3	SubName: Full=Zeta toxin family protein;
d0h0e6	721	74	10.3	SubName: Full=Cytolysin and hemolysin HlyA Pore-forming toxi...
c9mmm8	315	42	10.3	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
c9m6u0	135	42	10.3	SubName: Full=Toxin-antitoxin system, antitoxin component, H...
c9lws4	198	42	10.3	SubName: Full=Zeta toxin family protein;
c9l0u6	276	42	10.3	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
c8uej9	315	42	10.3	SubName: Full=Shiga toxin 1 subunit A;
c8u110	315	42	10.3	SubName: Full=Shiga toxin 1 subunit A;
c8ml96	239	42	10.3	SubName: Full=Toxin beta-grasp domain-containing protein;
c8mcl3	239	42	10.3	SubName: Full=Toxin beta-grasp domain-containing protein;
c8m7q8	239	42	10.3	SubName: Full=Toxin beta-grasp domain-containing protein;
c8m0m1	239	42	10.3	SubName: Full=Toxin beta-grasp domain-containing protein;
c8lv21	239	42	10.3	SubName: Full=Toxin beta-grasp domain-containing protein;
c8lh29	239	42	10.3	SubName: Full=Toxin beta-grasp domain-containing protein;
c8lgu4	231	42	10.3	SubName: Full=Toxin beta-grasp domain-containing protein;
c8l7s7	231	42	10.3	SubName: Full=Toxin beta-grasp domain-containing protein;
c8l2z8	239	42	10.3	SubName: Full=Toxin beta-grasp domain-containing protein;
c7gbr8	234	42	10.3	SubName: Full=Toxin-antitoxin system, antitoxin component, X...
c7fpv8	319	42	10.3	SubName: Full=Shiga toxin 2 A subunit;
c6dxx7	288	42	10.3	SubName: Full=Putative epsilon-toxin type B;
c5t353	392	42	10.3	SubName: Full=Zonular occludens toxin;
c5i7u3	485	50	10.3	SubName: Full=Cry4 delta-toxin-like protein ORF2;
c5anv5	699	72	10.3	SubName: Full=Zeta toxin family protein;
c4udj8	688	71	10.3	SubName: Full=Toxin ABC transporter, ATP-binding/permease pr...
c4k6t7	329	42	10.3	SubName: Full=APSE-2 prophage cytolethal distending toxin su...
c4hv83	333	42	10.3	SubName: Full=Putative ABC associated RTX toxin transporter,...
c4hpm3	333	42	10.3	SubName: Full=Putative ABC associated RTX toxin transporter,...
c4h6b6	333	42	10.3	SubName: Full=Putative ABC associated RTX toxin transporter,...
c3ks18	751	77	10.3	SubName: Full=Toxin complex component ORF-X2;
c2y3j4	248	42	10.3	SubName: Full=Zeta toxin;
c2i5z9	809	83	10.3	SubName: Full=RTX toxins and related Ca2+-binding proteins;
c2cyx2	362	42	10.3	SubName: Full=Possible toxin regulator;
c0wmw1	362	42	10.3	SubName: Full=Possible toxin regulator;
b8kv28	580	60	10.3	SubName: Full=Toxin secretion ABC transporter ATP-binding pr...
b7wuk1	290	42	10.3	SubName: Full=Zonular occludens toxin;
b7tgy8	224	42	10.3	SubName: Full=Toxin co-regulated pilin;
b7law4	310	42	10.3	SubName: Full=Putative zeta toxin poison-antidote element;
b6zz03	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
b6dz86	315	42	10.3	SubName: Full=Shiga toxin 1 subunit A;
b5ty45	226	42	10.3	SubName: Full=Diphtheria toxin repressor;
b5gct6	278	42	10.3	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
b3x2s6	273	42	10.3	SubName: Full=Cytolethal distending toxin B subunit;
b3wj85	308	42	10.3	SubName: Full=Putative zeta toxin;
b3igl4	308	42	10.3	SubName: Full=Putative zeta toxin;
b3i356	308	42	10.3	SubName: Full=Putative zeta toxin;
b3hep8	308	42	10.3	SubName: Full=Putative zeta toxin;
b3gk88	315	42	10.3	SubName: Full=Shiga toxin 1 subunit A;
b3bqk2	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
b3b832	315	42	10.3	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
b2za49	224	42	10.3	SubName: Full=Toxin-coregulated pilin;
b2vz90	446	46	10.3	SubName: Full=Toxin biosynthesis regulatory protein AflJ;
b2v3v1	748	77	10.3	SubName: Full=Toxin complex component ORF-X2;

b0xr34	551	57	10.3	SubName: Full=MFS toxin efflux pump (AflT), putative;
a8fjn4	265	42	10.3	SubName: Full=Cytolethal distending toxin, type I deoxyribon...
a8fgc2	342	42	10.3	SubName: Full=Possible toxin regulator;
a8b1h9	315	42	10.3	SubName: Full=Shiga toxin 1 subunit A; SubName: Full=Shiga t...
a8a7c2	308	42	10.3	SubName: Full=Putative zeta toxin;
a7zup1	308	42	10.3	SubName: Full=Putative zeta toxin;
a7zcm4	712	73	10.3	SubName: Full=Toxin secretion ATP-binding protein;
a6xzj3	294	42	10.3	SubName: Full=Cholera toxin transcriptional activator;
a6u2t2	239	42	10.3	SubName: Full=Toxin beta-grasp domain protein; Flags: Precur...
a6tyq3	231	42	10.3	SubName: Full=Toxin beta-grasp domain protein; Flags: Precur...
a6qe85	237	42	10.3	SubName: Full=Staphylococcal enterotoxin-like toxin;
a6a482	294	42	10.3	SubName: Full=Cholera toxin transcriptional activator;
a5ttf4	282	42	10.3	SubName: Full=Anititoxin/toxin system zeta toxin;
a5lh53	273	42	10.3	SubName: Full=Cytolethal distending toxin B subunit;
a5itz4	239	42	10.3	SubName: Full=Toxin, beta-grasp domain protein; Flags: Precu...
a4f2e0	266	42	10.3	SubName: Full=Cytolethal distending toxin B;
a4f2c8	266	42	10.3	SubName: Full=Cytolethal distending toxin B;
a4f277	265	42	10.3	SubName: Full=Cytolethal distending toxin B;
a2qjq5	264	42	10.3	SubName: Full=Similarity to larvicidal toxin 42K protein - B...
a2q922	310	42	10.3	SubName: Full=Function: A. alternata Akt3-1 is involved in A...
a1kxb9	280	42	10.3	SubName: Full=Exfoliative toxin A;
a1kx51	280	42	10.3	SubName: Full=Exfoliative toxin A;
a1dlq3	252	42	10.3	SubName: Full=Killer toxin sensitivity protein (Iki1), putat...
a0rm03	266	42	10.3	SubName: Full=Cytolethal distending toxin;
q8gi68	440	45	10.2	SubName: Full=Alpha-toxin;
q75va2	683	70	10.2	SubName: Full=Putative mosquitocidal toxin;
q4lau4	442	45	10.2	SubName: Full=Putative zonula occludens toxin;
q2c0t8	707	72	10.2	SubName: Full=Putative toxin secretion ATP-binding protein;
q1zuk7	707	72	10.2	SubName: Full=Putative toxin secretion ATP-binding protein;
p58762	462	47	10.2	RecName: Full=Toxin CqTX-A; Short=CQT-A; Short=Toxin A; Flag...
p55220	591	60	10.2	RecName: Full=Mono(ADP-ribosyl)transferase SpvB; Short=mADPR...
k6ye20	559	57	10.2	SubName: Full=Toxin secretion ABC transporter ATP-binding pr...
j9i8t8	502	51	10.2	SubName: Full=Multidrug and toxin extrusion protein 1;
j2y5g8	687	70	10.2	SubName: Full=C-terminal region of Pasteurella multocida tox...
i6t960	698	71	10.2	SubName: Full=Toxin RTX-I translocation ATP-binding protein;...
h9abz5	591	60	10.2	SubName: Full=Actin-ADP-ribosyltransferase2C toxin SpvB;
h7cjin1	725	74	10.2	SubName: Full=Toxin expression-transcriptional accessory pro...
g8uy21	736	75	10.2	SubName: Full=Toxin secretion ATP binding protein;
g7xfw7	410	42	10.2	SubName: Full=Toxin biosynthesis protein;
g7kg46	511	52	10.2	SubName: Full=Multidrug and toxin extrusion protein;
g4y0v8	704	72	10.2	SubName: Full=Putative ABC RTX toxin transporter;
g0slw9	489	50	10.2	SubName: Full=Toxin co-regulated pilus biosynthesis outer me...
f9rq63	569	58	10.2	SubName: Full=TcpI, toxin-coregulated pilus biosynthesis pro...
f4abp3	431	44	10.2	SubName: Full=C2 toxin, component I;
e9ueg8	440	45	10.2	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
e9e0x0	577	59	10.2	SubName: Full=MFS toxin efflux pump (AflT);
e3bfy5	412	42	10.2	SubName: Full=Toxin secretion, membrane fusion protein;
e2csb7	422	43	10.2	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
e2cs80	441	45	10.2	SubName: Full=Putative toxin secretion transmembrane protein...
d4d6q2	410	42	10.2	SubName: Full=Toxin biosynthesis protein (Tri7), putative;
d2yk18	489	50	10.2	SubName: Full=Toxin coregulated pilus biosynthesis outer mem...
d0zhs9	591	60	10.2	RecName: Full=Mono(ADP-ribosyl)transferase SpvB; Short=mADPR...
c8t9u4	440	45	10.2	SubName: Full=HipA family toxin-antitoxin system;
c5anj7	698	71	10.2	SubName: Full=Zeta toxin family protein;
c4k398	704	72	10.2	SubName: Full=Putative ABC RTX toxin transporter, fused ATP ...
b6eq47	717	73	10.2	SubName: Full=Putative type I toxin secretion system, ATP-bin...
a6dzv0	576	59	10.2	SubName: Full=Rhizobiocin/RTX toxin;
a6czn0	737	75	10.2	SubName: Full=RTX toxins and related Ca2+-binding protein;

a1d5b5	421	43	10.2	SubName: Full=Toxin biosynthesis protein, putative;
q9f5q8	335	41	10.1	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
q8iae2	226	41	10.1	RecName: Full=Toxin PsTX-20A; Short=Pstx20; Short=ptx20a; Al...
q8e8p4	455	46	10.1	SubName: Full=DNA damage-inducible multidrug and toxin efflu...
q7xig2	340	41	10.1	SubName: Full=Os07g0602000 protein; SubName: Full=Putative N...
q7vsx3	339	41	10.1	RecName: Full=Type IV secretion system protein PtlH; AltName...
q74yf9	587	59	10.1	SubName: Full=Toxin; SubName: Full=Toxin protein;
q66ag0	456	46	10.1	SubName: Full=Putative ABC associated RTX toxin transporter,...
q5dz51	208	41	10.1	SubName: Full=Toxin coregulated pilin subunit TcpA;
q54327	326	41	10.1	SubName: Full=Synergohymenotropic toxin;
q46670	181	41	10.1	RecName: Full=Cytolethal distending toxin subunit C; Short=C...
q46669	269	41	10.1	RecName: Full=Cytolethal distending toxin subunit B; Short=C...
q46308	336	41	10.1	SubName: Full=Beta-toxin; Flags: Precursor;
q46181	336	41	10.1	SubName: Full=Beta-toxin;
q1ely1	315	41	10.1	SubName: Full=Shiga toxin I subunit A; Flags: Precursor;
q1cc79	587	59	10.1	SubName: Full=Toxin;
q1c004	587	59	10.1	SubName: Full=Toxin;
q189k7	232	41	10.1	SubName: Full=Negative regulator of toxin gene expression;
q0pmd2	562	57	10.1	RecName: Full=Anthrax toxin receptor 1; Flags: Precursor;
q04470	259	41	10.1	RecName: Full=Type-2Aa cytolytic delta-endotoxin; AltName: F...
p15795	294	41	10.1	RecName: Full=Cholera toxin transcriptional activator;
p0dj17	226	41	10.1	RecName: Full=Diphtheria toxin repressor; AltName: Full=Iron...
p01546	316	41	10.1	RecName: Full=M1-1 protoxin; AltName: Full=Killer toxin K1; ...
o28590	156	41	10.1	RecName: Full=Putative VapC ribonuclease AF_1683; Short=Put...
o06522	223	41	10.1	RecName: Full=Cytolethal distending toxin subunit A; Short=C...
k6ptp1	344	41	10.1	SubName: Full=Membrane protein, putative toxin regulator;
k6nrh9	344	41	10.1	SubName: Full=Membrane protein, putative toxin regulator;
k6biz2	271	41	10.1	SubName: Full=Zeta toxin;
k5r488	386	41	10.1	SubName: Full=Zonula occludens toxin;
k5fli9	308	41	10.1	SubName: Full=Shiga-like toxin 1 subunit A; EC=3.2.2.22;
k5esx4	386	41	10.1	SubName: Full=Zonula occludens toxin;
k4zna5	186	41	10.1	SubName: Full=Toxin secretion/phage lysis holin;
k4fwt0	712	72	10.1	SubName: Full=Toxin secretion ATP-binding protein;
k3kkv1	215	41	10.1	SubName: Full=Xre family toxin-antitoxin system domain prote...
k3b7x7	308	41	10.1	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
k2vvi4	515	52	10.1	SubName: Full=RTX toxin RtxA domain protein;
k2jmm3	358	41	10.1	SubName: Full=RTX toxin;
k1xsr0	713	72	10.1	SubName: Full=Protoplast regeneration and killer toxin resis...
k0mbh6	269	41	10.1	SubName: Full=Pertussis toxin subunit 1; EC=2.4.2.-;
j7sw03	352	41	10.1	SubName: Full=Toxin secretion/phage lysis holin;
j7qty7	308	41	10.1	SubName: Full=Putative zeta toxin poison-antidote element;
j7qay7	308	41	10.1	SubName: Full=Putative zeta toxin;
j7i4w4	315	41	10.1	SubName: Full=Shiga toxin 1A subunit;
j7cj51	287	41	10.1	SubName: Full=Zeta toxin;
j7a5u8	287	41	10.1	SubName: Full=Zeta toxin;
j6zst5	287	41	10.1	SubName: Full=Zeta toxin;
j6ydj3	287	41	10.1	SubName: Full=Zeta toxin;
j6x740	287	41	10.1	SubName: Full=Zeta toxin;
j6rb54	287	41	10.1	SubName: Full=Zeta toxin;
j4wze7	344	41	10.1	SubName: Full=Membrane protein, putative toxin regulator;
j4wdc3	344	41	10.1	SubName: Full=Membrane protein, putative toxin regulator;
j4w0v1	344	41	10.1	SubName: Full=Membrane protein, putative toxin regulator;
j4vvs7	344	41	10.1	SubName: Full=Membrane protein, putative toxin regulator;
j4vrp2	344	41	10.1	SubName: Full=Membrane protein, putative toxin regulator;
j4ppn4	344	41	10.1	SubName: Full=Membrane protein, putative toxin regulator;
j2zyj0	344	41	10.1	SubName: Full=Membrane protein, putative toxin regulator;
j2id70	436	44	10.1	SubName: Full=Toxin;
j2dsz6	308	41	10.1	SubName: Full=Zeta toxin family protein;

j1gv35	270	41	10.1	SubName: Full=Zeta toxin;
j1fmd1	515	52	10.1	SubName: Full=RTX toxin RtxA domain protein;
i6qul3	170	41	10.1	SubName: Full=Toxin;
i6fr60	308	41	10.1	SubName: Full=Zeta toxin family protein;
i5n3f4	308	41	10.1	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
i5led4	308	41	10.1	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
i5ibd3	308	41	10.1	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
i5f5z9	308	41	10.1	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
i5f1n0	308	41	10.1	SubName: Full=Shiga toxin subunit A; EC=3.2.2.22;
i3btz3	364	41	10.1	SubName: Full=RTX toxin; Flags: Precursor;
i2txi5	308	41	10.1	SubName: Full=Zeta toxin;
i2tp80	308	41	10.1	SubName: Full=Zeta toxin;
i2t582	308	41	10.1	SubName: Full=Zeta toxin;
i2sr90	308	41	10.1	SubName: Full=Zeta toxin;
i2sid3	308	41	10.1	SubName: Full=Zeta toxin;
i1b782	310	41	10.1	SubName: Full=Putative zeta toxin poison-antidote element;
h914r8	467	47	10.1	SubName: Full=RTX toxin transporter;
h8xbm8	226	41	10.1	SubName: Full=Diphtheria toxin repressor;
h8jy54	467	47	10.1	SubName: Full=RTX toxin transporter;
h8jwh4	282	41	10.1	SubName: Full=Cholera toxin transcriptional activator;
h7y8x6	256	41	10.1	SubName: Full=Cytolethal distending toxin subunit A;
h6lxq6	513	52	10.1	SubName: Full=Toxin secretion ABC transporter HlyB;
h6lvh3	513	52	10.1	SubName: Full=Toxin secretion ABC transporter HlyB;
h6c935	272	41	10.1	SubName: Full=Toxin biosynthesis ketoreductase;
h5ri09	308	41	10.1	SubName: Full=Zeta toxin family protein;
h5r2n0	308	41	10.1	SubName: Full=Zeta toxin family protein;
h5qmd8	304	41	10.1	SubName: Full=Zeta toxin family protein;
h5q8x8	308	41	10.1	SubName: Full=Zeta toxin family protein;
h5psz2	308	41	10.1	SubName: Full=Zeta toxin family protein;
h5hfk4	308	41	10.1	SubName: Full=Zeta toxin family protein;
h5du61	183	41	10.1	SubName: Full=Toxin B domain protein;
h5a6i8	483	49	10.1	SubName: Full=Toxin B domain protein;
h4yp29	308	41	10.1	SubName: Full=Zeta toxin family protein;
h4y9h7	308	41	10.1	SubName: Full=Zeta toxin family protein;
h4xtr1	308	41	10.1	SubName: Full=Zeta toxin family protein;
h4wzc1	308	41	10.1	SubName: Full=Zeta toxin family protein;
h4rd56	496	50	10.1	SubName: Full=Toxin B domain protein;
h4hn17	210	41	10.1	SubName: Full=Beta-grasp domain toxin protein;
h4hc84	232	41	10.1	SubName: Full=Enterotoxin-like toxin;
h4h4u0	231	41	10.1	SubName: Full=Enterotoxin-like toxin;
h4h0n3	241	41	10.1	SubName: Full=Beta-grasp domain toxin protein;
h4gq10	241	41	10.1	SubName: Full=Beta-grasp domain toxin protein;
h4f2v8	207	41	10.1	SubName: Full=Zeta toxin family protein;
h4eu99	231	41	10.1	SubName: Full=Enterotoxin-like toxin;
h4ep56	232	41	10.1	SubName: Full=Enterotoxin-like toxin;
h4eda3	232	41	10.1	SubName: Full=Enterotoxin-like toxin;
h4e8z5	232	41	10.1	SubName: Full=Enterotoxin-like toxin;
h4dz24	241	41	10.1	SubName: Full=Beta-grasp domain toxin protein;
h4dp65	232	41	10.1	SubName: Full=Enterotoxin-like toxin;
h4di88	241	41	10.1	SubName: Full=Beta-grasp domain toxin protein;
h4d7x2	232	41	10.1	SubName: Full=Enterotoxin-like toxin;
h4d103	232	41	10.1	SubName: Full=Enterotoxin-like toxin;
h4cuq5	241	41	10.1	SubName: Full=Beta-grasp domain toxin protein;
h4cll8	232	41	10.1	SubName: Full=Enterotoxin-like toxin;
h4cbt6	232	41	10.1	SubName: Full=Enterotoxin-like toxin;
h4c655	241	41	10.1	SubName: Full=Beta-grasp domain toxin protein;
h4bm63	232	41	10.1	SubName: Full=Enterotoxin-like toxin;
h4bg88	241	41	10.1	SubName: Full=Beta-grasp domain toxin protein;

h4ayx0	232	41	10.1	SubName: Full=Enterotoxin-like toxin;
h4ari6	232	41	10.1	SubName: Full=Enterotoxin-like toxin;
h4ahw4	232	41	10.1	SubName: Full=Enterotoxin-like toxin;
h4aa78	232	41	10.1	SubName: Full=Enterotoxin-like toxin;
h4a240	231	41	10.1	SubName: Full=Enterotoxin-like toxin;
h3ywj6	292	41	10.1	SubName: Full=Toxin, beta-grasp domain protein;
h3y7g5	292	41	10.1	SubName: Full=Toxin, beta-grasp domain protein;
h3x5i0	292	41	10.1	SubName: Full=Toxin, beta-grasp domain protein;
h3s693	241	41	10.1	SubName: Full=Beta-grasp domain toxin protein;
h3rvw6	232	41	10.1	SubName: Full=Enterotoxin-like toxin;
h2dgl8	226	41	10.1	SubName: Full=Cytolethal distending toxin subunit A;
h1ta04	292	41	10.1	SubName: Full=Toxin, beta-grasp domain protein;
h1s1l9	360	41	10.1	SubName: Full=Zonular occludens toxin;
h0esg0	555	56	10.1	SubName: Full=Putative HC-toxin efflux carrier TOXA;
h0eh70	225	41	10.1	SubName: Full=Putative HC-toxin synthetase;
h0cnv5	356	41	10.1	SubName: Full=Toxin, beta-grasp domain protein;
h0cir9	343	41	10.1	SubName: Full=Toxin, beta-grasp domain protein;
g8upj2	344	41	10.1	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
g8u619	226	41	10.1	SubName: Full=Putative toxin component;
g8b0s3	594	60	10.1	SubName: Full=Putative secretion ATP-binding protein (ABC-ty...
g7xgj3	424	43	10.1	SubName: Full=Toxin biosynthesis protein;
g7tnm2	294	41	10.1	SubName: Full=Cholera toxin transcriptional activator;
g5gz65	296	41	10.1	SubName: Full=Zeta-toxin;
g5bj91	266	41	10.1	SubName: Full=Ras-related C3 botulinum toxin substrate 1;
g4n7k6	343	41	10.1	SubName: Full=Zeta toxin family protein;
g4enm2	676	68	10.1	SubName: Full=Toxin subunit s1;
g4c871	340	41	10.1	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
g2d715	308	41	10.1	SubName: Full=Zeta toxin family protein;
g2b407	246	41	10.1	SubName: Full=Shiga-like toxin 2 subunit A; EC=3.2.2.22;
g1yh72	308	41	10.1	SubName: Full=Zeta toxin family protein;
g0z024	203	41	10.1	SubName: Full=Enterotoxin-like toxin X;
g0t3d2	290	41	10.1	SubName: Full=Cytolethal distending toxin;
g0slw5	503	51	10.1	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
g0slw4	303	41	10.1	SubName: Full=Toxin co-regulated pilus biosynthesis protein ...
g0jkk2	587	59	10.1	SubName: Full=Toxin;
g0d2p5	262	41	10.1	SubName: Full=Secreted auto transporter toxin;
f9mww5	280	41	10.1	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
f9k549	292	41	10.1	SubName: Full=Toxin, beta-grasp domain protein;
f9k0b6	240	41	10.1	SubName: Full=Toxin, beta-grasp domain protein;
f7l045	298	41	10.1	SubName: Full=Putative zeta-toxin;
f6a157	269	41	10.1	SubName: Full=Zeta toxin;
f5wpt5	292	41	10.1	SubName: Full=Toxin, beta-grasp domain protein;
f5w6u8	240	41	10.1	SubName: Full=Toxin, beta-grasp domain protein;
f5lud5	269	41	10.1	SubName: Full=Zeta toxin;
f4fp20	232	41	10.1	SubName: Full=Staphylococcal enterotoxin-like toxin;
f3zg81	286	41	10.1	SubName: Full=Putative xre family toxin-antitoxin system, an...
f3tcj1	292	41	10.1	SubName: Full=Toxin, beta-grasp domain protein;
f2q1d2	258	41	10.1	SubName: Full=Toxin biosynthesis ketoreductase;
f0hzd9	360	41	10.1	SubName: Full=Toxin secretion/phage lysis holin subfamily;
f0gt21	281	41	10.1	SubName: Full=Toxin secretion/phage lysis holin;
e9x8d5	304	41	10.1	SubName: Full=Zeta toxin protein;
e9ea21	361	41	10.1	SubName: Full=Killer toxin sensitivity protein (Iki1), putat...
e9a164	240	41	10.1	SubName: Full=Guanine nucleotide exchange factor sopE2 Effec...
e8zn10	315	41	10.1	SubName: Full=Exfoliative toxin A;
e8srw2	401	41	10.1	SubName: Full=Zeta_1 toxin;
e8pja3	360	41	10.1	SubName: Full=Zeta toxin family protein;
e8p8e8	587	59	10.1	SubName: Full=Toxin;
e8nw53	333	41	10.1	SubName: Full=Putative ABC associated RTX toxin transporter,...

e6iq41	239	41	10.1	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
e6im65	377	41	10.1	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
e6i952	244	41	10.1	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
e6hyy1	239	41	10.1	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
e6hmu3	269	41	10.1	SubName: Full=Putative toxin-antitoxin system, toxin compone...
e6bm05	308	41	10.1	SubName: Full=Zeta toxin;
e5rma1	268	41	10.1	SubName: Full=Cytolethal distending toxin A;
e5rm87	268	41	10.1	SubName: Full=Cytolethal distending toxin A;
e5rm82	268	41	10.1	SubName: Full=Cytolethal distending toxin A;
e5rm77	268	41	10.1	SubName: Full=Cytolethal distending toxin A;
e5rm67	189	41	10.1	SubName: Full=Cytolethal distending toxin C;
e5r7f8	232	41	10.1	SubName: Full=Staphylococcal/Streptococcal toxin, beta-grasp...
e5r7f5	292	41	10.1	SubName: Full=Staphylococcal/Streptococcal toxin, beta-grasp...
e5cuj6	592	60	10.1	SubName: Full=Putative toxin-antitoxin system, toxin compone...
e4jjg6	287	41	10.1	SubName: Full=Zeta toxin;
e4j730	287	41	10.1	SubName: Full=Zeta toxin;
e4j0a0	287	41	10.1	SubName: Full=Zeta toxin;
e4iq66	258	41	10.1	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
e4ijn6	287	41	10.1	SubName: Full=Zeta toxin;
e4icc4	287	41	10.1	SubName: Full=Zeta toxin;
e3c1q5	281	41	10.1	SubName: Full=Toxin secretion/phage lysis holin;
e3bv0	281	41	10.1	SubName: Full=Toxin secretion/phage lysis holin;
e3bsq9	281	41	10.1	SubName: Full=Toxin secretion/phage lysis holin;
e2rzj7	280	41	10.1	SubName: Full=Exfoliative toxin; SubName: Full=Exfoliative t...
e2mu76	226	41	10.1	SubName: Full=Diphtheria toxin repressor;
e1yys3	427	43	10.1	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
e1nxd1	281	41	10.1	SubName: Full=Toxin secretion/phage lysis holin;
e1nmd1	281	41	10.1	SubName: Full=Toxin secretion/phage lysis holin;
e1j319	308	41	10.1	SubName: Full=Zeta toxin;
e1esl7	239	41	10.1	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
e0wtg4	284	41	10.1	SubName: Full=Toxin A;
e0hc60	239	41	10.1	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
e0h6t4	287	41	10.1	SubName: Full=Zeta toxin;
e0h0g1	239	41	10.1	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
e0fdw5	211	41	10.1	SubName: Full=RTX toxin protein;
e0f1f6	211	41	10.1	SubName: Full=RTX toxin protein;
d9xz16	277	41	10.1	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9xq58	286	41	10.1	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9xn51	277	41	10.1	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9xjb4	287	41	10.1	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9wsa0	288	41	10.1	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9wnc8	255	41	10.1	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9wm99	294	41	10.1	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9wm77	282	41	10.1	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9wdz4	288	41	10.1	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d9w797	331	41	10.1	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
d8unj5	180	41	10.1	SubName: Full=Putative toxin-antitoxin system, antitoxin com...
d7xt93	308	41	10.1	SubName: Full=Zeta toxin;
d7ixn3	427	43	10.1	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d7ivv8	376	41	10.1	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d7iq56	251	41	10.1	SubName: Full=Toxin-antitoxin system, toxin component, Bro f...
d7hjp5	467	47	10.1	SubName: Full=RTX toxin transporter;
d7h7i8	294	41	10.1	SubName: Full=Cholera toxin transcriptional activator;
d6fvi7	170	41	10.1	SubName: Full=Toxin;
d5nx35	212	41	10.1	SubName: Full=Putative toxin-antitoxin system, toxin compone...
d5k9g7	401	41	10.1	SubName: Full=Zeta_1 toxin;
d5k9e9	401	41	10.1	SubName: Full=Zeta_1 toxin;
d5b900	587	59	10.1	SubName: Full=Toxin;

d4w3b3	244	41	10.1	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d4fbk0	284	41	10.1	SubName: Full=Toxin secretion/phage lysis holin;
d4bvk4	454	46	10.1	SubName: Full=RTX toxin transporter;
d315t9	259	41	10.1	SubName: Full=Toxin-antitoxin system, toxin component, PIN f...
d2yzq3	226	41	10.1	RecName: Full=Hemolytic toxin Avt-2; AltName: Full=Avt-II; F...
d2q5w2	477	48	10.1	SubName: Full=Zeta toxin family protein;
d1vrq6	290	41	10.1	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
d1mau9	287	41	10.1	SubName: Full=AM13; SubName: Full=Zeta toxin;
d0vxy8	276	41	10.1	SubName: Full=Exfoliative toxin;
d0ki10	235	41	10.1	SubName: Full=Zeta toxin family protein;
d0jyc2	587	59	10.1	SubName: Full=Toxin;
d0jmj7	587	59	10.1	SubName: Full=Toxin;
c9l7h2	268	41	10.1	SubName: Full=Toxin-antitoxin system, antitoxin component, X...
c8tpy4	318	41	10.1	SubName: Full=Shiga toxin 1 subunit A;
c8p9r3	307	41	10.1	SubName: Full=Zeta-toxin;
c8mn42	234	41	10.1	SubName: Full=Toxin beta-grasp domain-containing protein;
c8mn39	292	41	10.1	SubName: Full=Toxin beta-grasp domain-containing protein;
c8mei4	315	41	10.1	SubName: Full=Exfoliative toxin;
c8m6y5	234	41	10.1	SubName: Full=Toxin beta-grasp domain-containing protein;
c8lgu2	292	41	10.1	SubName: Full=Toxin beta-grasp domain-containing protein;
c8l7s5	292	41	10.1	SubName: Full=Toxin beta-grasp domain-containing protein;
c7wlr8	287	41	10.1	SubName: Full=Zeta toxin;
c7gzg2	248	41	10.1	SubName: Full=Toxin-antitoxin system, antitoxin component, P...
c7fpv4	315	41	10.1	SubName: Full=Shiga toxin 1 A subunit;
c7fpu4	315	41	10.1	SubName: Full=Shiga toxin 1 A subunit;
c7bjc2	542	55	10.1	SubName: Full=RtxA toxin;
c6yc06	467	47	10.1	SubName: Full=RTX toxin transporter;
c6ybh1	294	41	10.1	SubName: Full=Cholera toxin transcriptional activator;
c5uy10	487	49	10.1	SubName: Full=Toxin complex component ORF-X3;
c4tiq8	181	41	10.1	SubName: Full=Cytolethal distending toxin C;
c4ihl5	487	49	10.1	SubName: Full=Toxin complex component ORF-X3;
c4i172	587	59	10.1	SubName: Full=Toxin;
c4h pz3	587	59	10.1	SubName: Full=Toxin;
c4hbn0	587	59	10.1	SubName: Full=Toxin;
c3x6z4	722	73	10.1	SubName: Full=Toxin ABC transporter ATPase and permease;
c3wqw5	296	41	10.1	SubName: Full=Zeta-toxin;
c3ltn2	294	41	10.1	SubName: Full=Cholera toxin transcriptional activator;
c3lme3	467	47	10.1	SubName: Full=RTX toxin transporter;
c2jsr0	287	41	10.1	SubName: Full=Epsilon-zeta postsegregational killing system ...
c2h xv0	467	47	10.1	SubName: Full=RTX toxin transporter;
c2enp1	307	41	10.1	SubName: Full=Zeta toxin;
c2ca58	467	47	10.1	SubName: Full=RTX toxin transporter;
b7tgx8	224	41	10.1	SubName: Full=Toxin co-regulated pilin;
b7m7t2	310	41	10.1	SubName: Full=Putative zeta toxin; poison-antidote element;
b7j5f4	445	45	10.1	SubName: Full=Toxin secretion protein, HlyD family;
b6vb99	192	41	10.1	SubName: Full=Ras-related C3 botulinum toxin substrate 1;
b5xl31	302	41	10.1	SubName: Full=Putative exfoliative toxin;
b5ty44	226	41	10.1	SubName: Full=Diphtheria toxin repressor;
b5gvz5	398	41	10.1	SubName: Full=Putative Zeta toxin;
b5gjz3	276	41	10.1	SubName: Full=Xre family toxin-antitoxin system, antitoxin c...
b3pyl2	613	62	10.1	SubName: Full=Putative RTX toxin hemolysin-type calcium-bind...
b2v3v2	487	49	10.1	SubName: Full=Toxin complex component ORF-X3;
b1r9v5	336	41	10.1	SubName: Full=Beta-toxin;
b1ah80	185	41	10.1	SubName: Full=Ras-related C3 botulinum toxin substrate 2; Su...
b0nse0	292	41	10.1	SubName: Full=Toxin-antitoxin system, toxin component, Fic f...
b0mx98	173	41	10.1	SubName: Full=Toxin secretion/phage lysis holin;
b0map4	239	41	10.1	SubName: Full=Putative toxin-antitoxin system, toxin compone...
b0i0z4	587	59	10.1	SubName: Full=Toxin;

b0hnm7	587	59	10.1	SubName: Full=Toxin;
b0hb47	587	59	10.1	SubName: Full=Toxin;
b0gzx5	587	59	10.1	SubName: Full=Toxin;
b0glm6	587	59	10.1	SubName: Full=Toxin;
b0a5m9	587	59	10.1	SubName: Full=Toxin;
a9zd22	587	59	10.1	SubName: Full=Toxin;
a9qye2	587	59	10.1	SubName: Full=Toxin;
a9bv73	341	41	10.1	SubName: Full=Zonular occludens toxin;
a7zf54	374	41	10.1	SubName: Full=Zonula occludens toxin (Zot) family;
a7i2k3	233	41	10.1	SubName: Full=RTX toxins and related Ca2+-binding protein;
a7i269	585	59	10.1	SubName: Full=General secretion pathway protein E (Type II t...
a6xv18	467	47	10.1	SubName: Full=RTX toxin transporter;
a6tyq4	232	41	10.1	SubName: Full=Toxin beta-grasp domain protein; Flags: Precur...
a6tyq1	292	41	10.1	SubName: Full=Toxin beta-grasp domain protein; Flags: Precur...
a6aeb2	467	47	10.1	SubName: Full=RTX toxin transporter;
a5w815	241	41	10.1	SubName: Full=Zeta toxin family protein;
a5f882	467	47	10.1	SubName: Full=RTX toxin transporter;
a4yrp9	704	71	10.1	SubName: Full=Toxin secretion ABC transporter (ATP-binding a...
a4xu57	396	41	10.1	SubName: Full=Zonular occludens toxin;
a4xfn7	315	41	10.1	SubName: Full=Zeta toxin family protein;
a4tsw6	587	59	10.1	SubName: Full=Toxin;
a4aj83	696	70	10.1	SubName: Full=RTX toxins and related Ca2+-binding protein;
a3h0m9	294	41	10.1	SubName: Full=Cholera toxin transcriptional activator; SubNa...
a3h0l3	467	47	10.1	SubName: Full=Membrane-fusion protein; SubName: Full=RTX tox...
a3gnz6	294	41	10.1	SubName: Full=Cholera toxin transcriptional activator;
a3glz6	467	47	10.1	SubName: Full=RTX toxin transporter;
a3elq3	467	47	10.1	SubName: Full=RTX toxin transporter;
a3elj8	294	41	10.1	SubName: Full=Cholera toxin transcriptional activator;
a2psc9	467	47	10.1	SubName: Full=RTX toxin transporter;
a1tt59	336	41	10.1	SubName: Full=Zonular occludens toxin;
a1f7f4	467	47	10.1	SubName: Full=RTX toxin transporter;
a1f5i1	294	41	10.1	SubName: Full=Cholera toxin transcriptional activator;
a1ep11	467	47	10.1	SubName: Full=RTX toxin transporter;
a0khz3	454	46	10.1	SubName: Full=RTX toxin transporter;
q208m1	440	44	10.0	SubName: Full=Alpha-toxin;
q08d9	488	49	10.0	SubName: Full=Anthrax toxin receptor 2; SubName: Full=Unchar...
k5pmy4	490	49	10.0	SubName: Full=Zonula occludens toxin;
k4yzq2	490	49	10.0	SubName: Full=Zonula occludens toxin;
k4im59	428	43	10.0	SubName: Full=Toxin of toxin-antitoxin module, HipA family;
k4ibc8	440	44	10.0	SubName: Full=Addiction module toxin protein HipA;
k2ifl2	638	64	10.0	SubName: Full=Toxin secretion ATP-binding protein;
h6ll97	578	58	10.0	SubName: Full=Toxin exporting ABC transporter, permease;
h4n3v9	689	69	10.0	SubName: Full=Toxin B domain protein;
g8w2m6	440	44	10.0	SubName: Full=HipA family toxin-antitoxin system;
f9kyl7	578	58	10.0	SubName: Full=Putative toxin RTX-I translocation ATP-binding...
f5z629	568	57	10.0	SubName: Full=Toxin secretion ABC transporter ATP-binding pr...
f4ggx0	560	56	10.0	SubName: Full=Zeta toxin family protein;
e6y2m1	669	67	10.0	SubName: Full=Cry toxin;
d7ixf2	408	41	10.0	SubName: Full=Toxin-antitoxin system, toxin component, HipA ...
d4axw1	410	41	10.0	SubName: Full=Toxin biosynthesis protein (Tri7), putative;
d2yk12	620	62	10.0	SubName: Full=Toxin coregulated pilus biosynthesis protein I...
d0k6a6	578	58	10.0	SubName: Full=Toxin exporting ABC transporter, permease;
d0cby1	728	73	10.0	SubName: Full=RTX toxin;
c4tv43	460	46	10.0	SubName: Full=Toxin ABC transporter, ATP-binding/permease pr...
c4sai0	708	71	10.0	SubName: Full=Toxin ABC transporter, ATP-binding/permease pr...
b7fp11	668	67	10.0	SubName: Full=RTX toxins and related Ca2+-binding protein;
b4f0p8	707	71	10.0	SubName: Full=Putative toxin transporter;
a3y7l5	788	79	10.0	SubName: Full=Putative toxin secretion ATP-binding protein;

C Scripts for allergen analysis

Script for making the search for identity over a window

```
#!/bin/csh
#
# USAGE: windowmatch <query sequence> <library> <windowlength> <cutoff>
# e.g. windowmatch BG025.fasta 80 35.0
#
awk -v window=$3 -f ./makewindows.awk $1
find . -name "window$3_*.fasta" -exec /z/linux/fasta/fasta34 -Q -b 100000 -d 100000 -w 1000000 {} \
    $2 2 \; | grep -A 2 ">>" \
    | awk -v window=$3 -v threshold=$4 '/^>>/ {name= substr($1,3,200); getline; getline; percent=gensub("%","", "g", $4); \
    overlap= int($9); if (1.0*percent >= 1.0*threshold && 1*overlap >= 1*window) \
    {printf "%s\t%3.1f%% identity i %2d aa overlap.\n", \
    name, percent, overlap}}' | sort -r -n --key=10
```

The script is invoked by the following command, where parameter 2 is the length of the window, and parameter 3 is the identity threshold:

```
windowmatch HyGe329.fasta allergenonline.fasta 80 35.0 >
allergenonline_window80_result.txt
```

and

```
windowmatch HyGe329.fasta allergen.org.fasta 80 35.0 >
allergenorg_window80_result.txt
```

Script for making the search for scaled identity over a window

```
#!/bin/csh
#
# USAGE: windowmatch_scale <query sequence> <Library> <windowlength> <cutoff>
# e.g. windowmatch BG025.fasta 80 35.0
#
awk -v window=$3 -f ./makewindows.awk $1
find . -name "window80_*.fasta" -exec /z/linux/fasta/fasta34 -Q -b 100000 -d 100000 -w 1000000 {} \
    $2 2 \; | tee windowmatch_scale_$3.fasta.txt | grep -A 2 ">>" \
    | awk -v window=$3 -v threshold=$4 '/^>>/ {name= substr($1,3,200); getline; getline; percent=$4; \
    overlap= int($9); newpercent=(1.0*percent*overlap)/(1.0*window); if (newpercent >= 1.0*threshold && overlap < window) \
    {printf "%s\t%3.1f%% identity i %2d aa overlap, scaled to %3.1f%% identity i %d aa overlap\n", \
    name, percent, overlap, newpercent, window }}' | sort -r -n --key=10
```

The script is invoked by the following command, where parameter 2 is the length of the window,

and parameter 3 is the identity threshold. This script allows identification of matches with higher identity over shorter windows than 80 amino acids. For example a match with 50% identity over 60 amino acids would still have enough identical amino acids to exceed the 35% threshold over 80 amino acids: $60 \cdot 0.50 / 80 = 0.375 = 37.5\%$.

```
windowmatch_scale HyGe329.fasta allergenonline.fasta 80 35.0 >
allergenonline.window80_result_scale.txt
```

and

```
windowmatch_scale HyGe329.fasta allergen.org.fasta 80 35.0 >
allergenorg.window80_result_scale.txt
```

Common awk script used by the two previous scripts

The file is named `makewindows.awk`

```
BEGIN { seq=""
        if (window < 1)
            window = 6
    }
    {
        if (substr($0,1,1) != ">")
        {
            gsub("[^A-Za-z]", "")
            seq = sprintf("%s%s", seq, $0)
        }
    }
    END {
        for (i=1; i<length(seq)-window+2; i++)
        {
            filename = sprintf ("window%d_%04d.fasta", window, i)
            printf ">window%d_%04d\n", window, i > filename
            printf "%s\n", substr(seq,i>window) > filename
        }
    }
}
```

Script for making the Needleman-Wunsch alignment and comparison

```
#!/bin/csh
#
# USAGE: fullmatch <query sequence> <library> <cutoff>
# e.g. fullmatch BG025.fasta 35.0
#
```

```

needle -asequence $1 -bsequence $2 \
-gapopen 10.0 -gapextend 0.5 -outfile /dev/stdout \
| awk -v threshold=$3 '2:/{name = substr($3,1,80) } \
/Identity/{ matches = $3; percent = strtonum(gensub("\\(", "", 1, $NF)); \
if (percent >= threshold) {printf "%-80s %-10s = %5.1f%%\n", \
name,matches,percent } } ' | sort -r -n --key=4

```

The script is invoked by the following command, where parameter 1 is the identity threshold:

```

fullmatch HyGe329.fasta allergenonline.fasta 10.0 >
allergenonline_fullresult.txt

```

and

```

fullmatch HyGe329.fasta allergen.org.fasta 10.0 >
allergenorg_fullresult.txt

```

D List of allergens from allergenonline

List of allergens that have been tested by the EFSA scientific opinion recommended allergen analysis described in section 2. The sequences were downloaded via <http://allergenonline.org>.

Count	Species	Common	IUIS Allergen	Type	Group	Length	GI#	FirstVersion
1	Acarus siro	Mite	Unassigned	Aero Mite	Acarus Aca s 13	131	118638268	9
2	Actinidia chinensis	Kiwi	Unassigned	Food Plant	Actinidia Act c 1 Act d 1	380	190358935	9
3	Actinidia deliciosa	Kiwi	Unassigned	Food Plant	Actinidia Act c 1 Act d 1	380	15984	7
4	Actinidia deliciosa	Kiwi	Unassigned	Food Plant	Actinidia Act c 1 Act d 1	380	166317	7
5	Actinidia deliciosa	Kiwi	Unassigned	Food Plant	Actinidia Act c 1 Act d 1	380	193806686	12
6	Actinidia chinensis	Kiwi	Unassigned	Food Plant	Actinidia Act c 8 Act d 8 PR-10	159	281552896	11
7	Actinidia deliciosa	Kiwi	Unassigned	Food Plant	Actinidia Act c 8 Act d 8 PR-10	157	281552898	11
8	Actinidia deliciosa	Kiwi	Unassigned	Unassigned	Actinidia Act d 11 Kirola MLP	150	332319679	12
9	Actinidia chinensis	Kiwi	Unassigned	Food Plant	Actinidia Kiwellin	189	85701136	7
10	Actinidia deliciosa	Kiwi	Unassigned	Food Plant	Actinidia Phytocystatin Act d 4	116	40807635	7
11	Actinidia chinensis	Kiwi	Unassigned	Food Plant	Actinidia thaumatin Act d 2	20	68064399	7
12	Actinidia deliciosa	Kiwi	Act c 2	Food Plant	Actinidia thaumatin Act d 2	225	71057064	7
13	Actinidia deliciosa	Kiwi	Unassigned	Food Plant	Actinidia thaumatin Act d 2	201	146737976	9
14	Aedes aegypti	Yellow fever mosquito	Aed a 2	Venom or Salivary	Aedes Aed a 2	321	118216	7
15	Aedes aegypti	Yellow fever mosquito	Aed a 2	Venom or Salivary	Aedes Aed a 2	321	205525919	9
16	Aedes aegypti	Yellow fever mosquito	Unassigned	Venom or Salivary	Aedes Aed a 3	253	2114497	7
17	Aedes aegypti	Yellow fever mosquito	Unassigned	Venom or Salivary	Aedes Aed a 3	273	94468546	7
18	Aedes aegypti	Yellow fever mosquito	Unassigned	Venom or Salivary	Aedes Aed a 3	258	94468552	7
19	Aedes aegypti	Yellow fever	Aed a 1	Venom or	Aedes apyrase Aed a	562	556272	7

		mosquito		Salivary	1			
20	Aedes aegypti	Yellow fever mosquito	Unassigned	Venom or Salivary	Aedes apyrase Aed a	562	193806340	10
21	Agrostis alba	Bent grass	Unassigned	Aero Plant	Agrostis Agr a 1	26	320606	7
22	Agrostis alba	Bent grass	Unassigned	Aero Plant	Agrostis Agr a 1	35	75139987	7
23	Agrostis alba	Bent grass	Unassigned	Aero Plant	Agrostis Agr a 1	35	75139989	7
24	Alnus glutinosa	Alder	Aln g 1	Aero Plant	Alnus Aln g 1	160	261407	7
25	Alnus glutinosa	Alder	Unassigned	Aero Plant	Alnus Aln g 4	85	3319651	7
26	Alternaria alternata	Fungus	Unassigned	Aero Fungi	Alternaria ADH Alta a 10	497	76666767	7
27	Alternaria alternata	Fungus	Unassigned	Aero Fungi	Alternaria Alt a 13	231	74611808	10
28	Alternaria alternata	Fungus	Alt a 1	Aero Fungi	Alternaria Alt a I	157	1842045	7
29	Alternaria alternata	Fungus	Alt a 1	Aero Fungi	Alternaria Alt a I	115	21913174	7
30	Alternaria alternata	Fungus	Unassigned	Aero Fungi	Alternaria Alt a I	157	45680856	7
31	Alternaria alternata	Fungus	Alt a 6	Aero Fungi	Alternaria enolase Alt a 6	438	14423684	7
32	Alternaria alternata	Fungus	Unassigned	Aero Fungi	Alternaria flavodoxin Alt a 7	204	1168402	9
33	Alternaria alternata	Fungus	Alt a 3	Aero Fungi	Alternaria HSP Alt a 3	152	14423730	7
34	Alternaria alternata	Fungus	Unassigned	Aero Plant	Alternaria MnSOD	25	292630881	12
35	Alternaria alternata	Fungus	Unassigned	Aero Fungi	Alternaria Nuc Transport 2	124	21748153	7
36	Alternaria alternata	Fungus	Alt a 12	Aero Fungi	Alternaria Ribosomal BP P1 Alt a 12	110	1350779	7
37	Alternaria alternata	Fungus	Alt a 5	Aero Fungi	Alternaria ribosomal P2 Alt a 5	113	1850540	7
38	Alternaria alternata	Fungus	Unassigned	Aero Fungi	Alternaria ribosomal P2 Alt a 5	113	1173071	10
39	Alternaria alternata	Fungus	Unassigned	Aero Fungi	Alternaria TCTP IgE binding	169	112824341	11
40	Alternaria alternata	Fungus	Alt a 4	Aero Fungi	Alternaria thioredoxin Alt a 4	436	85701160	7
41	Amaranthus retroflexus	Common Amaranth	Unassigned	Aero Plant	Amaranthus Ama r 2 Proflin	133	227937304	10
42	Ambrosia artemisiifolia	Short ragweed	Amb a 1.1	Aero Plant	Ambrosia Amb a 1	396	113475	7

43	Ambrosia |artemisiifolia	Short ragweed	Amb a 1.2	Aero Plant	Ambrosia Amb a 1	398	113476	7
44	Ambrosia |artemisiifolia	Short ragweed	Amb a 1.3	Aero Plant	Ambrosia Amb a 1	397	113477	7
45	Ambrosia |artemisiifolia	Short ragweed	Amb a 1.4	Aero Plant	Ambrosia Amb a 1	392	113478	7
46	Ambrosia |artemisiifolia	Short ragweed	Amb a 1.3	Aero Plant	Ambrosia Amb a 1	397	166443	7
47	Ambrosia |artemisiifolia	Short ragweed	Unassigned	Aero Plant	Ambrosia Amb a 1	396	302127810	12
48	Ambrosia |artemisiifolia	Short ragweed	Unassigned	Aero Plant	Ambrosia Amb a 1	398	302127812	12
49	Ambrosia |artemisiifolia	Short ragweed	Unassigned	Aero Plant	Ambrosia Amb a 1	397	302127814	12
50	Ambrosia |artemisiifolia	Short ragweed	Unassigned	Aero Plant	Ambrosia Amb a 1	397	302127816	12
51	Ambrosia |artemisiifolia	Short ragweed	Unassigned	Aero Plant	Ambrosia Amb a 1	397	302127818	12
52	Ambrosia |artemisiifolia	Short ragweed	Unassigned	Aero Plant	Ambrosia Amb a 1	397	302127820	12
53	Ambrosia |artemisiifolia	Short ragweed	Unassigned	Aero Plant	Ambrosia Amb a 1	397	302127822	12
54	Ambrosia |artemisiifolia	Short ragweed	Unassigned	Aero Plant	Ambrosia Amb a 1	387	302127824	12
55	Ambrosia |artemisiifolia	Short ragweed	Unassigned	Aero Plant	Ambrosia Amb a 1	397	302127826	12
56	Ambrosia |artemisiifolia	Short ragweed	Unassigned	Aero Plant	Ambrosia Amb a 1	397	302127828	12
57	Ambrosia |artemisiifolia	Short ragweed	Amb a 2	Aero Plant	Ambrosia Amb a 2	397	113479	7
58	Ambrosia |artemisiifolia |(elator)	Short ragweed	Amb a 3	Aero Plant	Ambrosia Amb a 3	101	416636	7
59	Ambrosia |artemisiifolia	Short ragweed	Unassigned	Aero Plant	Ambrosia Amb a 4	164	285005079	11
60	Ambrosia |artemisiifolia	Short ragweed	Unassigned	Aero Plant	Ambrosia Amb a 4	164	291197394	12
61	Ambrosia |artemisiifolia	Short ragweed	Unassigned	Aero Plant	Ambrosia Amb a 4	111	291482306	12
62	Ambrosia |artemisiifolia	Short ragweed	Unassigned	Aero Plant	Ambrosia Amb a 4	140	291482308	12
63	Ambrosia |artemisiifolia	Short ragweed	Unassigned	Aero Plant	Ambrosia Amb a 4	134	291482310	12
64	Ambrosia |artemisiifolia	Short ragweed	Unassigned	Aero Plant	Ambrosia Amb a 4	96	291482314	12
65	Ambrosia |artemisiifolia	Short ragweed	Unassigned	Aero Plant	Ambrosia Amb a 4	110	291482316	12

66	Ambrosia |artemisiifolia	Short ragweed	Unassigned	Aero Plant	Ambrosia Amb a 4	116	291482318	12
67	Ambrosia |artemisiifolia |(elator)	Short ragweed	Amb a 5	Aero Plant	Ambrosia Amb a 5	145	114090	7
68	Ambrosia |psilostachya	Western ragweed	Unassigned	Aero Plant	Ambrosia Amb a 5	177	515953	7
69	Ambrosia |psilostachya	Western ragweed	Unassigned	Aero Plant	Ambrosia Amb a 5	177	515954	7
70	Ambrosia |psilostachya	Western ragweed	Unassigned	Aero Plant	Ambrosia Amb a 5	177	515955	7
71	Ambrosia |psilostachya	Western ragweed	Unassigned	Aero Plant	Ambrosia Amb a 5	177	515956	7
72	Ambrosia |psilostachya	Western ragweed	Unassigned	Aero Plant	Ambrosia Amb a 5	177	515957	7
73	Ambrosia |artemisiifolia	Short ragweed	Amb a 6	Aero Plant	Ambrosia Amb a 6	118	14285595	7
74	Ambrosia |artemisiifolia	Short ragweed	Unassigned	Aero Plant	Ambrosia Amb a 8 |profilin	133	34851182	7
75	Ambrosia |artemisiifolia	Short ragweed	Unassigned	Aero Plant	Ambrosia Amb a 8 |profilin	131	34851180	7
76	Ambrosia |artemisiifolia	Short ragweed	Unassigned	Aero Plant	Ambrosia Amb a 8 |profilin	131	34851178	7
77	Ambrosia |artemisiifolia	Short ragweed	Unassigned	Aero Plant	Ambrosia Amb a 8 |profilin	133	62249502	7
78	Ambrosia |artemisiifolia	Short ragweed	Unassigned	Aero Plant	Ambrosia Amb a 8 |profilin	133	62249512	7
79	Ambrosia trifida |	Giant ragweed	Amb t 5	Aero Plant	Ambrosia trifida |Amb t 5	173	114091	7
80	Anacardium |occidentale	Cashew	Ana o 1	Food Plant	Anacardium Ana o 1	536	21666498	7
81	Anacardium |occidentale	Cashew	Ana o 1	Food Plant	Anacardium Ana o 1	538	21914823	7
82	Anacardium |occidentale	Cashew	Ana o 2	Food Plant	Anacardium Ana o 2	457	25991543	7
83	Anacardium |occidentale	Cashew	Ana o 3	Food Plant	Anacardium Ana o 3	138	24473800	7
84	Ananas comosus |	Pineapple	Unassigned	Aero Plant	Ananas Ana c 2 |Bromelain precursor	351	75277440	7
85	Ananas comosus	Pineapple	Unassigned	Food Plant	Ananas profilin	131	75306610	10
86	Anisakis simplex |	Parasitic fish worm	Ani s 1	Worm |(parasite)	Anisakis Ani s 1 |protease inhibitor	194	47605452	7
87	Anisakis simplex |	Parasitic fish worm	Unassigned	Food Animal	Anisakis Ani s 11	307	323575361	12
88	Anisakis simplex |	Parasitic fish worm	Unassigned	Food Animal	Anisakis Ani s 11	160	323575363	12

89	Anisakis simplex	Parasitic fish worm	Unassigned	Food Animal	Anisakis Ani s 11	287	323575365	12
90	Anisakis simplex	Parasitic fish worm	Unassigned	Food Animal	Anisakis Ani s 12	295	323575367	12
91	Anisakis simplex	Parasitic fish worm	Ani s 2	Worm (parasite)	Anisakis Ani s 2 paramyosin	473	8453086	7
92	Anisakis simplex	Parasitic fish worm	Unassigned	Worm (parasite)	Anisakis Ani s 2 paramyosin	869	42559536	9
93	Anisakis simplex	Parasitic fish worm	Ani s 4	Worm (parasite)	Anisakis Ani s 4	14	47605398	7
94	Anisakis simplex	Parasitic fish worm	Unassigned	Worm (parasite)	Anisakis Ani s 4	115	110346534	8
95	Anisakis simplex	Parasitic fish worm	Unassigned	Worm (parasite)	Anisakis Ani s 5 SXP/RAL-2 family protein	152	121308878	8
96	Anisakis simplex	Parasitic fish worm	Unassigned	Worm (parasite)	Anisakis Ani s 7 UA3-recognized allergen	1096	119524036	9
97	Anisakis simplex	Parasitic fish worm	Unassigned	Worm (parasite)	Anisakis Ani s 8 SXP/RAL-2 family protein 2	150	155676636	9
98	Anisakis simplex	Parasitic fish worm	Unassigned	Worm (parasite)	Anisakis Ani s 8 SXP/RAL-2 family protein 2	150	155676682	9
99	Anisakis simplex	Parasitic fish worm	Unassigned	Worm (parasite)	Anisakis Ani s 8 SXP/RAL-2 family protein 2	150	155676684	9
100	Anisakis simplex	Parasitic fish worm	Unassigned	Worm (parasite)	Anisakis Ani s 8 SXP/RAL-2 family protein 2	150	155676686	9
101	Anisakis simplex	Parasitic fish worm	Unassigned	Worm (parasite)	Anisakis Ani s 8 SXP/RAL-2 family protein 2	150	155676688	9
102	Anisakis simplex	Parasitic fish worm	Unassigned	Worm (parasite)	Anisakis Ani s 8 SXP/RAL-2 family protein 2	150	155676690	9
103	Anisakis simplex	Parasitic fish worm	Unassigned	Worm (parasite)	Anisakis Ani s 8 SXP/RAL-2 family protein 2	150	155676692	9
104	Anisakis simplex	Parasitic fish worm	Unassigned	Worm (parasite)	Anisakis Ani s 8 SXP/RAL-2 family protein 2	150	155676694	9
105	Anisakis simplex	Parasitic fish worm	Unassigned	Worm (parasite)	Anisakis Ani s 8 SXP/RAL-2 family protein 2	150	155676696	9
106	Anisakis simplex	Parasitic fish worm	Unassigned	Worm (parasite)	Anisakis Ani s 8 SXP/RAL-2 family protein 2	150	155676698	9
107	Anisakis simplex	Parasitic fish worm	Unassigned	Worm (parasite)	Anisakis Ani s 9	147	157418806	9

108	Anisakis simplex	Parasitic fish worm	Unassigned	Worm (parasite)	Anisakis simplex troponin-like	161	6065738	7
109	Anthoxanthum odoratum	Sweet vernal grass	Unassigned	Aero Plant	Anthoxanthum Ant o 1	26	320607	7
110	Anthoxanthum odoratum	Sweet vernal grass	Unassigned	Aero Plant	Anthoxanthum Ant o 1	32	75139986	7
111	Anthoxanthum odoratum	Sweet vernal grass	Unassigned	Aero Plant	Anthoxanthum Ant o 1	32	75139990	7
112	Apis cerana	Indian honeybee	Unassigned	Venom or Salivary	Apis Api m 1	134	7435005	7
113	Apis cerana cerana	Indian honeybee	Unassigned	Venom or Salivary	Apis Api m 1	134	24638082	7
114	Apis dorsata	Giant honeybee	Unassigned	Venom or Salivary	Apis Api m 1	134	47117012	7
115	Apis mellifera	Honeybee	Api m 1	Venom or Salivary	Apis Api m 1	167	24418862	7
116	Apis mellifera	Honeybee	Api m 2	Venom or Salivary	Apis Api m 2	382	585279	7
117	Apis mellifera	Honeybee	Unassigned	Venom or Salivary	Apis Api m 3 acid phosphatase	388	208342441	10
118	Apis mellifera	Honeybee	Unassigned	Venom or Salivary	Apis Api m 3 acid phosphatase	388	60652325	11
119	Apis dorsata	Giant honeybee	Unassigned	Venom or Salivary	Apis Api m 4 Melittin	26	126955	7
120	Apis mellifera	Honeybee	Unassigned	Venom or Salivary	Apis Api m 4 Melittin	27	69552	7
121	Apis mellifera	Honeybee	Unassigned	Venom or Salivary	Apis Api m 4 Melittin	70	126949	8
122	Apis mellifera	Honeybee	Unassigned	Venom or Salivary	Apis Api m 5 dipeptidylpeptidase	775	313471719	12
123	Apis mellifera	Honeybee	Unassigned	Venom or Salivary	Apis Api m 6	92	94400907	7
124	Apis mellifera	Honeybee	Unassigned	Venom or Salivary	Apis Api m 6	94	88770352	10
125	Apis mellifera	Honeybee	Unassigned	Venom or Salivary	Apis icarapin Api m 10	223	94471622	7
126	Apis mellifera	Honeybee	Unassigned	Venom or Salivary	Apis icarapin Api m 10	175	94471624	7
127	Apium graveolens	Celery	Api g 1.0101	Food Plant	Apium Api g 1	154	1346568	7
128	Apium graveolens	Celery	Api g 1.0201	Food Plant	Apium Api g 1	159	14423646	9
129	Apium graveolens	Celery	Api g 2.0101	Food Plant	Apium Api g 2	118	256600126	12
130	Apium graveolens	Celery	Api g 4	Food Plant	Apium Api g 4	134	4761578	7

131	Apium graveolens	Celery	Unassigned	Food Plant	Apium Api g 5	22	33300921	7
132	Apium graveolens	Celery	Unassigned	Food Plant	Apium Api g 5	30	32363124	7
133	Apium graveolens	Celery	Unassigned	Food Plant	Apium Api g 5	24	32363125	7
134	Apium graveolens	Celery	Unassigned	Food Plant	Apium Api g 5	10	32363126	7
135	Arachis hypogaea	Peanut	Unassigned	Food Plant	Arachis Agglutinin (lectin)	273	253289	7
136	Arachis hypogaea	Peanut	Ara h 1	Food Plant	Arachis Ara h 1	614	1168390	7
137	Arachis hypogaea	Peanut	Ara h 1	Food Plant	Arachis Ara h 1	626	1168391	7
138	Arachis hypogaea	Peanut	Unassigned	Food Plant	Arachis Ara h 1	299	46560474	7
139	Arachis hypogaea	Peanut	Unassigned	Food Plant	Arachis Ara h 1	303	46560472	7
140	Arachis hypogaea	Peanut	Unassigned	Food Plant	Arachis Ara h 1	428	46560476	7
141	Arachis hypogaea	Peanut	Unassigned	Food Plant	Arachis Ara h 1	619	312233063	12
142	Arachis hypogaea	Peanut	Ara h 2.02	Food Plant	Arachis Ara h 2	172	26245447	7
143	Arachis hypogaea	Peanut	Ara h 2	Food Plant	Arachis Ara h 2	169	31322017	7
144	Arachis hypogaea	Peanut	Unassigned	Food Plant	Arachis Ara h 2	156	15418705	10
145	Arachis hypogaea	Peanut	Unassigned	Food Plant	Arachis Ara h 2	158	224747150	10
146	Arachis hypogaea	Peanut	Ara h 5	Food Plant	Arachis Ara h 5	131	5902968	7
147	Arachis hypogaea	Peanut	Unassigned	Food Plant	Arachis Ara h 5	131	284810529	11
148	Arachis hypogaea	Peanut	Ara h 6	Food Plant	Arachis Ara h 6	129	5923742	7
149	Arachis hypogaea	Peanut	Unassigned	Food Plant	Arachis Ara h 6	144	17225991	7
150	Arachis hypogaea	Peanut	Unassigned	Food Plant	Arachis Ara h 6	127	159163254	9
151	Arachis hypogaea	Peanut	Unassigned	Food Plant	Arachis Ara h 6	145	75114094	10
152	Arachis hypogaea	Peanut	Ara h 7	Food Plant	Arachis Ara h 7	160	5931948	7
153	Arachis hypogaea	Peanut	Unassigned	Food Plant	Arachis Ara h 7	164	158121995	10
154	Arachis hypogaea	Peanut	Ara h 8	Food Plant	Arachis Ara h 8	157	37499626	7
155	Arachis hypogaea	Peanut	Unassigned	Food Plant	Arachis Ara h 8	153	145904610	9
156	Arachis hypogaea	Peanut	Unassigned	Food Plant	Arachis Ara h 8	157	169786740	9
157	Arachis hypogaea	Peanut	Unassigned	Food Plant	Arachis Ara h 8	157	110676574	12
158	Arachis hypogaea	Peanut	Unassigned	Food Plant	Arachis Ara h 9 LTP isoallergens	116	161087230	10
159	Arachis hypogaea	Peanut	Unassigned	Food Plant	Arachis Ara h 9 LTP isoallergens	92	161610580	10
160	Arachis hypogaea	Peanut	Ara h 3	Food Plant	Arachis Glycinin (Ara h 3/Ara h 4)	507	3703107	7
161	Arachis hypogaea	Peanut	Ara h 4	Food Plant	Arachis Glycinin (Ara h 3/Ara h 4)	530	5712199	7
162	Arachis hypogaea	Peanut	Unassigned	Food Plant	Arachis Glycinin (Ara h 3/Ara h 4)	538	21314465	7

163	Arachis hypogaea	Peanut	Unassigned	Food Plant	Arachis Glycinin (Ara h 3/Ara h 4)	219	22135348	7
164	Arachis hypogaea	Peanut	Unassigned	Food Plant	Arachis Glycinin (Ara h 3/Ara h 4)	512	112380623	8
165	Arachis hypogaea	Peanut	Unassigned	Food Plant	Arachis Glycinin (Ara h 3/Ara h 4)	530	199732457	10
166	Arachis hypogaea	Peanut	Unassigned	Food Plant	Arachis Glycinin (Ara h 3/Ara h 4)	510	224036293	10
167	Arachis hypogaea	Peanut	Unassigned	Food Plant	Arachis Glycinin (Ara h 3/Ara h 4)	512	312233065	12
168	Argas reflexus	European pigeon tick	Arg r 1	Venom or Salivary	Argas Arg r 1	159	58371884	7
169	Argas reflexus	European pigeon tick	Unassigned	Venom or Salivary	Argas Arg r 1	144	322812205	12
170	Artemisia vulgaris	Mugwort	Unassigned	Aero Plant	Artemisia Amb a 1-like	396	62530263	8
171	Artemisia vulgaris	Mugwort	Art v 1	Aero Plant	Artemisia Art v 1	132	27818335	7
172	Artemisia vulgaris	Mugwort	Unassigned	Aero Plant	Artemisia Art v 2	162	148887203	9
173	Artemisia vulgaris	Mugwort	Unassigned	Aero Plant	Artemisia Art v 3	37	73621307	7
174	Artemisia vulgaris	Mugwort	Unassigned	Aero Plant	Artemisia Art v 3	114	189544578	11
175	Artemisia vulgaris	Mugwort	Unassigned	Aero Plant	Artemisia Art v 3	116	189544584	11
176	Artemisia vulgaris	Mugwort	Unassigned	Aero Plant	Artemisia Art v 3	117	189544590	11
177	Artemisia vulgaris	Mugwort	Unassigned	Aero Plant	Artemisia Art v 3	117	189544595	11
178	Artemisia vulgaris	Mugwort	Unassigned	Aero Plant	Artemisia Art v 4	133	73621415	7
179	Artemisia vulgaris	Mugwort	Unassigned	Aero Plant	Artemisia Art v 4	133	73621416	7
180	Ascaris lumbricoides	Parasitic roundworm	Unassigned	Worm (parasite)	Ascaris Asc s 1	134	2735096	7
181	Ascaris lumbricoides	Parasitic roundworm	Unassigned	Worm (parasite)	Ascaris Asc s 1	134	2735098	7
182	Ascaris lumbricoides	Parasitic roundworm	Unassigned	Worm (parasite)	Ascaris Asc s 1	133	2735102	7
183	Ascaris lumbricoides	Parasitic roundworm	Unassigned	Worm (parasite)	Ascaris Asc s 1	133	2735106	7
184	Ascaris lumbricoides	Parasitic roundworm	Unassigned	Worm (parasite)	Ascaris Asc s 1	267	2735108	7
185	Ascaris lumbricoides	Parasitic roundworm	Unassigned	Worm (parasite)	Ascaris Asc s 1	267	2735110	7

186	Ascaris lumbricoides	Parasitic roundworm	Unassigned	Worm (parasite)	Ascaris Asc s 1	267	2735112	7
187	Ascaris lumbricoides	Parasitic roundworm	Unassigned	Worm (parasite)	Ascaris Asc s 1	134	2735114	7
188	Ascaris lumbricoides	Parasitic roundworm	Unassigned	Worm (parasite)	Ascaris Asc s 1	134	2735118	7
189	Ascaris lumbricoides	Parasitic roundworm	Unassigned	Worm (parasite)	Ascaris Asc s 1	134	2735100	7
190	Ascaris lumbricoides	Parasitic roundworm	Unassigned	Worm (parasite)	Ascaris Asc s 1	133	2735104	11
191	Ascaris suum	Parasitic roundworm	Asc s 1	Worm (parasite)	Ascaris Asc s 1	68	299550	7
192	Ascaris suum	Parasitic roundworm	Asc s 1	Worm (parasite)	Ascaris Asc s 1	1365	77416849	7
193	Ascaris suum	Parasitic roundworm	Unassigned	Worm (parasite)	Ascaris Asc s 1	134	343197079	12
194	Ascaris lumbricoides	Parasitic roundworm	Unassigned	Worm (parasite)	Ascaris tropomyosin	287	224016002	10
195	Aspergillus oryzae	Fungus	Asp o 21	Aero Fungi	Aspergillus Alpha-amylase A	499	94706935	7
196	Aspergillus fumigatus	Fungus	Asp f 1	Aero Fungi	Aspergillus Asp f 1	125	3021324	7
197	Aspergillus fumigatus	Fungus	Asp f 1	Aero Fungi	Aspergillus Asp f 1	150	9280360	7
198	Aspergillus fumigatus	Fungus	Unassigned	Aero Fungi	Aspergillus Asp f 1	176	54039254	7
199	Aspergillus fumigatus	Fungus	Asp f 10	Aero Fungi	Aspergillus Asp f 10	395	963013	7
200	Aspergillus fumigatus	Fungus	Asp f 11	Aero Fungi	Aspergillus Asp f 11	178	5019414	7
201	Aspergillus fumigatus	Fungus	Asp f 12	Aero Fungi	Aspergillus Asp f 12	706	83303658	7
202	Aspergillus fumigatus	Fungus	Asp f 2	Aero Fungi	Aspergillus Asp f 2	250	664852	7
203	Aspergillus fumigatus	Fungus	Asp f 2	Aero Fungi	Aspergillus Asp f 2	310	83300352	7
204	Aspergillus fumigatus Af293	Fungus	Unassigned	Aero Fungi	Aspergillus Asp f 2	304	66849502	7
205	Aspergillus fumigatus	Fungus	Asp f 22	Aero Fungi	Aspergillus Asp f 22	438	13925873	7
206	Aspergillus fumigatus	Fungus	Unassigned	Aero Fungi	Aspergillus Asp f 22	438	83288046	7
207	Aspergillus fumigatus	Fungus	Asp f 3	Aero Fungi	Aspergillus Asp f 3	168	2769700	7
208	Aspergillus fumigatus Af293	Fungus	Unassigned	Aero Fungi	Aspergillus Asp f 3	168	66845476	8

209	Aspergillus fumigatus	Fungus	Asp f 4	Aero Fungi	Aspergillus Asp f 4	286	3005839	7
210	Aspergillus fumigatus	Fungus	Unassigned	Aero Fungi	Aspergillus Asp f 4	322	83300369	7
211	Aspergillus fumigatus Af293	Fungus	Unassigned	Aero Fungi	Aspergillus Asp f 4	322	66847146	8
212	Aspergillus fumigatus	Fungus	Asp f 6	Aero Fungi	Aspergillus Asp f 6	221	1648970	7
213	Aspergillus fumigatus	Fungus	Unassigned	Aero Fungi	Aspergillus Asp f 6	210	83305645	7
214	Aspergillus fumigatus	Fungus	Asp f 7	Aero Fungi	Aspergillus Asp f 7	270	83300389	7
215	Aspergillus fumigatus	Fungus	Asp f 8	Aero Fungi	Aspergillus Asp f 8	111	6686524	7
216	Aspergillus fumigatus	Fungus	Unassigned	Aero Fungi	Aspergillus Asp f 8	111	83305635	7
217	Aspergillus fumigatus	Fungus	Unassigned	Aero Fungi	Aspergillus Asp f 9	395	85540942	7
218	Aspergillus niger	Fungus	Asp n 14	Aero Fungi	Aspergillus Asp n 14	804	2181180	7
219	Aspergillus niger	Fungus	Asp n 14	Aero Fungi	Aspergillus Asp n 14	804	4235093	7
220	Aspergillus flavus	Fungus	Unassigned	Aero Fungi	Aspergillus Oryzin Asp o 13, fl 13	403	74665726	7
221	Aspergillus oryzae	Fungus	Asp o 13	Aero Fungi	Aspergillus Oryzin Asp o 13, fl 13	403	129235	7
222	Aspergillus fumigatus	Fungus	Unassigned	Aero Fungi	Aspergillus Ribosomal protein L3	392	21215170	7
223	Aspergillus fumigatus	Fungus	Unassigned	Aero Fungi	Aspergillus Ribosomal protein L3	392	83305621	7
224	Aspergillus fumigatus	Fungus	Unassigned	Aero Fungi	Aspergillus Vacuolar Serine protease	495	2143220	7
225	Aspergillus niger	Fungus	Unassigned	Aero Fungi	Aspergillus Vacuolar Serine protease	533	289172	7
226	Bacillus sp.		Unassigned	Bacteria airway	Bacillus lentus Esperase	361	1225905	9
227	Bacillus lentus		Unassigned	Bacteria airway	Bacillus lentus subtilisin	269	267048	9
228	Bacillus licheniformis		Unassigned	Bacteria airway	Bacillus licheniformis subtlilisin	379	135016	9
229	Bacillus licheniformis		Unassigned	Bacteria airway	Bacillus licheniformis subtlilisin	374	11127680	9

230	Balanus rostratus		Unassigned	Food Animal	Balanus r tropomyosin	284	125659386	9
231	Batillus cornutus	Japanese turban shell	Unassigned	Food Animal	Batillus Tur c1	20	47117350	7
232	Batillus cornutus	Japanese turban shell	Unassigned	Food Animal	Batillus Tur c1	27	47117351	7
233	Batillus cornutus	Japanese turban shell	Unassigned	Food Animal	Batillus Tur c1	284	219806588	10
234	Bertholletia excelsa	Brazil nut	Ber e 2	Food Plant	Bertholletia 11S globulin	465	30313867	7
235	Bertholletia excelsa	Brazil nut	Unassigned	Food Plant	Bertholletia Ber e 1	154	17713	7
236	Bertholletia excelsa	Brazil nut	Ber e 1	Food Plant	Bertholletia Ber e 1	146	112754	7
237	Betula pendula	European white birch	Bet v 2	Aero Plant	Bet v 2	133	130975	7
238	Betula pendula	European white birch	Unassigned	Aero Plant	Bet v 2	133	157830684	9
239	Betula pendula	European white birch	Bet v 1	Aero Plant	Betula Bet v 1	51	320545	7
240	Betula pendula	European white birch	Bet v 1	Aero Plant	Betula Bet v 1	160	534898	7
241	Betula pendula	European white birch	Bet v 1	Aero Plant	Betula Bet v 1	159	534900	7
242	Betula pendula	European white birch	Bet v 1	Aero Plant	Betula Bet v 1	160	534910	7
243	Betula pendula	European white birch	Bet v 1.0301	Aero Plant	Betula Bet v 1	160	1168702	7
244	Betula pendula	European white birch	Bet v 1.1001	Aero Plant	Betula Bet v 1	160	1168709	7
245	Betula pendula	European white birch	Bet v 1.1601	Aero Plant	Betula Bet v 1	160	1321714	7
246	Betula pendula	European white birch	Bet v 1.1701	Aero Plant	Betula Bet v 1	160	1321716	7
247	Betula pendula	European white birch	Bet v 1.1801	Aero Plant	Betula Bet v 1	160	1321718	7
248	Betula pendula	European white birch	Bet v 1.1502	Aero Plant	Betula Bet v 1	160	1321720	7
249	Betula pendula	European white birch	Bet v 1.1901	Aero Plant	Betula Bet v 1	160	1321722	7
250	Betula pendula	European white birch	Bet v 1.2001	Aero Plant	Betula Bet v 1	160	1321724	7
251	Betula pendula	European white birch	Bet v 1.2101	Aero Plant	Betula Bet v 1	160	1321726	7
252	Betula pendula	European white birch	Bet v 1.2201	Aero Plant	Betula Bet v 1	160	1321728	7

253	Betula pendula	European	Bet v 1	Aero Plant	Betula Bet v 1	160	1168703	7
		white birch						
254	Betula pendula	European	Bet v	Aero Plant	Betula Bet v 1	160	1168704	7
		white birch	1.0501					
255	Betula pendula	European	Bet v 1f/I	Aero Plant	Betula Bet v 1	160	1168705	7
		white birch						
256	Betula pendula	European	Bet v	Aero Plant	Betula Bet v 1	160	1168707	7
		white birch	1.0801					
257	Betula pendula	European	Bet v	Aero Plant	Betula Bet v 1	160	1168708	7
		white birch	1.0901					
258	Betula pendula	European	Bet v 1m/n	Aero Plant	Betula Bet v 1	160	1168710	7
		white birch						
259	Betula pendula	European	Bet v	Aero Plant	Betula Bet v 1	160	1168701	7
		white birch	1.0201					
260	Betula pendula	European	Bet v	Aero Plant	Betula Bet v 1	160	1542861	7
		white birch	1.2401					
261	Betula pendula	European	Bet v	Aero Plant	Betula Bet v 1	160	1542863	7
		white birch	1.2501					
262	Betula pendula	European	Bet v	Aero Plant	Betula Bet v 1	160	1542865	7
		white birch	1.2601					
263	Betula pendula	European	Bet v	Aero Plant	Betula Bet v 1	160	1542867	7
		white birch	1.2701					
264	Betula pendula	European	Bet v	Aero Plant	Betula Bet v 1	160	1542869	7
		white birch	1.2801					
265	Betula pendula	European	Bet v	Aero Plant	Betula Bet v 1	160	1542871	7
		white birch	1.2901					
266	Betula pendula	European	Bet v	Aero Plant	Betula Bet v 1	160	1542873	7
		white birch	1.3001					
267	Betula pendula	European	Bet v	Aero Plant	Betula Bet v 1	160	2414158	7
		white birch	1.2301					
268	Betula pendula	European	Bet v 1	Aero Plant	Betula Bet v 1	160	2564220	7
		white birch						
269	Betula pendula	European	Bet v 1	Aero Plant	Betula Bet v 1	160	2564222	7
		white birch						
270	Betula pendula	European	Bet v 1	Aero Plant	Betula Bet v 1	160	2564224	7
		white birch						
271	Betula pendula	European	Bet v 1	Aero Plant	Betula Bet v 1	160	2564228	7
		white birch						
272	Betula pendula	European	Bet v 1	Aero Plant	Betula Bet v 1	160	4006928	7
		white birch						
273	Betula pendula	European	Bet v 1	Aero Plant	Betula Bet v 1	160	4006945	7
		white birch						
274	Betula pendula	European	Bet v 1	Aero Plant	Betula Bet v 1	160	4006953	7
		white birch						
275	Betula pendula	European	Bet v 1	Aero Plant	Betula Bet v 1	160	4006955	7
		white birch						

276	Betula pendula	European	Bet v 1	Aero Plant	Betula Bet v 1	160	4006957	7
		white birch						
277	Betula pendula	European	Bet v 1	Aero Plant	Betula Bet v 1	160	4006959	7
		white birch						
278	Betula pendula	European	Bet v 1	Aero Plant	Betula Bet v 1	160	4006961	7
		white birch						
279	Betula pendula	European	Bet v 1	Aero Plant	Betula Bet v 1	160	4006965	7
		white birch						
280	Betula pendula	European	Bet v 1	Aero Plant	Betula Bet v 1	160	4006967	7
		white birch						
281	Betula pendula	European	Bet v 1	Aero Plant	Betula Bet v 1	159	4376216	7
		white birch						
282	Betula pendula	European	Bet v 1	Aero Plant	Betula Bet v 1	159	4376219	7
		white birch						
283	Betula pendula	European	Bet v 1	Aero Plant	Betula Bet v 1	159	4376220	7
		white birch						
284	Betula pendula	European	Bet v 1	Aero Plant	Betula Bet v 1	159	4376221	7
		white birch						
285	Betula pendula	European	Bet v 1	Aero Plant	Betula Bet v 1	159	4376222	7
		white birch						
286	Betula pendula	European	Bet v 1 b1	Aero Plant	Betula Bet v 1	160	4590392	7
		white birch						
287	Betula pendula	European	Bet v 1 b2	Aero Plant	Betula Bet v 1	160	4590394	7
		white birch						
288	Betula pendula	European	Bet v 1 b3	Aero Plant	Betula Bet v 1	160	4590396	7
		white birch						
289	Betula pendula	European	Bet v 1.0701	Aero Plant	Betula Bet v 1	160	1168706	7
		white birch						
290	Betula pendula	European	Bet v 1	Aero Plant	Betula Bet v 1	159	11514622	7
		white birch						
291	Betula pendula	European	Bet v 1x	Aero Plant	Betula Bet v 1	21	30908931	7
		white birch						
292	Betula pendula	European	Bet v 1	Aero Plant	Betula Bet v 1	159	38492423	7
		white birch						
293	Betula pendula	European	Unassigned	Aero Plant	Betula Bet v 1	43	239734	7
		white birch						
294	Betula pendula	European	Unassigned	Aero Plant	Betula Bet v 1	120	4006963	7
		white birch						
295	Betula pendula	European	Unassigned	Aero Plant	Betula Bet v 1	120	4006947	7
		white birch						
296	Betula pendula	European	Bet v 1	Aero Plant	Betula Bet v 1	160	114922	8
		white birch						
297	Betula pendula	European	Bet v 1	Aero Plant	Betula Bet v 1	159	159162097	9
		white birch						
298	Betula platyphylla	Japanese	Unassigned	Aero Plant	Betula Bet v 1	160	12583681	7
		white birch						

299	Betula |platyphylla	Japanese |white birch	Unassigned	Aero Plant	Betula Bet v 1	160	12583683	7
300	Betula |platyphylla	Japanese |white birch	Unassigned	Aero Plant	Betula Bet v 1	160	12583685	7
301	Betula sp.	Birch	Unassigned	Aero Plant	Betula Bet v 1	51	298736	7
302	Betula pendula |	European |white birch	Unassigned	Aero Plant	Betula Bet v 1b	51	320546	7
303	Betula sp.	Birch	Unassigned	Aero Plant	Betula Bet v 1b	51	298737	7
304	Betula pendula |	European |white birch	Bet v 3	Aero Plant	Betula Bet v 3	205	1168696	7
305	Betula pendula |	European |white birch	Bet v 4	Aero Plant	Betula Bet v 4	85	14423850	7
306	Betula pendula |	European |white birch	Bet v |6.0102	Aero Plant	Betula Bet v 6	308	10764491	7
307	Betula pendula |	European |white birch	Bet v 7	Aero Plant	Betula Bet v 7	173	21886603	7
308	Blattella |germanica	German |cockroach	Bla g 1.02	Aero |Insect	Blattella Bla g 1	492	4240395	7
309	Blattella |germanica	German |cockroach	Bla g |1.0101	Aero |Insect	Blattella Bla g 1	412	4572592	7
310	Blattella |germanica	German |cockroach	Bla g 2	Aero |Insect	Blattella Bla g 2	352	1703445	7
311	Blattella |germanica	German |cockroach	Unassigned	Aero |Insect	Blattella Bla g 2	330	62738637	7
312	Blattella |germanica	German |cockroach	Unassigned	Aero |Insect	Blattella Bla g 2	352	145105726	9
313	Blattella |germanica	German |cockroach	Unassigned	Aero |Insect	Blattella Bla g 2	334	315113421	12
314	Blattella |germanica	German |cockroach	Bla g 4	Aero |Insect	Blattella Bla g 4	182	1166573	7
315	Blattella |germanica	German |cockroach	Unassigned	Aero |Insect	Blattella Bla g 4	182	144952778	9
316	Blattella |germanica	German |cockroach	Unassigned	Aero |Insect	Blattella Bla g 4	181	212675308	10
317	Blattella |germanica	German |cockroach	Unassigned	Aero |Insect	Blattella Bla g 4	191	194350815	11
318	Blattella |germanica	German |cockroach	Unassigned	Aero |Insect	Blattella Bla g 4	190	194350817	11
319	Blattella |germanica	German |cockroach	Unassigned	Aero |Insect	Blattella Bla g 5	204	6225491	7
320	Blattella |germanica	German |cockroach	Unassigned	Aero |Insect	Blattella Bla g 5	200	144952780	9
321	Blattella |germanica	German |cockroach	Unassigned	Unassigned	Blattella Bla g 6	151	82704032	8
322	Blattella	German	Unassigned	Unassigned	Blattella Bla g 6	151	82704034	8

	germanica	cockroach						
323	Blattella germanica	German cockroach	Unassigned	Unassigned	Blattella Bla g 6	154	82704036	8
324	Blattella germanica	German cockroach	Unassigned	Aero Insect	Blattella delta GST	216	161137518	11
325	Blattella germanica	German cockroach	Unassigned	Aero Insect	Blattella tropomyosin	284	8101069	7
326	Blattella germanica	German cockroach	Unassigned	Aero Insect	Blattella uncertain	20	544618	7
327	Blattella germanica	German cockroach	Unassigned	Aero Insect	Blattella uncertain	25	544619	7
328	Blomia tropicalis	Mite	Blo t 1	Aero Mite	Blomia Blo t 1.01	221	14276828	7
329	Blomia tropicalis	Mite	Unassigned	Aero Mite	Blomia Blo t 1.02	333	33667928	8
330	Blomia tropicalis	Mite	Unassigned	Aero Mite	Blomia Blo t 1.02	333	2	8
331	Blomia tropicalis	Mite	Unassigned	Aero Mite	Blomia Blo t 10	284	156938889	9
332	Blomia tropicalis	Mite	Blo t 11	Aero Mite	Blomia Blo t 11	875	21954740	7
333	Blomia tropicalis	Mite	Unassigned	Aero Mite	Blomia Blo t 13.01	130	37958153	8
334	Blomia tropicalis	Mite	Unassigned	Aero Mite	Blomia Blo t 13.01	130	14423698	9
335	Blomia tropicalis	Mite	Unassigned	Aero Mite	Blomia Blo t 21 tentative	129	111120432	8
336	Blomia tropicalis	Mite	Unassigned	Aero Mite	Blomia Blo t 21 tentative	129	111494253	8
337	Blomia tropicalis	Mite	Unassigned	Aero Mite	Blomia Blo t 21 tentative	129	111120424	8
338	Blomia tropicalis	Mite	Unassigned	Aero Mite	Blomia Blo t 21 tentative	129	111120428	8
339	Blomia tropicalis	Mite	Unassigned	Aero Mite	Blomia Blo t 21 tentative	129	111120420	8
340	Blomia tropicalis	Mite	Unassigned	Aero Mite	Blomia Blo t 3	266	25989482	7
341	Blomia tropicalis	Mite	Unassigned	Aero Mite	Blomia Blo t 3	266	33667930	8
342	Blomia tropicalis	Mite	Blo t 5	Aero Mite	Blomia Blo t 5	134	4204917	7
343	Blomia tropicalis	Mite	Unassigned	Aero Mite	Blomia Blo t 5	134	111120436	9
344	Blomia tropicalis	Mite	Unassigned	Aero Mite	Blomia Blo t 5	134	111120450	9
345	Blomia	Mite	Unassigned	Aero Mite	Blomia Blo t 5	119	160285626	9

	tropicalis							
346	Bombus pennsylvanicus	Bumblebee	Unassigned	Venom or Salivary	Bombus Bom p 1 phospholipase	136	47117013	12
347	Bombus pennsylvanicus	Bumblebee	Unassigned	Venom or Salivary	Bombus Bom p 4 protease	243	75009997	12
348	Bombus terrestris	Bumblebee	Unassigned	Venom or Salivary	Bombus Bom t 1	136	14423832	7
349	Bombus terrestris	Bumblebee	Unassigned	Venom or Salivary	Bombus Bom t 4 protease	20	313471465	12
350	Bombyx mori	Silkworm	Unassigned	Food insect	Bombyx arginine kinase	355	204324083	10
351	Bos taurus	Bovine	Unassigned	Food Animal	Bos Alpha-s1 casein	93	162650	7
352	Bos taurus	Bovine	Unassigned	Food Animal	Bos Alpha-s1 casein	214	162792	7
353	Bos taurus	Bovine	Unassigned	Food Animal	Bos Alpha-s1 casein	214	162794	7
354	Bos taurus	Bovine	Unassigned	Food Animal	Bos Alpha-s1 casein	76	162927	7
355	Bos taurus	Bovine	Unassigned	Food Animal	Bos Alpha-s1 casein	205	159793197	9
356	Bos taurus	Bovine	Unassigned	Food Animal	Bos Alpha-s1 casein	172	159793201	9
357	Bos taurus	Bovine	Unassigned	Food Animal	Bos Alpha-s1 casein	129	159793217	9
358	Bos taurus	Bovine	Unassigned	Food Animal	Bos Alpha-s2-like casein	222	162929	7
359	Bos taurus	Bovine	Unassigned	Food Animal	Bos Beta-casein	224	162797	7
360	Bos taurus	Bovine	Unassigned	Food Animal	Bos Beta-casein	224	162805	7
361	Bos taurus	Bovine	Unassigned	Food Animal	Bos Beta-casein	224	162931	7
362	Bos taurus	Bovine	Unassigned	Food Animal	Bos Beta-casein	224	459292	7
363	Bos taurus	Bovine	Unassigned	Aero Animal	Bos Bos d 2	172	2497701	9
364	Bos taurus	Bovine	Bos d 3	Aero Animal	Bos Bos d 3	101	2493414	7
365	Bos taurus	Bovine	Bos d 4	Food Animal	Bos Bos d 4	142	295774	7
366	Bos taurus	Bovine	Unassigned	Food Animal	Bos Bos d 4	142	125996	9
367	Bos taurus	Bovine	Bos d 5	Food Animal	Bos Bos d 5	178	520	7
368	Bos taurus	Bovine	Unassigned	Food	Bos Bos d 5	14	162750	7

				Animal				
369	Bos taurus	Bovine	Unassigned	Food Animal	Bos Bos d 5	178	125910	9
370	Bos taurus	Bovine	Unassigned	Food Animal	Bos Bos d 5	178	195957138	10
371	Bos taurus	Bovine	Unassigned	Food Animal	Bos Bos d 6	607	3336842	7
372	Bos taurus	Bovine	Unassigned	Food Animal	Bos Bos d 6	607	1351907	10
373	Bos taurus	Bovine	Unassigned	Vaccine	Bos collagen alpha2	1364	27806257	11
374	Bos taurus	Bovine	Unassigned	Food Animal	Bos Kappa-casein	190	162811	7
375	Bos taurus	Bovine	Unassigned	Food Animal	Bos lactotransferrin	708	30794292	8
376	Brassica napus	Rape	Bra n 1	Food Plant	Bra n 1	125	75107016	9
377	Brassica juncea	Mustard	Bra j 1	Food Plant	Brassica Bra j 1 2S albumin	129	32363444	9
378	Brassica oleracea	Cabbage	Unassigned	Food Plant	Brassica Bra o 3 LTP manual entry	20	1	8
379	Brassica rapa subsp. rapa	Turnip	Unassigned	Contact	Brassica Bra r 2	91	32363456	9
380	Brassica napus	Rape	Unassigned	Aero Plant	Brassica Calcim binding protein Group I	79	59800143	7
381	Brassica rapa subsp. rapa	Turnip	Unassigned	Aero Plant	Brassica Calcim binding protein Group I	79	59800144	7
382	Brassica napus	Rape	Unassigned	Food Plant	Brassica napus 2S albumin	109	26985163	7
383	Brassica napus	Rape	Unassigned	Aero Plant	Brassica Polcalcic Group II	83	2129801	7
384	Brassica napus	Rape	Unassigned	Aero Plant	Brassica Polcalcic Group II	83	2129802	7
385	Brassica napus	Rape	Unassigned	Aero Plant	Brassica Polcalcic Group II	83	59800145	7
386	Brassica rapa	Turnip	Unassigned	Aero Plant	Brassica Polcalcic Group II	80	2129805	7
387	Brassica rapa subsp. rapa	Turnip	Unassigned	Aero Plant	Brassica Polcalcic Group II	83	59800146	7
388	Candida albicans	Yeast	Cand a 3	Contact	Candida Cand a 3	236	37548637	7
389	Candida albicans	Yeast	Unassigned	Contact	Candida Enolase 1	440	232054	7
390	Canis familiaris	Dog	Can f 1	Aero Animal	Canis Can f 1	174	3121745	7
391	Canis familiaris	Dog	Can f 2	Aero Animal	Canis Can f 2	180	3121746	7

392	|Canis familiaris|Dog	|Can f 2	|Aero	|Canis Can f 2	|177	|29292272	|7
	|	|	|Animal	|	|	|	|
393	|Canis familiaris|Dog	|Can f 2	|Aero	|Canis Can f 2	|179	|29292274	|7
	|	|	|Animal	|	|	|	|
394	|Canis familiaris|Dog	|Can f 3	|Aero	|Canis Can f 3	|265	|633938	|7
	|	|	|Animal	|	|	|	|
395	|Canis familiaris|Dog	|Can f 3	|Aero	|Canis Can f 3	|585	|3319897	|7
	|	|	|Animal	|	|	|	|
396	|Canis familiaris|Dog	|Can f 3	|Aero	|Canis Can f 3	|608	|6687188	|7
	|	|	|Animal	|	|	|	|
397	|Canis familiaris|Dog	|Unassigned	|Aero	|Canis Can f	|174	|262232390	|12
	|	|	|Animal	|epithelial 18 kDa	|	|	|
398	|Capsicum annuum|Bell pepper	|Cap a 2	|Food Plant	|Capsicum Cap a 2	|131	|16555785	|7
399	|Carica papaya|Papaya	|Unassigned	|Food Plant	|Carica Car p 1	|345	|129614	|9
400	|Carpinus betulus|Hornbeam	|Car b 1	|Aero Plant	|Carpinus Car b 1	|159	|402745	|7
401	|Carpinus betulus|Hornbeam	|Car b 1	|Aero Plant	|Carpinus Car b 1	|160	|730048	|7
402	|Carpinus betulus|Hornbeam	|Car b 1	|Aero Plant	|Carpinus Car b 1	|160	|730049	|7
403	|Carpinus betulus|Hornbeam	|Car b	|Aero Plant	|Carpinus Car b 1	|160	|1545875	|7
	|	|1.0103	|	|	|	|	|
404	|Carpinus betulus|Hornbeam	|Car b	|Aero Plant	|Carpinus Car b 1	|160	|1545877	|7
	|	|1.0104	|	|	|	|	|
405	|Carpinus betulus|Hornbeam	|Car b	|Aero Plant	|Carpinus Car b 1	|160	|1545879	|7
	|	|1.0104	|	|	|	|	|
406	|Carpinus betulus|Hornbeam	|Car b	|Aero Plant	|Carpinus Car b 1	|160	|1545887	|7
	|	|1.0105	|	|	|	|	|
407	|Carpinus betulus|Hornbeam	|Car b 1	|Aero Plant	|Carpinus Car b 1	|160	|1545891	|7
408	|Carpinus betulus|Hornbeam	|Car b	|Aero Plant	|Carpinus Car b 1	|160	|1545893	|7
	|	|1.0108	|	|	|	|	|
409	|Carpinus betulus|Hornbeam	|Car b	|Aero Plant	|Carpinus Car b 1	|161	|1545895	|7
	|	|1.0301	|	|	|	|	|
410	|Carpinus betulus|Hornbeam	|Car b	|Aero Plant	|Carpinus Car b 1	|161	|1545897	|7
	|	|1.0302	|	|	|	|	|
411	|Carpinus betulus|Hornbeam	|Unassigned	|Aero Plant	|Carpinus Car b 1	|40	|239735	|7
412	|Carpinus betulus|Hornbeam	|Unassigned	|Aero Plant	|Carpinus Car b 1	|160	|167472845	|10
413	|Carpinus betulus|Hornbeam	|Unassigned	|Aero Plant	|Carpinus Car b 1	|160	|167472837	|10
414	|Carpinus betulus|Hornbeam	|Unassigned	|Aero Plant	|Carpinus Car b 1	|160	|167472843	|10
415	|Carpinus betulus|Hornbeam	|Unassigned	|Aero Plant	|Carpinus Car b 1	|160	|167472841	|10
416	|Carpinus betulus|Hornbeam	|Unassigned	|Aero Plant	|Carpinus Car b 1	|160	|167472839	|10
417	|Carpinus betulus|Hornbeam	|Unassigned	|Aero Plant	|Carpinus Car b 1	|80	|1008578	|12
418	|Carpinus betulus|Hornbeam	|Unassigned	|Aero Plant	|Carpinus Car b 1	|80	|1008579	|12
419	|Carpinus betulus|Hornbeam	|Unassigned	|Aero Plant	|Carpinus Car b 1	|80	|1008580	|12

420	|Castanea sativa|European|Cas s 1|Aero Plant|Castanea Cas s 1|160|16555781|7|
	|chestnut|
421	|Castanea sativa|European|Unassigned|Aero Plant|Castanea Cas s 1|159|212291466|10|
	|chestnut|
422	|Castanea sativa|European|Unassigned|Aero Plant|Castanea Cas s 1|159|212291464|10|
	|chestnut|
423	|Castanea sativa|European|Unassigned|Aero Plant|Castanea Cas s 1|159|212291468|10|
	|chestnut|
424	|Castanea sativa|European|Unassigned|Aero Plant|Castanea Cas s 5|298|307159110|12|
	|chestnut|
425	|Castanea sativa|European|Cas s 5|Food Plant|Castanea Cas s 5|316|1359600|7|
	|chestnut|
426	|Cavia porcellus|Domestic|Cav p 1|Aero|Cavia Cav p 1|15|32469617|7|
	|guinea pig|Animal|
427	|Cavia porcellus|Domestic|Unassigned|Aero|Cavia Cav p 2|170|325910590|12|
	|guinea pig|Animal|
428	|Cavia porcellus|Domestic|Unassigned|Aero|Cavia Cav p 3|170|325910592|12|
	|guinea pig|Animal|lipocalin|
429	|Chamaecyparis|Japanese|Unassigned|Aero Plant|Chamaecyparis Cha o|375|9087163|9|
	|lobtusa|cypress|1|
430	|Chamaecyparis|Japanese|Unassigned|Aero Plant|Chamaecyparis Cha o|514|47606004|7|
	|lobtusa|cypress|2|
431	|Chamaecyparis|Japanese|Unassigned|Aero Plant|Chamaecyparis Cha o|419|114841683|8|
	|lobtusa|cypress|2|
432	|Charybdis|Crab|Cha f 1|Food|Charybdis Cha f 1|264|14285800|9|
	|feriatus|Animal|
433	|Chenopodium|Pigweed|Unassigned|Aero Plant|Chenopodium Che a 1|168|47605504|9|
	|album|
434	|Chenopodium|Pigweed|Che a 2|Aero Plant|Chenopodium Che a 2|131|29465666|7|
	|album|
435	|Chenopodium|Pigweed|Unassigned|Aero Plant|Chenopodium Che a 2|133|238886048|11|
	|album|
436	|Chenopodium|Pigweed|Che a 3|Aero Plant|Chenopodium Che a 3|86|29465668|7|
	|album|
437	|Chionoecetes|Snow Crab|Unassigned|Food|Chionoecetes|284|308191588|12|
	|lopilio|Animal|tropomyosin|
438	|Chironomus|Midge|Unassigned|Aero|Chironomus Chi k 10|285|42559556|9|
	|kiliensis|Insect|
439	|Chironomus|Midge|Chi t 1.01|Aero|Chironomus Chi t 1|151|121219|7|
	|thummi thummi|Insect|
440	|Chironomus|Midge|Chi t 1.02|Aero|Chironomus Chi t 1|151|121227|7|
	|thummi thummi|Insect|
441	|Chironomus|Midge|Chi t 2|Aero|Chironomus Chi t 2|158|2506460|7|
	|thummi thummi|Insect|
442	|Chironomus|Midge|Chi t 3|Aero|Chironomus Chi t 3|160|1707908|7|
	|thummi thummi|Insect|

443	Chironomus |thummi thummi	Midge	Chi t 4	Aero |Insect	Chironomus Chi t 4	151	121256	7	
444	Chironomus |thummi thummi	Midge	Chi t 5	Aero |Insect	Chironomus Chi t 5	162	2506461	7	
445	Chironomus |thummi thummi	Midge	Chi t 7	Aero |Insect	Chironomus Chi t 7	161	56405052	7	
446	Chironomus |thummi thummi	Midge	Chi t 7	Aero |Insect	Chironomus Chi t 7	161	121244	7	
447	Chironomus |thummi thummi	Midge	Chi t 7	Aero |Insect	Chironomus Chi t 7	161	56405054	7	
448	Chironomus |thummi thummi	Midge	Chi t 7	Aero |Insect	Chironomus Chi t 7	161	121248	7	
449	Chironomus |thummi thummi	Midge	Chi t 7	Aero |Insect	Chironomus Chi t 7	162	121249	7	
450	Chironomus |thummi thummi	Midge	Chi t 8	Aero |Insect	Chironomus Chi t 8	151	121237	7	
451	Chironomus |thummi thummi	Midge	Chi t 9	Aero |Insect	Chironomus Chi t 9	151	121259	7	
452	Citrus sinensis	Navel orange	Unassigned	Food Plant	Citrus Cit s 1	25	52782810	7	
453	Citrus sinensis	Navel orange	Unassigned	Food Plant	Citrus Cit s 2	131	261260074	11	
454	Citrus limon	Lemon	Unassigned	Food Plant	Citrus LTP Cit s 3	20	52783176	7	
455	Citrus sinensis	Navel orange	Unassigned	Food Plant	Citrus LTP Cit s 3	20	52783177	7	
456	Citrus sinensis	Navel orange	Cit s 3	Food Plant	Citrus LTP Cit s 3	91	50199132	7	
457	Davidiella |tassiana	Fungus	Unassigned	Aero Fungi	Cladosporium / |Davidiella Cla h 10|	496	108935817	8	
458	Davidiella |tassiana	Fungus	Cla h 5	Aero Fungi	Cladosporium / |Davidiella Cla h 5|	111	1173074	7	
459	Davidiella |tassiana	Fungus	Cla h 5	Aero Fungi	Cladosporium / |Davidiella Cla h 5|	111	21542440	7	
460	Davidiella |tassiana	Fungus	Cla h 6	Aero Fungi	Cladosporium / |Davidiella Cla h 6|	440	467660	7	
461	Davidiella |tassiana	Fungus	Cla h 6	Aero Fungi	Cladosporium / |Davidiella Cla h 6|	440	6015094	7	
462	Davidiella |tassiana	Fungus	Cla h 7	Aero Fungi	Cladosporium / |Davidiella Cla h 7|	204	1168970	7	
463	Davidiella |tassiana	Fungus	Unassigned	Aero Fungi	Cladosporium / |Davidiella Cla h 8|	267	85701146	7	
464	Davidiella |tassiana	Fungus	Unassigned	Aero Fungi	Cladosporium / |Davidiella Cla h 9| |vacuolar serine	518	60116876	10	
465	Davidiella |tassiana	Fungus	Unassigned	Aero Fungi	Cladosporium / |Davidiella Heat |shock 70 kDa protei	643	729764	7	
466	Davidiella |tassiana	Fungus	Unassigned	Aero Fungi	Cladosporium / |Davidiella |Hydrophobin	105	22796153	7	

467	Davidiella tassiana	Fungus	Unassigned	Aero Fungi	Cladosporium / Davidiella Putative nuclear transpo	125	21748151	7
468	Cladosporium cladosporioides		Unassigned	Aero Fungi	Cladosporium Cla c 9 Davidiella	388	148361511	11
469	Cochliobolus lunatus		Unassigned	Aero Fungi	Cochliobolus (Curvularia) Cur l 3 * ver 10	108	20137645	8
470	Cochliobolus lunatus		Cur l 2.01	Aero Fungi	Cochliobolus (Curvularia) enolase Cur l 2.01	440	14585753	8
471	Coprinus comatus	Shaggy mane	Cop c 1	Food Fungi	Coprinus Cop c 1	81	4538529	7
472	Corylus avellana hazelnut	European	Cor a 1.0103	Aero Plant	Corylus Cor a 1	160	22684	7
473	Corylus avellana hazelnut	European	Cor a 1.0104	Aero Plant	Corylus Cor a 1	160	22686	7
474	Corylus avellana hazelnut	European	Cor a 1.0102	Aero Plant	Corylus Cor a 1	160	22690	7
475	Corylus avellana hazelnut	European	Cor a 1.0201	Aero Plant	Corylus Cor a 1	160	1321731	7
476	Corylus avellana hazelnut	European	Cor a 1.0301	Aero Plant	Corylus Cor a 1	160	1321733	7
477	Corylus avellana hazelnut	European	Cor a I	Aero Plant	Corylus Cor a 1	160	584968	7
478	Corylus avellana hazelnut	European	Cor a 1.0401	Food Plant	Corylus Cor a 1	161	5726304	7
479	Corylus avellana hazelnut	European	Cor a 1.0402	Food Plant	Corylus Cor a 1	161	11762102	7
480	Corylus avellana hazelnut	European	Cor a 1.0403	Food Plant	Corylus Cor a 1	161	11762104	7
481	Corylus avellana hazelnut	European	Cor a 1.0404	Food Plant	Corylus Cor a 1	161	11762106	7
482	Corylus avellana hazelnut	European	Cor a 10	Aero Plant	Corylus Cor a 10	668	10944737	7
483	Corylus avellana hazelnut	European	Cor a 11	Food Plant	Corylus Cor a 11	448	19338630	7
484	Corylus avellana hazelnut	European	Unassigned	Food Plant	Corylus Cor a 14 2S albumin	147	226437844	11
485	Corylus avellana hazelnut	European	Cor a 2	Aero Plant	Corylus Cor a 2	131	12659206	7
486	Corylus avellana hazelnut	European	Cor a 2	Aero Plant	Corylus Cor a 2	131	12659208	7
487	Corylus avellana hazelnut	European	Cor a 8	Food Plant	Corylus Cor a 8	115	13507262	7
488	Corylus avellana hazelnut	European	Cor a 9	Food Plant	Corylus Cor a 9	515	18479082	7

489	Corylus avellana	European hazelnut	Unassigned	Food Plant	Corylus Oleosin	140	29170509	7
490	Crangon crangon		Unassigned	Food Animal	Crangon Cra c 1 tropomyosin	284	238477263	12
491	Crangon crangon		Unassigned	Food Animal	Crangon Cra c 2 arginine kinase	356	238477265	12
492	Crangon crangon		Unassigned	Food Animal	Crangon Cra c 4 sarcoplasmic calcium-binding prote	193	238477327	12
493	Crangon crangon		Unassigned	Food Animal	Crangon Cra c 5 myosin light chain	153	238477331	12
494	Crangon crangon		Unassigned	Food Animal	Crangon Cra c 6 troponin C	150	238477333	12
495	Crangon crangon		Unassigned	Food Animal	Crangon Cra c 8 triosephosphate isomerase	249	238477329	12
496	Crassostrea gigas	American oyster	Unassigned	Food Animal	Crassostrea Tropomyosin	233	15419048	7
497	Crassostrea gigas	American oyster	Unassigned	Food Animal	Crassostrea Tropomyosin	284	219806594	10
498	Crassostrea virginica	Eastern oyster	Unassigned	Food Animal	Crassostrea Tropomyosin	160	3668408	7
499	Crocus sativus	Saffron crocus	Unassigned	Aero Plant	Crocus profilin Cro s 2	131	58700651	7
500	Cryptomeria japonica	Japanese cedar	Unassigned	Aero Plant	Cryptomeria class IV chitinase	281	56550550	7
501	Cryptomeria japonica	Japanese cedar	Cry j 1	Aero Plant	Cryptomeria Cry j 1	374	1173367	7
502	Cryptomeria japonica	Japanese cedar	Cry j 1	Aero Plant	Cryptomeria Cry j 1	374	19570315	7
503	Cryptomeria japonica	Japanese cedar	Unassigned	Aero Plant	Cryptomeria Cry j 1	374	493634	8
504	Cryptomeria japonica	Japanese cedar	Cry j 2	Aero Plant	Cryptomeria Cry j 2	514	1171004	7
505	Cryptomeria japonica	Japanese cedar	Cry j 2	Aero Plant	Cryptomeria Cry j 2	514	24898904	7
506	Cryptomeria japonica	Japanese cedar	Cry j 2	Aero Plant	Cryptomeria Cry j 2	514	24898906	7
507	Cryptomeria japonica	Japanese cedar	Cry j 2	Aero Plant	Cryptomeria Cry j 2	514	24898908	7
508	Cryptomeria japonica	Japanese cedar	Unassigned	Aero Plant	Cryptomeria Cry j 2	514	114841607	8
509	Cryptomeria japonica	Japanese cedar	Unassigned	Aero Plant	Cryptomeria Cry j 2	514	114841617	8
510	Cryptomeria japonica	Japanese cedar	Unassigned	Aero Plant	Cryptomeria Cry j 2	514	114841629	8

511	Cryptomeria japonica	Japanese cedar	Unassigned	Aero Plant	Cryptomeria Cry j 2	514	114841635	8
512	Cryptomeria japonica	Japanese cedar	Unassigned	Aero Plant	Cryptomeria Cry j 2	514	114841641	8
513	Cryptomeria japonica	Japanese cedar	Unassigned	Aero Plant	Cryptomeria Cry j 2	514	114841653	8
514	Cryptomeria japonica	Japanese cedar	Unassigned	Aero Plant	Cryptomeria Cry j 2	514	114841657	8
515	Cryptomeria japonica	Japanese cedar	Unassigned	Aero Plant	Cryptomeria Cry j 2	514	114841663	8
516	Cryptomeria japonica	Japanese cedar	Unassigned	Aero Plant	Cryptomeria Cry j 2	514	114841665	8
517	Cryptomeria japonica	Japanese cedar	Unassigned	Aero Plant	Cryptomeria Cry j 2	514	114841671	8
518	Cryptomeria japonica	Japanese cedar	Unassigned	Aero Plant	Cryptomeria Cry j 2	65	123299282	9
519	Cryptomeria japonica	Japanese cedar	Unassigned	Aero Plant	Cryptomeria Isoflavone reductase-like protein	306	19847822	7
520	Cryptomeria japonica	Japanese cedar	Unassigned	Aero Plant	Cryptomeria pollen allergen CJP-8	165	291621332	12
521	Cryptomeria japonica	Japanese cedar	Unassigned	Aero Plant	Cryptomeria pollen allergen CPA63	472	293329689	12
522	Cryptomeria japonica	Japanese cedar	Unassigned	Aero Plant	Cryptomeria thaumatin like Cry j 3.8	225	139002766	8
523	Cucumis melo	Muskmelon	Unassigned	Food Plant	Cucumis Cuc m 1	731	71153243	9
524	Cucumis melo	Muskmelon	Cuc m 2	Food Plant	Cucumis Cuc m 2	131	31559374	7
525	Cucumis melo	Muskmelon	Cuc m 2	Food Plant	Cucumis Cuc m 2	131	58263793	7
526	Cucumis melo var. reticulatus	Netted muskmelon	Cuc m 2	Food Plant	Cucumis Cuc m 2	131	57021110	7
527	Cucumis melo	Muskmelon	Cuc m 3	Food Plant	Cucumis Cuc m 3	21	46396596	7
528	Cucumis melo	Muskmelon	Cuc m 3	Food Plant	Cucumis Cuc m 3	10	46396597	7
529	Cucumis melo	Muskmelon	Cuc m 3	Food Plant	Cucumis Cuc m 3	10	46396598	7
530	Cucumis melo var. inodorus	Muskmelon	Unassigned	Food Plant	Cucumis Cuc m 3	151	171464770	9
531	Cupressus arizonica	Arizona Cypress	Cup a 1	Aero Plant	Cupressus Cup a 1	367	19069497	7
532	Cupressus arizonica	Arizona Cypress	Unassigned	Aero Plant	Cupressus Cup a 1	347	118197955	8
533	Cupressus arizonica	Arizona Cypress	Unassigned	Aero Plant	Cupressus Cup a 1	346	9087167	9
534	Cupressus sempervirens	Mediterranean Cypress	Cup s 1.0101	Aero Plant	Cupressus Cup a 1	367	8101711	7

535	Cupressus sempervirens	Mediterranean Cypress	Cup s 1.0102	Aero Plant	Cupressus Cup a 1	367	8101713	7
536	Cupressus sempervirens	Mediterranean Cypress	Cup s 1.0103	Aero Plant	Cupressus Cup a 1	367	8101715	7
537	Cupressus sempervirens	Mediterranean Cypress	Cup s 1.0104	Aero Plant	Cupressus Cup a 1	367	8101717	7
538	Cupressus sempervirens	Mediterranean Cypress	Cup s 1.0105	Aero Plant	Cupressus Cup a 1	367	8101719	7
539	Cupressus arizonica	Arizona Cypress	Unassigned	Aero Plant	Cupressus Cup s 3	199	9929163	7
540	Cupressus sempervirens	Mediterranean Cypress	Unassigned	Aero Plant	Cupressus Cup s 3	225	38456230	7
541	Cupressus sempervirens	Mediterranean Cypress	Unassigned	Aero Plant	Cupressus Cup s 3	225	38456228	7
542	Cupressus arizonica	Arizona Cypress	Unassigned	Aero Plant	Cupressus putative allergen Cup a 4	165	261865475	11
543	Cynodon dactylon	Bermuda grass	Cyn d 1	Aero Plant	Cynodon Cyn d 1	25	451274	7
544	Cynodon dactylon	Bermuda grass	Cyn d 1	Aero Plant	Cynodon Cyn d 1	38	451275	7
545	Cynodon dactylon	Bermuda grass	Cyn d 1	Aero Plant	Cynodon Cyn d 1	34	691726	7
546	Cynodon dactylon	Bermuda grass	Cyn d 1.0204	Aero Plant	Cynodon Cyn d 1	244	10314021	7
547	Cynodon dactylon	Bermuda grass	Cyn d 1	Aero Plant	Cynodon Cyn d 1	246	14423757	7
548	Cynodon dactylon	Bermuda grass	Cyn d 1.0201	Aero Plant	Cynodon Cyn d 1	244	15384338	7
549	Cynodon dactylon	Bermuda grass	Cyn d 1.0202	Aero Plant	Cynodon Cyn d 1	262	16076693	7
550	Cynodon dactylon	Bermuda grass	Cyn d 1	Aero Plant	Cynodon Cyn d 1	262	16076695	7
551	Cynodon dactylon	Bermuda grass	Cyn d 1.0203	Aero Plant	Cynodon Cyn d 1	262	16076697	7
552	Cynodon dactylon	Bermuda grass	Cyn d 12	Aero Plant	Cynodon Cyn d 12	131	2154730	7
553	Cynodon dactylon	Bermuda grass	Unassigned	Aero Plant	Cynodon Cyn d 7	71	1247373	7
554	Cynodon dactylon	Bermuda grass	Unassigned	Aero Plant	Cynodon Cyn d 7	73	1247375	7
555	Cynodon dactylon	Bermuda grass	Cyn d 7	Aero Plant	Cynodon Cyn d 7	82	1871507	7
556	Cyprinus carpio	Carp	Unassigned	Food Animal	Cyprinus Parvalbumin	109	17977825	7
557	Cyprinus carpio	Carp	Unassigned	Food Animal	Cyprinus Parvalbumin	109	17977827	7
558	Dactylis glomerata	Orchard grass	Dac g 1	Aero Plant	Dactylis Dac g 1	264	18093991	7
559	Dactylis glomerata	Orchard grass	Unassigned	Aero Plant	Dactylis Dac g 1	240	33149333	7
560	Dactylis glomerata	Orchard grass	Dac g 2	Aero Plant	Dactylis Dac g 2	196	1093120	7

561	Dactylis glomerata	Orchard grass	Dac g 2	Aero Plant	Dactylis Dac g 2	122	4007040	7
562	Dactylis glomerata	Orchard grass	Unassigned	Aero Plant	Dactylis Dac g 3	96	14423759	8
563	Dactylis glomerata	Orchard grass	Unassigned	Aero Plant	Dactylis Dac g 4	12	32363464	7
564	Dactylis glomerata	Orchard grass	Unassigned	Aero Plant	Dactylis Dac g 4	11	32363465	7
565	Dactylis glomerata	Orchard grass	Unassigned	Aero Plant	Dactylis Dac g 4	17	32363466	7
566	Dactylis glomerata	Orchard grass	Unassigned	Aero Plant	Dactylis Dac g 4	15	32363467	7
567	Dactylis glomerata	Orchard grass	Dac g 5	Aero Plant	Dactylis Dac g 5	290	14423124	7
568	Dactylis glomerata	Orchard grass	Dac g 5	Aero Plant	Dactylis Dac g 5	265	18093971	7
569	Daucus carota	Carrot	Dau c 1.0101	Food Plant	Daucus Dau c 1	168	1335877	7
570	Daucus carota	Carrot	Dau c 1.0102	Food Plant	Daucus Dau c 1	154	1663522	7
571	Daucus carota	Carrot	Dau c 1.0103	Food Plant	Daucus Dau c 1	154	2154732	7
572	Daucus carota	Carrot	Dau c 1.0104	Food Plant	Daucus Dau c 1	154	2154734	7
573	Daucus carota	Carrot	Dau c 1.0201	Food Plant	Daucus Dau c 1	154	18652047	7
574	Daucus carota	Carrot	Unassigned	Food Plant	Daucus Dau c 1	154	19912791	7
575	Daucus carota	Carrot	Dau c 1.0105	Food Plant	Daucus Dau c 1	154	8928058	9
576	Daucus carota	Carrot	Dau c 1.0301	Food Plant	Daucus Dau c 1	154	302379147	12
577	Daucus carota	Carrot	Unassigned	Food Plant	Daucus Dau c 1	154	302379149	12
578	Daucus carota	Carrot	Unassigned	Food Plant	Daucus Dau c 1	154	302379151	12
579	Daucus carota	Carrot	Unassigned	Food Plant	Daucus Dau c 1	154	302379153	12
580	Daucus carota	Carrot	Unassigned	Food Plant	Daucus Dau c 1	154	302379155	12
581	Daucus carota	Carrot	Unassigned	Food Plant	Daucus Dau c 1	154	302379157	12
582	Daucus carota	Carrot	Unassigned	Food Plant	Daucus Dau c 1	154	302379159	12
583	Daucus carota	Carrot	Unassigned	Food Plant	Daucus Dau c 4	134	47606043	10
584	Dermatophagoides farinae	House dust mite	Unassigned	Aero Mite	Dermatophagoides Der f 13	131	99031759	7
585	Dermatophagoides farinae	House dust mite	Der f 16	Aero Mite	Dermatophagoides Der f 16	480	21591547	7
586	Dermatophagoides farinae	House dust mite	Der f 1	Aero Mite	Dermatophagoides Der p 1 Der f 1	321	730035	7

587	Dermatophagoides |farinae	House dust |mite	Der f 1	Aero Mite	Dermatophagoides |Der p 1 Der f 1	321	27530349	7
588	Dermatophagoides |farinae	House dust |mite	Unassigned	Aero Mite	Dermatophagoides |Der p 1 Der f 1	276	76097507	7
589	Dermatophagoides |farinae	House dust |mite	Unassigned	Aero Mite	Dermatophagoides |Der p 1 Der f 1	321	156106765	9
590	Dermatophagoides |farinae	House dust |mite	Unassigned	Aero Mite	Dermatophagoides |Der p 1 Der f 1	263	37958161	12
591	Dermatophagoides |microceras	House dust |mite	Der m 1	Aero Mite	Dermatophagoides |Der p 1 Der f 1	30	127205	7
592	Dermatophagoides |pteronysinus	House dust |mite	Der p 1	Aero Mite	Dermatophagoides |Der p 1 Der f 1	320	730036	7
593	Dermatophagoides |pteronysinus	House dust |mite	Der p 1	Aero Mite	Dermatophagoides |Der p 1 Der f 1	222	21725560	7
594	Dermatophagoides |pteronysinus	House dust |mite	Der p 1	Aero Mite	Dermatophagoides |Der p 1 Der f 1	222	21725562	7
595	Dermatophagoides |pteronysinus	House dust |mite	Der p 1	Aero Mite	Dermatophagoides |Der p 1 Der f 1	222	21725564	7
596	Dermatophagoides |pteronysinus	House dust |mite	Der p 1	Aero Mite	Dermatophagoides |Der p 1 Der f 1	222	21725566	7
597	Dermatophagoides |pteronysinus	House dust |mite	Der p 1	Aero Mite	Dermatophagoides |Der p 1 Der f 1	222	21725568	7
598	Dermatophagoides |pteronysinus	House dust |mite	Der p 1	Aero Mite	Dermatophagoides |Der p 1 Der f 1	222	21725570	7
599	Dermatophagoides |pteronysinus	House dust |mite	Der p 1	Aero Mite	Dermatophagoides |Der p 1 Der f 1	222	21725572	7
600	Dermatophagoides |pteronysinus	House dust |mite	Der p 1	Aero Mite	Dermatophagoides |Der p 1 Der f 1	222	21725574	7
601	Dermatophagoides |pteronysinus	House dust |mite	Der p 1	Aero Mite	Dermatophagoides |Der p 1 Der f 1	222	21725576	7
602	Dermatophagoides |pteronysinus	House dust |mite	Der p 1	Aero Mite	Dermatophagoides |Der p 1 Der f 1	222	21725578	7
603	Dermatophagoides |pteronysinus	House dust |mite	Der p 1	Aero Mite	Dermatophagoides |Der p 1 Der f 1	222	21725580	7
604	Dermatophagoides |pteronysinus	House dust |mite	Unassigned	Aero Mite	Dermatophagoides |Der p 1 Der f 1	216	61608445	7
605	Dermatophagoides |pteronysinus	House dust |mite	Unassigned	Aero Mite	Dermatophagoides |Der p 1 Der f 1	222	83754033	7
606	Dermatophagoides |pteronysinus	House dust |mite	Unassigned	Aero Mite	Dermatophagoides |Der p 1 Der f 1	211	1460058	8
607	Dermatophagoides |pteronysinus	House dust |mite	Unassigned	Aero Mite	Dermatophagoides |Der p 1 Der f 1	223	157696052	9
608	Dermatophagoides |pteronysinus	House dust |mite	Unassigned	Aero Mite	Dermatophagoides |Der p 1 Der f 1	222	223365887	10
609	Dermatophagoides |pteronysinus	House dust |mite	Unassigned	Aero Mite	Dermatophagoides |Der p 1 Der f 1	320	195933901	10

610	Dermatophagoides | pteronyssinus	House dust | mite	Unassigned	Aero Mite	Dermatophagoides | Der p 1 Der f 1	302	256095986	11
611	Dermatophagoides | pteronyssinus	House dust | mite	Unassigned	Aero Mite	Dermatophagoides | Der p 1 Der f 1	96	387592	11
612	Dermatophagoides | farinae	House dust | mite	Unassigned	Aero Mite	Dermatophagoides | Der p 10 / Der f 10	284	42559584	9
613	Dermatophagoides | pteronyssinus	House dust | mite	Der p 10	Aero Mite	Dermatophagoides | Der p 10 / Der f 10	284	2353266	17
614	Dermatophagoides | pteronyssinus	House dust | mite	Der p 10	Aero Mite	Dermatophagoides | Der p 10 / Der f 10	284	2440053	17
615	Dermatophagoides | pteronyssinus	House dust | mite	Unassigned	Aero Mite	Dermatophagoides | Der p 10 / Der f 10	281	80553470	17
616	Dermatophagoides | pteronyssinus	House dust | mite	Unassigned	Aero Mite	Dermatophagoides | Der p 10 / Der f 10	284	208970286	10
617	Dermatophagoides | farinae	House dust | mite	Unassigned	Aero Mite	Dermatophagoides | Der p 11 / Der f 11	692	42559514	9
618	Dermatophagoides | pteronyssinus	House dust | mite	Der p 11	Aero Mite	Dermatophagoides | Der p 11 / Der f 11	875	37778944	17
619	Dermatophagoides | pteronyssinus	House dust | mite	Unassigned	Aero Mite	Dermatophagoides | Der p 13	131	302035350	12
620	Dermatophagoides | farinae	House dust | mite	Unassigned	Aero Mite	Dermatophagoides | Der p 14 / Der f 14	341	729979	17
621	Dermatophagoides | farinae	House dust | mite	Der f 14	Aero Mite	Dermatophagoides | Der p 14 / Der f 14	349	1545803	17
622	Dermatophagoides | pteronyssinus	House dust | mite	Der p 14	Aero Mite	Dermatophagoides | Der p 14 / Der f 14	1662	20385544	17
623	Dermatophagoides | farinae	House dust | mite	Der f 2	Aero Mite	Dermatophagoides | Der p 2 / Der f 2	138	217308	17
624	Dermatophagoides | farinae	House dust | mite	Der f 2	Aero Mite	Dermatophagoides | Der p 2 / Der f 2	142	546852	17
625	Dermatophagoides | farinae	House dust | mite	Der f 2	Aero Mite	Dermatophagoides | Der p 2 / Der f 2	129	17978844	17
626	Dermatophagoides | farinae	House dust | mite	Unassigned	Aero Mite	Dermatophagoides | Der p 2 / Der f 2	146	55859470	17
627	Dermatophagoides | farinae	House dust | mite	Unassigned	Aero Mite	Dermatophagoides | Der p 2 / Der f 2	146	55859468	17
628	Dermatophagoides | farinae	House dust | mite	Unassigned	Aero Mite	Dermatophagoides | Der p 2 / Der f 2	146	55859466	17
629	Dermatophagoides | farinae	House dust | mite	Unassigned	Aero Mite	Dermatophagoides | Der p 2 / Der f 2	129	76097511	17
630	Dermatophagoides | farinae	House dust | mite	Unassigned	Aero Mite	Dermatophagoides | Der p 2 / Der f 2	175	156480837	9
631	Dermatophagoides | farinae	House dust | mite	Unassigned	Aero Mite	Dermatophagoides | Der p 2 / Der f 2	146	218203834	10
632	Dermatophagoides | farinae	House dust | mite	Unassigned	Aero Mite	Dermatophagoides | Der p 2 / Der f 2	146	256631558	11

633	Dermatophagoides |farinae	House dust |mite	Unassigned	Aero Mite	Dermatophagoides |Der p 2 / Der f 2	140	37958157	12
634	Dermatophagoides |pteronysinus	House dust |mite	Der p 2	Aero Mite	Dermatophagoides |Der p 2 / Der f 2	146	1352237	17
635	Dermatophagoides |pteronysinus	House dust |mite	Der p 2	Aero Mite	Dermatophagoides |Der p 2 / Der f 2	129	21465915	17
636	Dermatophagoides |pteronysinus	House dust |mite	Der p 2	Aero Mite	Dermatophagoides |Der p 2 / Der f 2	129	21725582	17
637	Dermatophagoides |pteronysinus	House dust |mite	Der p 2	Aero Mite	Dermatophagoides |Der p 2 / Der f 2	129	21725584	17
638	Dermatophagoides |pteronysinus	House dust |mite	Der p 2	Aero Mite	Dermatophagoides |Der p 2 / Der f 2	129	21725586	17
639	Dermatophagoides |pteronysinus	House dust |mite	Der p 2	Aero Mite	Dermatophagoides |Der p 2 / Der f 2	129	21725588	17
640	Dermatophagoides |pteronysinus	House dust |mite	Der p 2	Aero Mite	Dermatophagoides |Der p 2 / Der f 2	129	21725590	17
641	Dermatophagoides |pteronysinus	House dust |mite	Der p 2	Aero Mite	Dermatophagoides |Der p 2 / Der f 2	129	21725592	17
642	Dermatophagoides |pteronysinus	House dust |mite	Der p 2	Aero Mite	Dermatophagoides |Der p 2 / Der f 2	129	21725594	17
643	Dermatophagoides |pteronysinus	House dust |mite	Der p 2	Aero Mite	Dermatophagoides |Der p 2 / Der f 2	129	21725596	17
644	Dermatophagoides |pteronysinus	House dust |mite	Der p 2	Aero Mite	Dermatophagoides |Der p 2 / Der f 2	129	21725600	17
645	Dermatophagoides |pteronysinus	House dust |mite	Der p 2	Aero Mite	Dermatophagoides |Der p 2 / Der f 2	129	21725602	17
646	Dermatophagoides |pteronysinus	House dust |mite	Der p 2	Aero Mite	Dermatophagoides |Der p 2 / Der f 2	129	21725604	17
647	Dermatophagoides |pteronysinus	House dust |mite	Unassigned	Aero Mite	Dermatophagoides |Der p 2 / Der f 2	129	76097509	17
648	Dermatophagoides |pteronysinus	House dust |mite	Unassigned	Aero Mite	Dermatophagoides |Der p 2 / Der f 2	146	99644635	17
649	Dermatophagoides |pteronysinus	House dust |mite	Unassigned	Aero Mite	Dermatophagoides |Der p 2 / Der f 2	130	110560872	19
650	Dermatophagoides |pteronysinus	House dust |mite	Unassigned	Aero Mite	Dermatophagoides |Der p 2 / Der f 2	129	157829757	19
651	Dermatophagoides |pteronysinus	House dust |mite	Unassigned	Aero Mite	Dermatophagoides |Der p 2 / Der f 2	145	164415595	19
652	Dermatophagoides |pteronysinus	House dust |mite	Unassigned	Aero Mite	Dermatophagoides |Der p 2 / Der f 2	129	256095984	11
653	Dermatophagoides |siboney	House dust |mite	Unassigned	Aero Mite	Dermatophagoides |Der p 2 / Der f 2	146	86450747	17
654	Dermatophagoides |pteronysinus	House dust |mite	Unassigned	Aero Mite	Dermatophagoides |Der p 21	140	85687540	17
655	Dermatophagoides |farinae	House dust |mite	Der f 3	Aero Mite	Dermatophagoides |Der p 3 / Der f 3	232	1314736	17

656	Dermatophagoides |farinae	House dust |mite	Der f 3	Aero Mite	Dermatophagoides |Der p 3 / Der f 3	259	2507248	7
657	Dermatophagoides |farinae	House dust |mite	Unassigned	Aero Mite	Dermatophagoides |Der p 3 / Der f 3	259	163638970	9
658	Dermatophagoides |farinae	House dust |mite	Unassigned	Aero Mite	Dermatophagoides |Der p 3 / Der f 3	259	218203816	10
659	Dermatophagoides |farinae	House dust |mite	Unassigned	Aero Mite	Dermatophagoides |Der p 3 / Der f 3	259	218203818	10
660	Dermatophagoides |pteronysinus	House dust |mite	Der p 3	Aero Mite	Dermatophagoides |Der p 3 / Der f 3	261	511476	7
661	Dermatophagoides |pteronysinus	House dust |mite	Der p 4	Aero Mite	Dermatophagoides |Der p 4	496	5059162	7
662	Dermatophagoides |pteronysinus	House dust |mite	Unassigned	Aero Mite	Dermatophagoides |Der p 4	19	1351935	7
663	Dermatophagoides |pteronysinus	House dust |mite	Der p 5	Aero Mite	Dermatophagoides |Der p 5	132	1352238	7
664	Dermatophagoides |pteronysinus	House dust |mite	Der p 5	Aero Mite	Dermatophagoides |Der p 5	132	913285	7
665	Dermatophagoides |pteronysinus	House dust |mite	Der p 5	Aero Mite	Dermatophagoides |Der p 5	132	28798085	7
666	Dermatophagoides |farinae	House dust |mite	Unassigned	Aero Mite	Dermatophagoides |Der p 6 / Der f 6	279	14424450	7
667	Dermatophagoides |farinae	House dust |mite	Unassigned	Aero Mite	Dermatophagoides |Der p 6 / Der f 6	20	404371	7
668	Dermatophagoides |farinae	House dust |mite	Unassigned	Aero Mite	Dermatophagoides |Der p 6 / Der f 6	279	218203826	10
669	Dermatophagoides |farinae	House dust |mite	Unassigned	Aero Mite	Dermatophagoides |Der p 6 / Der f 6	279	218203828	10
670	Dermatophagoides |pteronysinus	House dust |mite	Der p 6	Aero Mite	Dermatophagoides |Der p 6 / Der f 6	20	1352239	7
671	Dermatophagoides |farinae	House dust |mite	Der f 7	Aero Mite	Dermatophagoides |Der p 7 / Der f 7	213	2498299	7
672	Dermatophagoides |farinae	House dust |mite	Unassigned	Aero Mite	Dermatophagoides |Der p 7 / Der f 7	213	37958165	8
673	Dermatophagoides |farinae	House dust |mite	Unassigned	Aero Mite	Dermatophagoides |Der p 7 / Der f 7	213	218203832	10
674	Dermatophagoides |pteronysinus	House dust |mite	Der p 7	Aero Mite	Dermatophagoides |Der p 7 / Der f 7	215	10189811	7
675	Dermatophagoides |pteronysinus	House dust |mite	Unassigned	Aero Mite	Dermatophagoides |Der p 7 / Der f 7	215	1352240	9
676	Dermatophagoides |pteronysinus	House dust |mite	Unassigned	Aero Mite	Dermatophagoides |Der p 8	219	60920878	7
677	Dermatophagoides |pteronysinus	House dust |mite	Unassigned	Aero Mite	Dermatophagoides |Der p 8	219	1170095	9
678	Dermatophagoides |farinae	House dust |mite	Der f 18	Aero Mite	Dermatophagoides |farinae Der f 18	462	27550039	7

					Der p chitinase			
679	Dermatophagoides pteronyssinus	House dust mite	Unassigned	Aero Mite	Dermatophagoides farinae Der f 18 Der p chitinase	462	67975085	7
680	Dermatophagoides farinae	House dust mite	Unassigned	Aero Mite	Dermatophagoides farinae Der f 21 Chew	136	60679572	9
681	Dermatophagoides farinae	House dust mite	Unassigned	Aero Mite	Dermatophagoides farinae Der f 21 Chew	136	140089314	9
682	Dermatophagoides farinae	House dust mite	Unassigned	Aero Mite	Dermatophagoides farinae Der f 21 Chew	136	140089316	9
683	Dermatophagoides farinae	House dust mite	Unassigned	Aero Mite	Dermatophagoides farinae Der f 21 Chew	136	140089320	9
684	Dermatophagoides farinae	House dust mite	Unassigned	Aero Mite	Dermatophagoides farinae Der f 21 Chew	136	140089322	9
685	Dermatophagoides farinae	House dust mite	Unassigned	Aero Mite	Dermatophagoides farinae Der f 21 Chew	136	140089324	9
686	Dermatophagoides farinae	House dust mite	Unassigned	Aero Mite	Dermatophagoides farinae Der f 21 Chew	136	140089326	9
687	Dolichovespula maculata	Whiteface hornet	Dol m 1	Venom or Salivary	Dolichovespula Dol m 1	317	548449	7
688	Dolichovespula maculata	Whiteface hornet	Dol m 1	Venom or Salivary	Dolichovespula Dol m 1	303	1709542	7
689	Dolichovespula maculata	Whiteface hornet	Dol m 2	Venom or Salivary	Dolichovespula Dol m 2	331	1346322	7
690	Dolichovespula arenaria	Yellow jacket	Dol a 5	Venom or Salivary	Dolichovespula Venom allergen 5	203	465052	7
691	Dolichovespula maculata	Whiteface hornet	Dol m 5	Venom or Salivary	Dolichovespula Venom allergen 5	227	137395	7
692	Dolichovespula maculata	Whiteface hornet	Dol m 5	Venom or Salivary	Dolichovespula Venom allergen 5	215	549186	7
693	Epicoccum nigrum	Fungus	Unassigned	Aero Fungi	Epicoccum Epi p 1	18	24636820	9
694	Equus caballus	Horse	Equ c 1	Aero Animal	Equus Equ c 1	187	3121758	7
695	Equus caballus	Horse	Equ c 2.0101	Aero Animal	Equus Equ c 2	29	3121755	7
696	Equus caballus	Horse	Equ c 2.0102	Aero Animal	Equus Equ c 2	19	3121756	7
697	Equus caballus	Horse	Unassigned	Aero Animal	Equus Equ c 3	607	543794	9
698	Equus caballus	Horse	Unassigned	Aero Animal	Equus Equ c 4	228	38258932	8

699	|Equus caballus	|Horse	|Unassigned	|Aero	|Equus Equ c 4	|228	|152031631	|9
				|Animal				
700	|Erimacrus		|Unassigned	|Food	|Erimacrus	|284	|125995169	|8
	|isenbeckii			|Animal	|tropomyosin			
701	|Erimacrus		|Unassigned	|Food	|Erimacrus	|284	|125995171	|8
	|isenbeckii			|Animal	|tropomyosin			
702	|Euphausia		|Unassigned	|Food	|Euphausia	|284	|156712754	|9
	|pacificica			|Animal				
703	|Euphausia		|Unassigned	|Food	|Euphausia	|284	|156712752	|9
	|superba			|Animal				
704	|Euroglyphus	|House dust	|Eur m	|Aero Mite	|Euroglyphus Eur m 2	|135	|3941386	|7
	|maynei	|mite	|2.0102					
705	|Euroglyphus	|House dust	|Eur m 2	|Aero Mite	|Euroglyphus Eur m 2	|145	|14423649	|7
	|maynei	|mite						
706	|Fagopyrum	|Buckwheat	|Unassigned	|Food Plant	|Fagopyrum BW 16kDa	|127	|61970231	|7
	|esculentum				|allergen			
707	|Fagopyrum	|Buckwheat	|Unassigned	|Food Plant	|Fagopyrum BW 16kDa	|149	|83416591	|7
	|esculentum				|allergen			
708	|Fagopyrum	|Buckwheat	|Unassigned	|Food Plant	|Fagopyrum BW 16kDa	|149	|320445237	|12
	|tataricum				|allergen			
709	|Fagopyrum	|Buckwheat	|Unassigned	|Food Plant	|Fagopyrum BW 8 kDa	|133	|17907758	|7
	|esculentum				|protein			
710	|Fagopyrum	|Buckwheat	|Unassigned	|Food Plant	|Fagopyrum BW 8 kDa	|133	|144228127	|8
	|tataricum				|protein			
711	|Fagopyrum	|Buckwheat	|Unassigned	|Food Plant	|Fagopyrum			
	|esculentum				|Legumin-like	|565	|29839254	|9
					|protein			
712	|Fagopyrum	|Buckwheat	|Unassigned	|Food Plant	|Fagopyrum			
	|esculentum				|Legumin-like	|504	|29839255	|9
					|protein			
713	|Fagopyrum	|Buckwheat	|Unassigned	|Food Plant	|Fagopyrum			
	|esculentum				|Legumin-like	|538	|29839419	|9
					|protein			
714	|Fagopyrum	|Buckwheat	|Unassigned	|Food Plant	|Fagopyrum			
	|gracilipes				|Legumin-like	|191	|6979766	|7
					|protein			
715	|Fagopyrum	|Buckwheat	|Unassigned	|Food Plant	|Fagopyrum			
	|tataricum				|Legumin-like	|515	|113200131	|9
					|protein			
716	|Fagopyrum	|Buckwheat	|Unassigned	|Food Plant	|Fagopyrum			
	|esculentum				|vicilin-like	|136	|146217148	|9
					|protein			
717	|Fagus sylvatica	|European	|Unassigned	|Aero Plant	|Fagus Fag s 1	|160	|212291472	|10
		|Beech						
718	|Fagus sylvatica	|European	|Fag s 1	|Aero Plant	|Fagus Fag s 1	|160	|212291470	|10
		|Beech						
719	|Fagus sylvatica	|European	|Unassigned	|Aero Plant	|Fagus Fag s 1	|160	|212291474	|10
		|Beech						

720	Farfantepenaeus |aztecus	Brown shrimp	Pen a 1	Food |Animal	Farfantepenaeus Pen |a 1	284	73532979	7
721	Felis catus	Cat	Fel d 1	Aero |Animal	Felis Fel d 1 Chain |1	88	1364212	7
722	Felis catus	Cat	Fel d 1	Aero |Animal	Felis Fel d 1 Chain |1	92	1364213	7
723	Felis catus	Cat	Fel d 1	Aero |Animal	Felis Fel d 1 Chain |1	92	1169665	7
724	Felis catus	Cat	Fel d 1	Aero |Animal	Felis Fel d 1 Chain |1	92	163825	7
725	Felis catus	Cat	Unassigned	Aero |Animal	Felis Fel d 1 Chain |1	88	114326420	8
726	Felis catus	Cat	Fel d 1	Aero |Animal	Felis Fel d 1 chain |2	109	232086	7
727	Felis catus	Cat	Unassigned	Aero |Animal	Felis Fel d 1 chain |2	107	395407	8
728	Felis catus	Cat	Unassigned	Aero |Animal	Felis Fel d 2	608	1351908	9
729	Felis catus	Cat	Unassigned	Aero |Animal	Felis Fel d 3	98	47605720	9
730	Felis catus	Cat	Unassigned	Aero |Animal	Felis Fel d 4	186	75062228	8
731	Felis catus	Cat	Unassigned	Aero |Animal	Felis Fel d 7 von |Ebner gland protein	180	301072397	12
732	Felis catus	Cat	Unassigned	Aero |Animal	Felis Fel d 8 |latherin-like	228	303387468	12
733	Schedonorus |arundinaceus	Tall fescue	Unassigned	Aero Plant	Festuca group 1 |allergen	35	75139991	7
734	Schedonorus |arundinaceus	Tall fescue	Unassigned	Aero Plant	Festuca group 1 |allergen	17	320610	7
735	Schedonorus |arundinaceus	Tall fescue	Unassigned	Aero Plant	Festuca group 1 |allergen	20	320611	7
736	Forcipomyia |taiwana	biting midges	Unassigned	Venom or |Salivary	Forcipomyia For t 1	118	188572341	10
737	Forcipomyia |taiwana	biting midges	Unassigned	Venom or |Salivary	Forcipomyia For t 2	325	188572343	10
738	Fragaria x |ananassa	Strawberry	Fra a 1	Food Plant	Fragaria Fra a 1	14	60389904	7
739	Fragaria x |ananassa	Strawberry	Fra a 1	Food Plant	Fragaria Fra a 1	74	60389905	7
740	Fragaria x |ananassa	Strawberry	Fra a 1	Food Plant	Fragaria Fra a 1	160	90185692	7
741	Fragaria x |ananassa	Strawberry	Fra a 1	Food Plant	Fragaria Fra a 1	159	90185688	7
742	Fragaria x |ananassa	Strawberry	Fra a 1	Food Plant	Fragaria Fra a 1	160	90185684	7

743	Fragaria x ananassa	Strawberry	Fra a 1	Food Plant	Fragaria Fra a 1	160	90185682	7
744	Fragaria x ananassa	Strawberry	Fra a 1	Food Plant	Fragaria Fra a 1	160	88082485	7
745	Fraxinus excelsior	European ash	Fra e 1	Aero Plant	Fraxinus Fra e 1	146	34978692	7
746	Fraxinus excelsior	European ash	Fra e 1	Aero Plant	Fraxinus Fra e 1	145	56122438	7
747	Fraxinus excelsior	European ash	Fra e 1	Aero Plant	Fraxinus Fra e 1	145	33327133	7
748	Fulvia mutica		Unassigned	Food Animal	Fulvia tropomyosin	284	219806596	10
749	Fusarium culmorum	Fungus	Unassigned	Aero Fungi	Fusarium claimed Fus c 3	450	25361513	7
750	Fusarium culmorum	Fungus	Unassigned	Aero Fungi	Fusarium Fus c 1	109	41688715	10
751	Fusarium culmorum	Fungus	Unassigned	Aero Fungi	Fusarium Fus c 2	121	52783462	9
752	Gadus callarias	Baltic cod	Gad c 1	Food Animal	Gadus Gad c 1	113	131112	7
753	Gadus morhua	Atlantic cod	Unassigned	Food Animal	Gadus Gad c 1	109	14531014	7
754	Gadus morhua	Atlantic cod	Unassigned	Food Animal	Gadus Gad c 1	109	14531016	7
755	Gadus morhua	Atlantic cod	Unassigned	Food Animal	Gadus Gad c 1	109	148356691	9
756	Gadus morhua	Atlantic cod	Unassigned	Food Animal	Gadus Gad c 1	109	148356693	9
757	Gallus gallus	Chicken	Gal d 1	Food Animal	Gallus Gal d 1	210	124757	7
758	Gallus gallus	Chicken	Unassigned	Food Animal	Gallus Gal d 1	208	162952006	9
759	Gallus gallus	Chicken	Unassigned	Food Animal	Gallus Gal d 1	210	209979542	10
760	Gallus gallus	Chicken	Gal d 2	Food Animal	Gallus Gal d 2	155	63052	7
761	Gallus gallus	Chicken	Gal d 2	Food Animal	Gallus Gal d 2	386	129293	7
762	Gallus gallus	Chicken	Gal d 2	Food Animal	Gallus Gal d 2	386	808969	7
763	Gallus gallus	Chicken	Gal d 2	Food Animal	Gallus Gal d 2	385	15826578	7
764	Gallus gallus	Chicken	Unassigned	Food Animal	Gallus Gal d 2	385	34811333	7
765	Gallus gallus	Chicken	Gal d 3	Food Animal	Gallus Gal d 3	705	757851	7

766	Gallus gallus	Chicken	Gal d 3	Food Animal	Gallus Gal d 3	705	1351295	7
767	Gallus gallus	Chicken	Gal d 4	Food Animal	Gallus Gal d 4	147	126608	7
768	Gallus gallus	Chicken	Gal d 4	Food Animal	Gallus Gal d 4	24	212279	7
769	Gallus gallus	Chicken	Unassigned	Food Animal	Gallus Gal d 5	615	113575	9
770	Gallus gallus	Chicken	Unassigned	Food Animal	Gallus parvalbumin	110	225877920	10
771	Gibberella zeae PH-1	Fungus	Unassigned	Aero Fungi	Gibberella 60S acidic ribosomal protein P2	109	46122455	7
772	Glossina morsitans	Tsetse fly	Unassigned	Venom or Salivary	Glossina Glo m 5	258	289740263	11
773	Glossina morsitans	Tsetse fly	Unassigned	Venom or Salivary	Glossina Glo m 5	259	289742475	11
774	Glossina morsitans	Tsetse fly	Unassigned	Venom or Salivary	Glossina Glo m 5	222	289742483	11
775	Glossina morsitans	Tsetse fly	Unassigned	Venom or Salivary	Glossina Glo m 5	259	8927462	11
776	Glycine max	Soybean	Unassigned	Food Plant	Gly m 5 Glycine Beta-conglycinin	605	18536	7
777	Glycine max	Soybean	Unassigned	Food Plant	Gly m 5 Glycine Beta-conglycinin	218	169927	7
778	Glycine max	Soybean	Unassigned	Food Plant	Gly m 5 Glycine Beta-conglycinin	639	169929	7
779	Glycine max	Soybean	Unassigned	Food Plant	Gly m 5 Glycine Beta-conglycinin	439	256427	7
780	Glycine max	Soybean	Gly m 1.0101	Aero Plant	Glycine Gly m 1	42	999355	7
781	Glycine max	Soybean	Unassigned	Food Plant	Glycine Gly m 1	134	76782247	7
782	Glycine max	Soybean	Unassigned	Food Plant	Glycine Gly m 1	119	76782249	7
783	Glycine max	Soybean	Gly m 2	Aero Plant	Glycine Gly m 2	20	1362049	7
784	Glycine max	Soybean	Gly m 3	Food Plant	Glycine Gly m 3	131	3021373	7
785	Glycine max	Soybean	Gly m 3	Food Plant	Glycine Gly m 3	131	3914435	7
786	Glycine max	Soybean	Unassigned	Food Plant	Glycine Gly m 3	131	156938901	9
787	Glycine max	Soybean	Unassigned	Food Plant	Glycine Gly m 4	158	134194	9
788	Glycine max	Soybean	Unassigned	Food Plant	Glycine Gly m Bd 28K	473	12697782	7
789	Glycine max	Soybean	Unassigned	Food Plant	Glycine Gly m Bd 28K	373	187766751	10

790	Glycine max	Soybean	Unassigned	Food Plant	Glycine Gly m Bd 28K	373	187766749	10
791	Glycine max	Soybean	Unassigned	Food Plant	Glycine Gly m Bd 28K	373	187766747	10
792	Glycine max	Soybean	Unassigned	Food Plant	Glycine Gly m Bd 28K	455	187766755	10
793	Glycine max	Soybean	Unassigned	Food Plant	Glycine Gly m Bd 30 kDa	379	129353	17
794	Glycine max	Soybean	Unassigned	Food Plant	Glycine Gly m Bd 30 kDa	379	1199563	17
795	Glycine max	Soybean	Unassigned	Food Plant	Glycine Gly m Bd 30 kDa	379	3097321	17
796	Glycine max	Soybean	Unassigned	Food Plant	Glycine Glycinin G1	495	18615	17
797	Glycine max	Soybean	Unassigned	Food Plant	Glycine Glycinin G1	495	18635	17
798	Glycine max	Soybean	Unassigned	Food Plant	Glycine Glycinin G2	485	18609	17
799	Glycine max	Soybean	Unassigned	Food Plant	Glycine Glycinin G2	485	18637	17
800	Glycine max	Soybean	Unassigned	Food Plant	Glycine Glycinin G3	481	18639	17
801	Glycine max	Soybean	Unassigned	Food Plant	Glycine Glycinin G4	562	18641	17
802	Glycine max	Soybean	Unassigned	Food Plant	Glycine Glycinin G4	562	732706	17
803	Glycine soja	Soybean	Unassigned	Food Plant	Glycine Glycinin G4	563	806556	17
804	Glycine max	Soybean	Unassigned	Food Plant	Glycine Glycinin G5	516	169969	17
805	Glycine max	Soybean	Unassigned	Food Plant	Glycine Glycinin G5	240	169971	17
806	Glycine soja	Soybean	Unassigned	Food Plant	Glycine Glycinin G5	517	736002	17
807	Glycine max	Soybean	Unassigned	Food Plant	Glycine Major Gly 50 kDa allergen	17	85681057	17
808	Glycine max	Soybean	Unassigned	Food Plant	Glycine Trypsin inhibitor	217	18770	17
809	Glycine max	Soybean	Unassigned	Food Plant	Glycine Trypsin inhibitor	217	18772	17
810	Glycine max	Soybean	Unassigned	Food Plant	Glycine Trypsin inhibitor	216	256429	17
811	Glycine max	Soybean	Unassigned	Food Plant	Glycine Trypsin inhibitor	203	256635	17
812	Glycine max	Soybean	Unassigned	Food Plant	Glycine Trypsin inhibitor	204	256636	17
813	Glycine max	Soybean	Unassigned	Food Plant	Glycine Trypsin inhibitor	208	510515	17
814	Glycyphagus domesticus	Storage mite	Unassigned	Aero Mite	Glycyphagus Gly d 2	141	33772588	17
815	Glycyphagus domesticus	Storage mite	Unassigned	Aero Mite	Glycyphagus Gly d 2	125	48428170	19
816	Glycyphagus	Storage mite	Unassigned	Aero Mite	Glycyphagus Gly d 2	128	48428178	19

	domesticus							
817	Haliotis discus discus	Disk abalone	Unassigned	Food Animal	Haliotis Hal m 1 tropomyosin	284	219806586	10
818	Haliotis diversicolor	Abalone	Unassigned	Food Animal	Haliotis Hal m 1 tropomyosin	284	9954249	7
819	Haliotis discus discus	Disk abalone	Unassigned	Food Animal	Haliotis paramyosin	860	318609972	12
820	Helianthus annuus	Sunflower	Hel a 2	Aero Plant	Helianthus Hel a 2	133	3581965	7
821	Helianthus annuus	Sunflower	Unassigned	Food Plant	Helianthus Seed 2S albumin	141	112745	9
822	Helix aspersa |	Brown garden snail	Unassigned	Food Animal	Helix Hel as 1 tropomyosin	284	42559558	9
823	Hevea brasiliensis	Para rubber tree	Hev b 1	Contact	Hevea Hev b 1	138	132270	7
824	Hevea brasiliensis	Para rubber tree	Hev b 10.0101	Contact	Hevea Hev b 10	233	348137	7
825	Hevea brasiliensis	Para rubber tree	Hev b 10.0102	Contact	Hevea Hev b 10	205	5777414	7
826	Hevea brasiliensis	Para rubber tree	Hev b 10.0103	Contact	Hevea Hev b 10	205	10862818	7
827	Hevea brasiliensis	Para rubber tree	Hev b 11	Contact	Hevea Hev b 11	295	14575525	7
828	Hevea brasiliensis subsp. brasiliensis	Para rubber tree	Hev b 11	Contact	Hevea Hev b 11	295	27526732	7
829	Hevea brasiliensis	Para rubber tree	Hev b 12	Contact	Hevea Hev b 12	116	20135538	7
830	Hevea brasiliensis	Para rubber tree	Unassigned	Contact	Hevea Hev b 13	391	51315784	9
831	Hevea brasiliensis	Para rubber tree	Unassigned	Contact	Hevea Hev b 14 hevamine	208	313870530	12
832	Hevea brasiliensis	Para rubber tree	Hev b 2	Contact	Hevea Hev b 2	374	1184668	7
833	Hevea brasiliensis	Para rubber tree	Hev b 2	Contact	Hevea Hev b 2	374	32765543	7
834	Hevea brasiliensis	Para rubber tree	Unassigned	Contact	Hevea Hev b 2	374	124294783	8
835	Hevea brasiliensis	Para rubber tree	Unassigned	Contact	Hevea Hev b 2	374	124294785	8
836	Hevea brasiliensis	Para rubber tree	Unassigned	Contact	Hevea Hev b 2	374	124365249	8
837	Hevea brasiliensis	Para rubber tree	Unassigned	Contact	Hevea Hev b 2	374	124365251	8
838	Hevea brasiliensis	Para rubber tree	Unassigned	Contact	Hevea Hev b 2	374	124365253	8

839	Hevea brasiliensis	Para rubber tree	Unassigned	Contact	Hevea Hev b 2	316	261824817	11
840	Hevea brasiliensis	Para rubber tree	Unassigned	Contact	Hevea Hev b 2	374	268037674	11
841	Hevea brasiliensis	Para rubber tree	Unassigned	Contact	Hevea Hev b 2	374	270315180	11
842	Hevea brasiliensis	Para rubber tree	Hev b 3	Contact	Hevea Hev b 3	204	14423933	7
843	Hevea brasiliensis	Para rubber tree	Unassigned	Contact	Hevea Hev b 4	366	46410859	7
844	Hevea brasiliensis	Para rubber tree	Unassigned	Contact	Hevea Hev b 5	151	7387766	8
845	Hevea brasiliensis	Para rubber tree	Hev b 6	Contact	Hevea Hev b 6	204	123062	7
846	Hevea brasiliensis	Para rubber tree	Hev b 6	Contact	Hevea Hev b 6	187	2832430	7
847	Hevea brasiliensis	Para rubber tree	Unassigned	Contact	Hevea Hev b 6	43	73535415	7
848	Hevea brasiliensis	Para rubber tree	Unassigned	Contact	Hevea Hev b 6	204	158342650	9
849	Hevea brasiliensis	Para rubber tree	Hev b 7.01	Contact	Hevea Hev b 7	388	1916805	7
850	Hevea brasiliensis	Para rubber tree	Hev b 7.02	Contact	Hevea Hev b 7	388	3087805	7
851	Hevea brasiliensis	Para rubber tree	Unassigned	Contact	Hevea Hev b 7	388	3288200	7
852	Hevea brasiliensis	Para rubber tree	Hev b 7	Contact	Hevea Hev b 7	388	6707018	7
853	Hevea brasiliensis	Para rubber tree	Unassigned	Contact	Hevea Hev b 7	387	41581137	7
854	Hevea brasiliensis	Para rubber tree	Hev b 8	Contact	Hevea Hev b 8	131	3183706	7
855	Hevea brasiliensis	Para rubber tree	Hev b 8	Contact	Hevea Hev b 8	131	11513601	7
856	Hevea brasiliensis	Para rubber tree	Hev b 8.0204	Contact	Hevea Hev b 8	131	14423856	7
857	Hevea brasiliensis	Para rubber tree	Hev b 8.0203	Contact	Hevea Hev b 8	131	14423858	7
858	Hevea brasiliensis	Para rubber tree	Hev b 8.0202	Contact	Hevea Hev b 8	131	14423859	7
859	Hevea brasiliensis	Para rubber tree	Hev b 8.0201	Contact	Hevea Hev b 8	131	14423860	7
860	Hevea brasiliensis	Para rubber tree	Hev b 8.0102	Contact	Hevea Hev b 8	131	14423868	7
861	Hevea brasiliensis	Para rubber tree	Unassigned	Contact	Hevea Hev b 9	445	14423687	9

862	Hevea brasiliensis	Para rubber tree	Unassigned	Contact	Hevea Hev b 9	445	14423688	9
863	Holcus lanatus	Velvet grass	Unassigned	Aero Plant	Holcus group V	240	2266623	7
864	Holcus lanatus	Velvet grass	Unassigned	Aero Plant	Holcus group V	264	2266625	7
865	Holcus lanatus	Velvet grass	Unassigned	Aero Plant	Holcus group V	296	11991229	7
866	Holcus lanatus	Velvet grass	Hol 1 1.0102	Aero Plant	Holcus Hol 1 1	248	1167836	7
867	Holcus lanatus	Velvet grass	Unassigned	Aero Plant	Holcus Hol 1 1	263	3860384	7
868	Holcus lanatus	Velvet grass	Unassigned	Aero Plant	Holcus Hol 1 1	265	1171005	9
869	Homarus americanus	American lobster	Unassigned	Food Animal	Homarus Tropomyosin	284	2660868	7
870	Homarus americanus	American lobster	Unassigned	Food Animal	Homarus Tropomyosin	284	14285796	7
871	Hordeum vulgare subsp. vulgare	Barley	Unassigned	Aero Plant	Hordeum Alpha-amylase inhibitor BDAI-1	152	3367714	7
872	Hordeum vulgare subsp. vulgare	Barley	Unassigned	Aero Plant	Hordeum Alpha-amylase inhibitor component Cma	144	18955	7
873	Hordeum vulgare subsp. vulgare	Barley	Unassigned	Aero Plant	Hordeum Alpha-amylase inhibitor component Cma	145	439275	7
874	Hordeum vulgare	Barley	Unassigned	Aero Plant	Hordeum Alpha-amylase inhibitor component CMb	149	585290	7
875	Hordeum vulgare	Barley	Hor v 15	Aero Plant	Hordeum Hor v 15	146	2506771	7
876	Hordeum vulgare	Barley	Unassigned	Aero Plant	Hordeum LTP 1	117	167077	7
877	Hordeum vulgare	Barley	Unassigned	Food Plant	Hordeum LTP 1	134	19039	7
878	Hordeum vulgare	Barley	Unassigned	Aero Plant	Hordeum Trypsin inhibitor CMe	144	1405736	7
879	Hordeum vulgare subsp. vulgare	Barley	Unassigned	Aero Plant	Hordeum Trypsin inhibitor CMe	148	19009	7
880	Humulus japonicus	Japanese hop	Hum j 1	Aero Plant	Humulus Humj1	155	33113263	7
881	Humulus scandens	Japanese hop	Unassigned	Aero Plant	Humulus profilin-like protein	131	34851176	7
882	Humulus scandens	Japanese hop	Unassigned	Aero Plant	Humulus profilin-like protein	131	34851174	7
883	Juglans nigra	Black walnut	Jug n 1	Food Plant	Juglans Jug r 1	161	31321942	7
884	Juglans regia	English walnut	Jug r 1	Food Plant	Juglans Jug r 1	139	1794252	7

885	Juglans nigra	Black walnut	Jug n 2	Food Plant	Juglans Jug r 2	481	31321944	7
886	Juglans regia	English walnut	Jug r 2	Food Plant	Juglans Jug r 2	593	6580762	7
887	Juglans regia	English walnut	Unassigned	Food Plant	Juglans Jug r 3	119	209484145	11
888	Juglans regia	English walnut	Unassigned	Food Plant	Juglans Jug r 4 seed storage protein	507	56788031	7
889	Juniperus ashei	Mountain cedar	Unassigned	Aero Plant	Juniperus Jun a 2	507	47606048	9
890	Juniperus ashei	Mountain cedar	Unassigned	Aero Plant	Juniperus Jun a 3	225	9087177	8
891	Juniperus rigida	Cedar	Unassigned	Aero Plant	Juniperus Jun a 3	225	38456224	7
892	Juniperus rigida	Cedar	Unassigned	Aero Plant	Juniperus Jun a 3	225	38456222	7
893	Juniperus virginiana	Red cedar	Unassigned	Aero Plant	Juniperus Jun a 3	110	51316532	7
894	Juniperus ashei	Mountain cedar	Unassigned	Aero Plant	Juniperus Jun a/v 1	367	9087152	9
895	Juniperus oxycedrus	Juniper	Unassigned	Aero Plant	Juniperus Jun a/v 1	367	15139849	7
896	Juniperus virginiana	Red cedar	Jun v 1	Aero Plant	Juniperus Jun a/v 1	367	8843917	7
897	Juniperus virginiana	Red cedar	Jun v 1	Aero Plant	Juniperus Jun a/v 1	367	8843921	7
898	Juniperus oxycedrus	Juniper	Unassigned	Aero Plant	Juniperus Jun o 4	165	14423843	8
899	Lens culinaris	Lentil	Len c 1.0101	Food Plant	Lens Len c 1	418	29539109	7
900	Lens culinaris	Lentil	Len c 1.0102	Food Plant	Lens Len c 1	415	29539111	7
901	Lepidoglyphus destructor	Storage mite	Lep d 10	Aero Mite	Lepidoglyphus Lep d 10	284	14423956	7
902	Lepidoglyphus destructor	Storage mite	Lep d 13	Aero Mite	Lepidoglyphus Lep d 13	131	14423714	7
903	Lepidoglyphus destructor	Storage mite	Lep d 2	Aero Mite	Lepidoglyphus Lep d 2	141	2147108	7
904	Lepidoglyphus destructor	Storage mite	Lep d 2	Aero Mite	Lepidoglyphus Lep d 2	141	21213898	7
905	Lepidoglyphus destructor	Storage mite	Lep d 2	Aero Mite	Lepidoglyphus Lep d 2	141	21213900	7
906	Lepidoglyphus destructor	Storage mite	Lep d 2	Aero Mite	Lepidoglyphus Lep d 2	141	1582223	7
907	Lepidoglyphus destructor	Storage mite	Lep d 2	Aero Mite	Lepidoglyphus Lep d 2	141	1582222	7
908	Lepidoglyphus	Storage mite	Unassigned	Aero Mite	Lepidoglyphus Lep d 141	141	34495274	7

	destructor				2			
909	Lepidoglyphus destructor	Storage mite	Unassigned	Aero Mite	Lepidoglyphus Lep d 2	141	34495278	7
910	Lepidoglyphus destructor	Storage mite	Unassigned	Aero Mite	Lepidoglyphus Lep d 2	140	34495280	7
911	Lepidoglyphus destructor	Storage mite	Unassigned	Aero Mite	Lepidoglyphus Lep d 2	141	34495282	7
912	Lepidoglyphus destructor	Storage mite	Unassigned	Aero Mite	Lepidoglyphus Lep d 2	141	34495284	7
913	Lepidoglyphus destructor	Storage mite	Unassigned	Aero Mite	Lepidoglyphus Lep d 2	141	34495286	7
914	Lepidoglyphus destructor	Storage mite	Unassigned	Aero Mite	Lepidoglyphus Lep d 2	141	34495288	7
915	Lepidoglyphus destructor	Storage mite	Unassigned	Aero Mite	Lepidoglyphus Lep d 2	141	34495290	7
916	Lepidoglyphus destructor	Storage mite	Unassigned	Aero Mite	Lepidoglyphus Lep d 2	141	1708793	9
917	Lepidoglyphus destructor	Storage mite	Lep d 5	Aero Mite	Lepidoglyphus Lep d 5	110	14423651	7
918	Lepidoglyphus destructor	Storage mite	Unassigned	Aero Mite	Lepidoglyphus Lep d 5	171	34495292	7
919	Lepidoglyphus destructor	Storage mite	Unassigned	Aero Mite	Lepidoglyphus Lep d 5	169	34495294	7
920	Lepidoglyphus destructor	Storage mite	Lep d 7	Aero Mite	Lepidoglyphus Lep d 7	216	14423650	7
921	Lepidorhombus whiffiagonis		Unassigned	Food Animal	Lepidorhombus Lep w 1 parvalbumin	109	208608078	10
922	Lepisma saccharina	Silverfish	Lep s 1	Aero Insect	Lepisma Tropomyosin	284	20387027	7
923	Lepisma saccharina	Silverfish	Unassigned	Aero Insect	Lepisma Tropomyosin	243	20387029	7
924	Ligustrum vulgare	Privet	Lig v 1.0102	Aero Plant	Ligustrum Lig v 1	145	3256212	7
925	Ligustrum vulgare	Privet	Unassigned	Aero Plant	Ligustrum Lig v 1	145	14423737	8
926	Lilium longiflorum	Trumpet lily	Unassigned	Aero Plant	Lilium polygalacturonase	413	73913442	8
927	Litchi chinensis	Lychee nut	Lit c 1	Food Plant	Litchi Lit c 1	131	15809696	7
928	Litchi chinensis	Lychee nut	Unassigned	Food Plant	Litchi Lit c 1	131	83317152	7
929	Litopenaeus vannamei		Unassigned	Food Animal	Litopenaeus Lit v 4 sarcoplasmic Ca+ binding	193	223403273	11
930	Litopenaeus vannamei		Unassigned	Food Animal	Litopenaeus Lit v 2	356	115492980	8
931	Litopenaeus vannamei		Unassigned	Food Animal	Litopenaeus Lit v 3 myosin	177	184198734	10

932	Lolium perenne	Perennial ryegrass	Lol p 1	Aero Plant	Lolium Lol p 1	263	126385	7
933	Lolium perenne	Perennial ryegrass	Lol p 1	Aero Plant	Lolium Lol p 1	252	168314	7
934	Lolium perenne	Perennial ryegrass	Lol p 1	Aero Plant	Lolium Lol p 1	263	75274600	7
935	Lolium perenne	Perennial ryegrass	Unassigned	Aero Plant	Lolium Lol p 1	263	168316	10
936	Lolium perenne	Perennial ryegrass	Lol p 11	Aero Plant	Lolium Lol p 11	134	47605808	7
937	Lolium perenne	Perennial ryegrass	Lol p 2	Aero Plant	Lolium Lol p 2	97	126386	7
938	Lolium perenne	Perennial ryegrass	Lol p 2	Aero Plant	Lolium Lol p 2	88	939932	7
939	Lolium perenne	Perennial ryegrass	Lol p 3	Aero Plant	Lolium Lol p 3	97	126387	7
940	Lolium perenne	Perennial ryegrass	Unassigned	Aero Plant	Lolium Lol p 4	423	55859464	7
941	Lolium perenne	Perennial ryegrass	Lol p 5.0101	Aero Plant	Lolium Lol p 5 *ver 10	339	2498582	7
942	Lolium perenne	Perennial ryegrass	Lol p 5	Aero Plant	Lolium Lol p 5 *ver 10	301	4416516	7
943	Lolium perenne	Perennial ryegrass	Lol p 5	Aero Plant	Lolium Lol p 5 *ver 10	301	6634467	7
944	Lolium perenne	Perennial ryegrass	Unassigned	Aero Plant	Lolium Lol p 5 *ver 10	307	332278195	12
945	Lupinus angustifolius		Unassigned	Food Plant	Lupinus conglutin beta	521	149208401	9
946	Lupinus angustifolius		Unassigned	Food Plant	Lupinus conglutin beta	455	149208403	9
947	Lupinus angustifolius		Unassigned	Food Plant	Lupinus conglutin beta	611	169950562	10
948	Lycopersicon esculentum	Tomato	Lyc e 1	Food Plant	Lycopersicon Lyc e 1	131	16555787	7
949	Lycopersicon esculentum	Tomato	Lyc e 1	Food Plant	Lycopersicon Lyc e 1	131	17224229	7
950	Lycopersicon esculentum	Tomato	Lyc e 2.0101	Food Plant	Lycopersicon Lyc e 2	553	18542113	7
951	Lycopersicon esculentum	Tomato	Lyc e 2.0102	Food Plant	Lycopersicon Lyc e 2	636	18542115	7
952	Lycopersicon esculentum	Tomato	Unassigned	Food Plant	Lycopersicon Lyc e 3	114	71360928	7
953	Lycopersicon esculentum	Tomato	Unassigned	Food Plant	Lycopersicon Lyc e 3	114	71360930	7
954	Macrobrachium rosenbergii		Unassigned	Food Animal	Macrobrachium rosenbergii shrimp	284	288819271	11

					tropomyosin			
955	Malassezia furfur	Yeast	Unassigned	Contact	Malassezia Mala f 2	177	3914386	8
956	Malassezia furfur	Yeast	Unassigned	Contact	Malassezia Mala f 3	166	3914387	8
957	Malassezia furfur	Yeast	Mala f 4	Contact	Malassezia Mala f 4	342	4587985	7
958	Malassezia furfur	Yeast	Unassigned	Contact	Malassezia Mala s 1	350	13959403	7
959	Malassezia sympodialis	Yeast	Mala s 11	Contact	Malassezia Mala s 11	237	28569698	7
960	Malassezia sympodialis	Yeast	Unassigned	Contact	Malassezia Mala s 12	618	78038796	7
961	Malassezia sympodialis	Yeast	Unassigned	Contact	Malassezia Mala s 13 Thioredoxin Rev	121	119390336	8
962	Malassezia sympodialis	Yeast	Mala s 5	Contact	Malassezia Mala s 5	172	4138171	7
963	Malassezia sympodialis	Yeast	Mala s 6	Contact	Malassezia Mala s 6	162	4138173	7
964	Malassezia sympodialis	Yeast	Mala s 7	Contact	Malassezia Mala s 7	187	4138175	7
965	Malassezia sympodialis	Yeast	Mala s 8	Contact	Malassezia Mala s 8	179	7271239	7
966	Malassezia sympodialis	Yeast	Mala s 9	Contact	Malassezia Mala s 9	342	19069920	7
967	Malus x domestica	Apple	Mal d 1	Food Plant	Malus Mal d 1	159	1313966	7
968	Malus x domestica	Apple	Mal d 1	Food Plant	Malus Mal d 1	159	4590364	7
969	Malus x domestica	Apple	Mal d 1	Food Plant	Malus Mal d 1	159	4590366	7
970	Malus x domestica	Apple	Mal d 1	Food Plant	Malus Mal d 1	159	4590368	7
971	Malus x domestica	Apple	Mal d 1	Food Plant	Malus Mal d 1	159	4590376	7
972	Malus x domestica	Apple	Mal d 1	Food Plant	Malus Mal d 1	159	4590378	7
973	Malus x domestica	Apple	Mal d 1	Food Plant	Malus Mal d 1	159	4590380	7
974	Malus x domestica	Apple	Mal d 1	Food Plant	Malus Mal d 1	159	4590382	7
975	Malus x domestica	Apple	Mal d 1	Food Plant	Malus Mal d 1	159	4590388	7
976	Malus x domestica	Apple	Mal d 1	Food Plant	Malus Mal d 1	159	16555783	7
977	Malus x	Apple	Mal d 1	Food Plant	Malus Mal d 1	159	27922941	7

	domestica							
978	Malus x domestica	Apple	Mal d 1	Food Plant	Malus Mal d 1	159	1346478	7
979	Malus x domestica	Apple	Unassigned	Food Plant	Malus Mal d 1	159	60280829	7
980	Malus x domestica	Apple	Unassigned	Food Plant	Malus Mal d 1	159	60280851	7
981	Malus x domestica	Apple	Unassigned	Food Plant	Malus Mal d 1	159	42558971	9
982	Malus x domestica	Apple	Unassigned	Food Plant	Malus Mal d 1	159	75306008	11
983	Malus x domestica	Apple	Unassigned	Food Plant	Malus Mal d 1	159	75306007	11
984	Malus x domestica	Apple	Unassigned	Food Plant	Malus Mal d 1	159	886683	11
985	Malus x domestica	Apple	Unassigned	Food Plant	Malus Mal d 2	26	1478293	7
986	Malus x domestica	Apple	Unassigned	Food Plant	Malus Mal d 2	246	60418842	7
987	Malus x domestica	Apple	Unassigned	Food Plant	Malus Mal d 2	246	60418848	7
988	Malus x domestica	Apple	Unassigned	Food Plant	Malus Mal d 2	246	30316292	8
989	Malus x domestica	Apple	Unassigned	Food Plant	Malus Mal d 2	158	218059718	10
990	Malus x domestica	Apple	Unassigned	Food Plant	Malus Mal d 2	158	218059715	10
991	Malus x domestica	Apple	Unassigned	Food Plant	Malus Mal d 3	115	50659891	7
992	Malus x domestica	Apple	Unassigned	Food Plant	Malus Mal d 3	115	50659889	7
993	Malus x domestica	Apple	Unassigned	Food Plant	Malus Mal d 3	115	50659885	7
994	Malus x domestica	Apple	Unassigned	Food Plant	Malus Mal d 3	115	50659879	7
995	Malus x domestica	Apple	Unassigned	Food Plant	Malus Mal d 3	115	50659859	7
996	Malus x domestica	Apple	Unassigned	Food Plant	Malus Mal d 3	115	38492338	7
997	Malus x domestica	Apple	Unassigned	Food Plant	Malus Mal d 3	115	14423814	9
998	Malus x domestica	Apple	Mal d 4	Food Plant	Malus Mal d 4	131	14423873	7
999	Malus x domestica	Apple	Mal d 4	Food Plant	Malus Mal d 4	131	14423874	7
1000	Malus x domestica	Apple	Mal d 4	Food Plant	Malus Mal d 4	131	14423875	7

	domestica							
1001	Malus x domestica	Apple	Mal d 4	Food Plant	Malus Mal d 4	131	28881453	7
1002	Malus x domestica	Apple	Mal d 4	Food Plant	Malus Mal d 4	131	28881457	7
1003	Malus x domestica	Apple	Mal d 4	Food Plant	Malus Mal d 4	131	28881455	7
1004	Malus x domestica	Apple	Unassigned	Food Plant	Malus Mal d 4	131	60418854	7
1005	Malus x domestica	Apple	Unassigned	Food Plant	Malus Mal d 4	131	60418858	7
1006	Malus x domestica	Apple	Unassigned	Food Plant	Malus Mal d 4	131	60418862	7
1007	Malus x domestica	Apple	Unassigned	Food Plant	Malus Mal d 4	131	60418866	7
1008	Malus x domestica	Apple	Unassigned	Food Plant	Malus Mal d 4	131	164510842	9
1009	Malus x domestica	Apple	Unassigned	Food Plant	Malus Mal d 4	131	164510858	9
1010	Malus x domestica	Apple	Unassigned	Food Plant	Malus Mal d 4	131	164510860	9
1011	Malus x domestica	Apple	Unassigned	Food Plant	Malus Mal d 4	77	218059730	10
1012	Malus x domestica	Apple	Unassigned	Food Plant	Malus Mal d 4	115	218059733	10
1013	Malus x domestica	Apple	Unassigned	Food Plant	Malus Mal d 4	131	218059728	10
1014	Marsupinaeus japonicus		Unassigned	Food Animal	Marsupinaeus tropomyosin	284	125995159	8
1015	Mercurialis annua	Annual mercury grass	Mer a 1	Aero Plant	Mercurialis Mer a 1	133	2959898	7
1016	Metapanaeus ensis	Greasyback shrimp	Unassigned	Food Animal	Metapanaeus Met e 1	274	6094504	9
1017	Mimachlamys nobilis	Noble scallop	Unassigned	Food Animal	Mimachlamys Tropomyosin	284	9954253	7
1018	Morus nigra	Black mulberry	Unassigned	Food Plant	Morus Mor n 3 mulberry LTP	91	288561913	11
1019	Mus musculus	Mouse	Mus m 1	Aero Animal	Mus Mus m 1	180	20178291	7
1020	Musa acuminata	Banana	Mus xp 1	Food Plant	Musa profilin banana	131	14161635	7
1021	Myrmecia pilosula	Jumper ant	Myr p 1	Venom or Salivary	Myrmecia Myr p 1	112	730091	7
1022	Myrmecia pilosula	Jumper ant	Unassigned	Venom or Salivary	Myrmecia Myr p 1	112	1911819	7
1023	Myrmecia	Jumper ant	Myr p 2	Venom or	Myrmecia Myr p 2	75	1587177	7

	pilosula			Salivary				
1024	Myrmecia pilosula	Jumper ant	Myr p 2	Venom or Salivary	Myrmecia Myr p 2	75	2498604	7
1025	Neptunea polycostata		Unassigned	Food Animal	Neptunea tropomyosin	284	219806590	10
1026	Nicotiana tabacum	Tobacco	Unassigned	Aero Plant	Nicotiana villin	520	57283139	7
1027	Nicotiana tabacum	Tobacco	Unassigned	Aero Plant	Nicotiana villin	559	57283137	7
1028	Octopus vulgaris		Unassigned	Food Animal	Octopus tropomyosin	284	83715936	7
1029	Olea europaea	Olive tree	Ole e 1	Aero Plant	Olea Ole e 1	145	14424429	7
1030	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 1	137	1362128	7
1031	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 1	136	1362129	7
1032	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 1	136	1362130	7
1033	Olea europaea	Olive tree	Ole e 1.0104	Aero Plant	Olea Ole e 1	145	1362131	7
1034	Olea europaea	Olive tree	Ole e 1	Aero Plant	Olea Ole e 1	137	1362132	7
1035	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 1	136	1362133	7
1036	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 1	136	1362134	7
1037	Olea europaea	Olive tree	Ole e 1.0102	Aero Plant	Olea Ole e 1	145	1362135	7
1038	Olea europaea	Olive tree	Ole e 1.0103	Aero Plant	Olea Ole e 1	145	1362136	7
1039	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 1	136	1362137	7
1040	Olea europaea	Olive tree	Ole e 1.0105	Aero Plant	Olea Ole e 1	146	2465127	7
1041	Olea europaea	Olive tree	Ole e 1.0106	Aero Plant	Olea Ole e 1	146	2465129	7
1042	Olea europaea	Olive tree	Ole e 1.0107	Aero Plant	Olea Ole e 1	146	2465131	7
1043	Olea europaea	Olive tree	Ole e 1.0101	Aero Plant	Olea Ole e 1	130	13195753	7
1044	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 1	134	37724597	7
1045	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 1	135	37724593	7
1046	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 1	132	37548753	7
1047	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 1	131	33329758	7
1048	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 1	132	33329756	7
1049	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 1	132	33329754	7
1050	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 1	131	33329752	7
1051	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 1	131	33329750	7

1052	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 1	129	33329748	7
1053	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 1	131	33329744	7
1054	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 1	132	33329738	7
1055	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 1	132	33329732	7
1056	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 1	132	33325115	7
1057	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 1	140	145313982	9
1058	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 1	140	145313984	9
1059	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 1	140	145313988	9
1060	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 1	140	145313990	9
1061	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 1	140	145313992	9
1062	Olea europaea	Olive tree	Ole e 10	Aero Plant	Olea Ole e 10	123	29465664	7
1063	Olea europaea	Olive tree	Ole e 11.0101 11.0102	Aero Plant	Olea Ole e 11.0101 and 0102	364	68270856	11
1064	Olea europaea	Olive tree	Ole e 11.0101	Aero Plant	Olea Ole e 11.0101 and 0102	364	269996495	11
1065	Olea europaea	Olive tree	Unassigned	Food Plant	Olea Ole e 13 thaumatin	226	269996497	12
1066	Olea europaea	Olive tree	Ole e 2	Aero Plant	Olea Ole e 2	134	3914426	7
1067	Olea europaea	Olive tree	Ole e 2	Aero Plant	Olea Ole e 2	134	3914427	7
1068	Olea europaea	Olive tree	Ole e 2	Aero Plant	Olea Ole e 2	134	3914428	7
1069	Olea europaea	Olive tree	Ole e 3	Aero Plant	Olea Ole e 3	84	3337403	7
1070	Olea europaea	Olive tree	Ole e 3	Aero Plant	Olea Ole e 3	52	37725377	7
1071	Olea europaea	Olive tree	Ole e 5	Aero Plant	Olea Ole e 5	30	122064581	8
1072	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 5	152	145313972	9
1073	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 5	152	160347106	9
1074	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 5	144	160347108	9
1075	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 5	152	160347112	9
1076	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 5	152	160347120	9
1077	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 5	152	160347122	9
1078	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 5	152	160347124	9
1079	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 5	152	160347126	9
1080	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 5	152	160347130	9
1081	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 5	152	160347134	9
1082	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 5	152	160347138	9
1083	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 5	152	160962543	9
1084	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 5	152	160962547	9

1085	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 5	152	160962557	9
1086	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 5	152	160962577	9
1087	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 5	152	160962583	9
1088	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 5	144	160962587	9
1089	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 5	152	160962591	9
1090	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 5	152	160962597	9
1091	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 5	152	160962611	9
1092	Olea europaea	Olive tree	Ole e 6	Aero Plant	Olea Ole e 6	150	14423643	7
1093	Olea europaea	Olive tree	Ole e 7	Aero Plant	Olea Ole e 7	121	22002032	7
1094	Olea europaea	Olive tree	Ole e 8	Aero Plant	Olea Ole e 8	171	6901654	7
1095	Olea europaea	Olive tree	Ole e 8	Aero Plant	Olea Ole e 8	171	14423648	7
1096	Olea europaea	Olive tree	Ole e 9	Aero Plant	Olea Ole e 9	1460	14279169	7
1097	Olea europaea	Olive tree	Unassigned	Aero Plant	Olea Ole e 9	101	166235350	9
1098	Ommastrephes bartramii		Unassigned	Food Animal	Ommastrephes tropomyosin	284	83715934	7
1099	Onchocerca volvulus	Parasitic nematode	Unassigned	Worm (parasite)	Onchocerca tropomyosin	284	42559586	12
1100	Oncorhynchus mykiss		Unassigned	Food Animal	Oncorhynchus Rainbow trout parv Onc m 1	108	288559139	11
1101	Oncorhynchus mykiss		Unassigned	Food Animal	Oncorhynchus Rainbow trout parv Onc m 1	107	288559140	11
1102	Oratosquilla oratoria		Unassigned	Food Animal	Oratosquilla tropomyosin	284	162286975	9
1103	Oryza sativa	Rice	Unassigned	Food Plant	Oryza Glyoxalase I	291	84029333	7
1104	Oryza sativa (japonica cultivar-group)	Rice	Unassigned	Food Plant	Oryza Glyoxalase I	291	16580747	7
1105	Oryza sativa	Rice	Ory s 1	Aero Plant	Oryza Ory s 1	263	1173557	8
1106	Oryza sativa	Rice	Unassigned	Aero Plant	Oryza Ory s 1	267	8118439	7
1107	Oryza sativa (japonica cultivar-group)	Rice	Ory s 1	Aero Plant	Oryza Ory s 1	267	109913547	8
1108	Oryza sativa (japonica cultivar-group)	Rice	Unassigned	Food Plant	Oryza Trypsin alpha-amylase inhibitor UNCERTAIN	157	23616954	8
1109	Oryza sativa (japonica cultivar-group)	Rice	Unassigned	Food Plant	Oryza Trypsin alpha-amylase inhibitor UNCERTAIN	165	218193	7
1110	Oryza sativa (japonica cultivar-group)	Rice	Unassigned	Food Plant	Oryza Trypsin alpha-amylase inhibitor UNCERTAIN	157	218197	7

1111	Oryza sativa (japonica cultivar-group)	Rice	Unassigned	Food Plant	Oryza Trypsin alpha-amylase inhibitor UNCERTAIN	111	1304216	7
1112	Oryza sativa (japonica cultivar-group)	Rice	Unassigned	Food Plant	Oryza Trypsin alpha-amylase inhibitor UNCERTAIN	109	1304217	7
1113	Oryza sativa (japonica cultivar-group)	Rice	Unassigned	Food Plant	Oryza Trypsin alpha-amylase inhibitor UNCERTAIN	113	1304218	7
1114	Oryza sativa (japonica cultivar-group)	Rice	Unassigned	Food Plant	Oryza Trypsin alpha-amylase inhibitor UNCERTAIN	166	1398913	7
1115	Oryza sativa (japonica cultivar-group)	Rice	Unassigned	Food Plant	Oryza Trypsin alpha-amylase inhibitor UNCERTAIN	160	1398915	7
1116	Oryza sativa (japonica cultivar-group)	Rice	Unassigned	Food Plant	Oryza Trypsin alpha-amylase inhibitor UNCERTAIN	157	1398916	7
1117	Oryza sativa (japonica cultivar-group)	Rice	Unassigned	Food Plant	Oryza Trypsin alpha-amylase inhibitor UNCERTAIN	160	1398918	7
1118	Oryza sativa (japonica cultivar-group)	Rice	Unassigned	Food Plant	Oryza Trypsin alpha-amylase inhibitor UNCERTAIN	157	2827316	7
1119	Oryza sativa (japonica cultivar-group)	Rice	Unassigned	Food Plant	Oryza Trypsin alpha-amylase inhibitor UNCERTAIN	166	114152865	8
1120	Oryza sativa (japonica cultivar-group)	Rice	Unassigned	Food Plant	Oryza Trypsin alpha-amylase inhibitor UNCERTAIN	163	114152864	8
1121	Oryza sativa (japonica cultivar-group)	Rice	Unassigned	Food Plant	Oryza Trypsin alpha-amylase inhibitor UNCERTAIN	160	23495787	8
1122	Oryza sativa (japonica cultivar-group)	Rice	Unassigned	Food Plant	Oryza Trypsin alpha-amylase inhibitor UNCERTAIN	160	23616947	7
1123	Ostrya carpinifolia		Unassigned	Aero Plant	Ostrya Ost c 1pollen allergen	160	300872535	12
1124	Pachycondyla chinensis		Unassigned	Venom or Salivary	Pachycondyla Pac c 3 allergen	199	169822894	10
1125	Pandalus borealis		Unassigned	Food Animal	Pandalus Pan b 1	284	312831088	12
1126	Pandalus eous		Unassigned	Food Animal	Pandalus Pan b 1	284	125995161	8
1127	Panulirus stimpsoni	Lobster	Unassigned	Food Animal	Panulirus Pan s 1	274	14285797	7
1128	Paralithodes camtschaticus		Unassigned	Food Animal	Paralithodes tropomyosin	284	125995163	8
1129	Paralithodes camtschaticus		Unassigned	Food Animal	Paralithodes tropomyosin	284	125995165	8

1130	Parietaria judaica	Weed	Par j 1	Aero Plant	Parietaria Par j 1	143	741844	7
1131	Parietaria judaica	Weed	Par j 1.0102	Aero Plant	Parietaria Par j 1	176	1532058	7
1132	Parietaria judaica	Weed	Par j 1.0201	Aero Plant	Parietaria Par j 1	138	2497749	7
1133	Parietaria judaica	Weed	Par j 1.0101	Aero Plant	Parietaria Par j 1	139	3915783	7
1134	Parietaria judaica	Weed	Par j 2.0102	Aero Plant	Parietaria Par j 2	133	1532056	7
1135	Parietaria judaica	Weed	Par j 2.0101	Aero Plant	Parietaria Par j 2	133	2497750	7
1136	Parietaria judaica	Weed	Par j 3	Aero Plant	Parietaria Par j 3	131	14423869	7
1137	Parietaria judaica	Weed	Par j 3	Aero Plant	Parietaria Par j 3	132	14423876	7
1138	Parietaria officinalis	Weed	Par o 1	Aero Plant	Parietaria Par o 1	12	75139847	7
1139	Parietaria officinalis	Weed	Par o 1	Aero Plant	Parietaria Par o 1	17	1311509	7
1140	Parietaria officinalis	Weed	Par o 1	Aero Plant	Parietaria Par o 1	15	1311510	7
1141	Parietaria officinalis	Weed	Par o 1	Aero Plant	Parietaria Par o 1	15	1311511	7
1142	Parietaria officinalis	Weed	Par o 1	Aero Plant	Parietaria Par o 1	15	1311512	7
1143	Parietaria officinalis	Weed	Par o 1	Aero Plant	Parietaria Par o 1	30	1311513	7
1144	Parietaria officinalis	Weed	Par o 1	Aero Plant	Parietaria Par o 1	24	1836011	7
1145	Parietaria officinalis	Weed	Unassigned	Aero Plant	Parietaria Par o 1	25	1836010	7
1146	Paspalum notatum	Bahia grass	Unassigned	Aero Plant	Paspalum group 13 pollen allergen	169	338930686	12
1147	Paspalum notatum	Bahia grass	Unassigned	Aero Plant	Paspalum group 13 pollen allergen	169	338930684	12
1148	Paspalum notatum	Bahia grass	Unassigned	Aero Plant	Paspalum group 13 pollen allergen	169	338930682	12
1149	Paspalum notatum	Bahia grass	Unassigned	Aero Plant	Paspalum group 13 pollen allergen	169	338930680	12
1150	Paspalum notatum	Bahia grass	Unassigned	Aero Plant	Paspalum group 13 pollen allergen	393	338930678	12
1151	Paspalum notatum	Bahia grass	Unassigned	Aero Plant	Paspalum group 13 pollen allergen	393	338930676	12
1152	Paspalum notatum	Bahia grass	Unassigned	Aero Plant	Paspalum group 13 pollen allergen	391	338930674	12

1153	Paspalum notatum	Bahia grass	Unassigned	Aero Plant	Paspalum group 13 pollen allergen	395	338930672	12
1154	Paspalum notatum	Bahia grass	Unassigned	Aero Plant	Paspalum Pas n 1 beta expansin	265	168419914	10
1155	Penaeus monodon	Black tiger shrimp	Unassigned	Food Animal	Penaeus Pen m 1 tropomyosin	284	125995157	8
1156	Penaeus monodon	Black tiger shrimp	Pen m 2	Food Animal	Penaeus Pen m 2	356	27463265	7
1157	Penaeus monodon	Black tiger shrimp	Unassigned	Food Animal	Penaeus Pen m 2	356	308154236	12
1158	Penaeus monodon	Black tiger shrimp	Unassigned	Food Animal	Penaeus Pen m 3 myosin light chain	177	317383196	12
1159	Penaeus monodon	Black tiger shrimp	Unassigned	Food Animal	Penaeus Pen m 4 sarcoplasmic calcium binding	193	317383198	12
1160	Penicillium chrysogenum	Fungus	Pen ch 18	Aero Fungi	Penicillium Pen 18	494	7963902	7
1161	Penicillium chrysogenum	Fungus	Pen ch 18	Aero Fungi	Penicillium Pen 18	494	14215732	7
1162	Penicillium citrinum	Fungus	Unassigned	Aero Fungi	Penicillium Pen 18	457	4588118	7
1163	Penicillium citrinum	Fungus	Unassigned	Aero Fungi	Penicillium Pen 18	358	12005501	7
1164	Penicillium oxalicum	Fungus	Pen o 18	Aero Fungi	Penicillium Pen 18	503	12005497	7
1165	Penicillium brevicompactum	Fungus	Unassigned	Aero Fungi	Penicillium Pen b 26	107	59894749	7
1166	Penicillium citrinum	Fungus	Pen c 19	Aero Fungi	Penicillium Pen c 19	503	14423733	7
1167	Penicillium citrinum	Fungus	Unassigned	Aero Fungi	Penicillium Pen c 22	438	74664773	9
1168	Penicillium citrinum	Fungus	Pen c 24	Aero Fungi	Penicillium Pen c 24	228	38326693	7
1169	Penicillium citrinum	Fungus	Pen c 3	Aero Fungi	Penicillium Pen c 3	167	5326864	7
1170	Penicillium chrysogenum	Fungus	Pen ch 13	Aero Fungi	Penicillium Pen ch 13	397	6684758	7
1171	Penicillium chrysogenum	Fungus	Pen ch 13	Aero Fungi	Penicillium Pen ch 13	398	21069093	7
1172	Penicillium citrinum	Fungus	Unassigned	Aero Fungi	Penicillium Pen ch 13	397	4587983	7
1173	Penicillium chrysogenum	Fungus	Pen ch 20	Aero Fungi	Penicillium Pen ch 20 68 kDa protein	117	999009	7
1174	Periplaneta americana	American cockroach	Per a 7.0101	Aero Insect	Periplaneta Per 7	284	4378573	7
1175	Periplaneta	American	Unassigned	Aero	Periplaneta Per 7	284	14423957	9

	americana	cockroach		Insect				
1176	Periplaneta americana	American cockroach	Unassigned	Aero Insect	Periplaneta Per 7	284	239740599	11
1177	Periplaneta fuliginosa	Smokybrown cockroach	Unassigned	Aero Insect	Periplaneta Per 7	284	19310971	7
1178	Periplaneta americana	American cockroach	Per a 1	Aero Insect	Periplaneta Per a 1	446	2231297	7
1179	Periplaneta americana	American cockroach	Per a 1.0104	Aero Insect	Periplaneta Per a 1	274	2253610	7
1180	Periplaneta americana	American cockroach	Per a 1	Aero Insect	Periplaneta Per a 1	395	2580504	7
1181	Periplaneta americana	American cockroach	Per a 1.0102	Aero Insect	Periplaneta Per a 1	228	2897849	7
1182	Periplaneta americana	American cockroach	Per a 1.0101	Aero Insect	Periplaneta Per a 1	231	4240399	7
1183	Periplaneta americana	American cockroach	Unassigned	Aero Insect	Periplaneta Per a 1	124	30144660	7
1184	Periplaneta americana	American cockroach	Unassigned	Aero Insect	Periplaneta Per a 1	395	284518361	11
1185	Periplaneta americana	American cockroach	Per a 3.0201	Aero Insect	Periplaneta Per a 3	631	1531589	7
1186	Periplaneta americana	American cockroach	Per a 3.0202	Aero Insect	Periplaneta Per a 3	470	1580794	7
1187	Periplaneta americana	American cockroach	Per a 3.0203	Aero Insect	Periplaneta Per a 3	393	1580797	7
1188	Periplaneta americana	American cockroach	Per a 3.0101	Aero Insect	Periplaneta Per a 3	685	2833325	9
1189	Periplaneta americana	American cockroach	Unassigned	Aero Insect	Periplaneta Per a 3	688	284518363	11
1190	Periplaneta americana	American cockroach	Unassigned	Aero Insect	Periplaneta Per a 3	685	289721058	11
1191	Periplaneta americana	American cockroach	Unassigned	Aero Insect	Periplaneta putative Per a 4	183	60678787	7
1192	Periplaneta americana	American cockroach	Unassigned	Aero Insect	Periplaneta putative Per a 4	163	215794707	10
1193	Periplaneta americana	American cockroach	Unassigned	Aero Insect	Periplaneta putative Per a 4	167	212675312	10
1194	Perna viridis	Asian green mussell	Unassigned	Food Animal	Perna Tropomyosin	284	9954251	7
1195	Persea americana	Avocado	Pers a 1	Food Plant	Persea Pers a 1	326	3201547	7
1196	Phalaris aquatica	Canary grass	Unassigned	Aero Plant	Phalaris Pha a 1	20	409328	7
1197	Phalaris aquatica	Canary grass	Pha a 1	Aero Plant	Phalaris Pha a 1	269	2498576	7
1198	Phalaris aquatica	Canary grass	Unassigned	Aero Plant	Phalaris Pha a 5	320	2498577	7

1199	Phalaris aquatica	Canary grass	Unassigned	Aero Plant	Phalaris Pha a 5	305	2498578	7
1200	Phalaris aquatica	Canary grass	Unassigned	Aero Plant	Phalaris Pha a 5	294	2498579	7
1201	Phalaris aquatica	Canary grass	Unassigned	Aero Plant	Phalaris Pha a 5	175	2498580	7
1202	Phaseolus vulgaris	Kidney bean	Unassigned	Food Plant	Phaseolus Pha v 3	115	289064177	11
1203	Phaseolus vulgaris	Kidney bean	Unassigned	Food Plant	Phaseolus Pha v 3	118	289064179	11
1204	Phleum pratense	Common timothy	Phl p 1.0101	Aero Plant	Phleum Phl p 1	263	3901094	7
1205	Phleum pratense	Common timothy	Phl p 1	Aero Plant	Phleum Phl p 1	241	28373838	7
1206	Phleum pratense	Common timothy	Unassigned	Aero Plant	Phleum Phl p 1	240	45823012	7
1207	Phleum pratense	Common timothy	Unassigned	Aero Plant	Phleum Phl p 1	263	1171008	9
1208	Phleum pratense	Common timothy	Unassigned	Aero Plant	Phleum Phl p 1	262	1582250	10
1209	Phleum pratense	Common timothy	Unassigned	Aero Plant	Phleum Phl p 11	143	47606039	9
1210	Phleum pratense	Common timothy	Phl p 12	Aero Plant	Phleum Phl p 12	131	464471	7
1211	Phleum pratense	Common timothy	Phl p 12	Aero Plant	Phleum Phl p 12	131	2415700	7
1212	Phleum pratense	Common timothy	Phl p 12	Aero Plant	Phleum Phl p 12	131	2415702	7
1213	Phleum pratense	Common timothy	Phl p 13	Aero Plant	Phleum Phl p 13	394	4826572	7
1214	Phleum pratense	Common timothy	Unassigned	Aero Plant	Phleum Phl p 2	122	1171009	8
1215	Phleum pratense	Common timothy	Unassigned	Aero Plant	Phleum Phl p 4	525	82492267	7
1216	Phleum pratense	Common timothy	Unassigned	Aero Plant	Phleum Phl p 4	508	54144332	7
1217	Phleum pratense	Common timothy	Unassigned	Aero Plant	Phleum Phl p 4	500	45108973	7
1218	Phleum pratense	Common timothy	Unassigned	Aero Plant	Phleum Phl p 4	500	45108967	7
1219	Phleum pratense	Common timothy	Unassigned	Aero Plant	Phleum Phl p 4	500	189014266	10
1220	Phleum pratense	Common timothy	Unassigned	Aero Plant	Phleum Phl p 4	500	189014268	10
1221	Phleum pratense	Common timothy	Unassigned	Aero Plant	Phleum Phl p 4	500	189014270	10

1222	Phleum pratense	Common	Unassigned	Aero Plant	Phleum Phl p 4	500	189014272	10
		timothy						
1223	Phleum pratense	Common	Phl p	Aero Plant	Phleum Phl p 5	312	398830	17
		timothy	5.0101					
1224	Phleum pratense	Common	Phl p 5	Aero Plant	Phleum Phl p 5	257	422005	17
		timothy						
1225	Phleum pratense	Common	Phl p 5	Aero Plant	Phleum Phl p 5	280	481397	17
		timothy						
1226	Phleum pratense	Common	Phl p 5	Aero Plant	Phleum Phl p 5	24	75139900	17
		timothy						
1227	Phleum pratense	Common	Unassigned	Aero Plant	Phleum Phl p 5	285	1092249	17
		timothy						
1228	Phleum pratense	Common	Phl p	Aero Plant	Phleum Phl p 5	281	1684718	17
		timothy	5.0202					
1229	Phleum pratense	Common	Phl p	Aero Plant	Phleum Phl p 5	276	1684720	17
		timothy	5.0104					
1230	Phleum pratense	Common	Phl p 5	Aero Plant	Phleum Phl p 5	286	2398757	17
		timothy						
1231	Phleum pratense	Common	Phl p 5	Aero Plant	Phleum Phl p 5	284	2851457	17
		timothy						
1232	Phleum pratense	Common	Phl p	Aero Plant	Phleum Phl p 5	276	3135497	17
		timothy	5.0105					
1233	Phleum pratense	Common	Phl p	Aero Plant	Phleum Phl p 5	276	3135499	17
		timothy	5.0106					
1234	Phleum pratense	Common	Phl p	Aero Plant	Phleum Phl p 5	276	3135501	17
		timothy	5.0107					
1235	Phleum pratense	Common	Phl p	Aero Plant	Phleum Phl p 5	276	3135503	17
		timothy	5.0108					
1236	Phleum pratense	Common	Phl p	Aero Plant	Phleum Phl p 5	312	3309039	17
		timothy	5.0103					
1237	Phleum pratense	Common	Unassigned	Aero Plant	Phleum Phl p 5	295	3309041	17
		timothy						
1238	Phleum pratense	Common	Unassigned	Aero Plant	Phleum Phl p 5	290	3309045	17
		timothy						
1239	Phleum pratense	Common	Unassigned	Aero Plant	Phleum Phl p 5	287	3309047	17
		timothy						
1240	Phleum pratense	Common	Phl p 5	Aero Plant	Phleum Phl p 5	275	13430402	17
		timothy						
1241	Phleum pratense	Common	Unassigned	Aero Plant	Phleum Phl p 5	287	21725606	17
		timothy						
1242	Phleum pratense	Common	Unassigned	Aero Plant	Phleum Phl p 5	287	21725608	17
		timothy						
1243	Phleum pratense	Common	Unassigned	Aero Plant	Phleum Phl p 5	287	21725610	17
		timothy						
1244	Phleum pratense	Common	Unassigned	Aero Plant	Phleum Phl p 5	287	21725612	17
		timothy						

1245	Phleum pratense	Common timothy	Unassigned	Aero Plant	Phleum Phl p 5	287	21725614	7
1246	Phleum pratense	Common timothy	Unassigned	Aero Plant	Phleum Phl p 5	287	21725616	7
1247	Phleum pratense	Common timothy	Unassigned	Aero Plant	Phleum Phl p 5	287	21725618	7
1248	Phleum pratense	Common timothy	Unassigned	Aero Plant	Phleum Phl p 5	287	21725620	7
1249	Phleum pratense	Common timothy	Unassigned	Aero Plant	Phleum Phl p 5	287	21725622	7
1250	Phleum pratense	Common timothy	Unassigned	Aero Plant	Phleum Phl p 5	287	21725624	7
1251	Phleum pratense	Common timothy	Unassigned	Aero Plant	Phleum Phl p 5	287	21725626	7
1252	Phleum pratense	Common timothy	Unassigned	Aero Plant	Phleum Phl p 5	287	21725628	7
1253	Phleum pratense	Common timothy	Unassigned	Aero Plant	Phleum Phl p 5	287	21725630	7
1254	Phleum pratense	Common timothy	Unassigned	Aero Plant	Phleum Phl p 5	287	21725632	7
1255	Phleum pratense	Common timothy	Phl p 5	Aero Plant	Phleum Phl p 5	102	28948464	7
1256	Phleum pratense	Common timothy	Unassigned	Aero Plant	Phleum Phl p 5	284	29500897	7
1257	Phleum pratense	Common timothy	Phl p 6	Aero Plant	Phleum Phl p 6	138	3004465	7
1258	Phleum pratense	Common timothy	Phl p 6	Aero Plant	Phleum Phl p 6	138	3004467	7
1259	Phleum pratense	Common timothy	Unassigned	Aero Plant	Phleum Phl p 6	106	3004469	7
1260	Phleum pratense	Common timothy	Unassigned	Aero Plant	Phleum Phl p 6	111	28374072	7
1261	Phleum pratense	Common timothy	Unassigned	Aero Plant	Phleum Phl p 7	78	14423846	7
1262	Phoenix dactylifera	Date palm	Pho d 2	Aero Plant	Phoenix Pho d 2	131	21322677	7
1263	Pistacia vera		Unassigned	Food Plant	Pistacia 11S globulin	472	156001070	9
1264	Pistacia vera		Unassigned	Food Plant	Pistacia 11S globulin	496	110349083	10
1265	Pistacia vera		Unassigned	Food Plant	Pistacia 11S globulin	472	110349085	10
1266	Pistacia vera		Unassigned	Food Plant	Pistacia Pis v 1 2S albumin	149	110349081	10
1267	Pistacia vera		Unassigned	Food Plant	Pistacia Pis v 3 vicilin	519	133711974	10

1268	Pisum sativum	Pea	Pis s 1	Food Plant	Pisum Pis s 1	415	42414629	7
1269	Pisum sativum	Pea	Pis s 1	Food Plant	Pisum Pis s 1	415	42414627	7
1270	Plantago lanceolata	Narrow-leaved plantain	Pla l 1	Aero Plant	Plantago Pla l 1	131	14422359	7
1271	Plantago lanceolata	Narrow-leaved plantain	Pla l 1	Aero Plant	Plantago Pla l 1	131	14422361	7
1272	Plantago lanceolata	Narrow-leaved plantain	Pla l 1	Aero Plant	Plantago Pla l 1	131	14422363	7
1273	Plantago lanceolata	Narrow-leaved plantain	Unassigned	Aero Plant	Plantago Pla l 1	65	29163773	7
1274	Platanus x acerifolia	London plane tree	Unassigned	Aero Plant	Platanus Pla a 1	179	29839547	9
1275	Platanus x acerifolia	London plane tree	Pla a 2	Aero Plant	Platanus Pla a 2	377	49523394	7
1276	Platanus orientalis		Unassigned	Aero Plant	Platanus Pla or 1	170	162949336	9
1277	Plodia interpunctella	Indian meal moth	Unassigned	Aero Insect	Plodia Plo i 1 Arginine kinase	355	15886861	7
1278	Poa pratensis	Kentucky bluegrass	Unassigned	Aero Plant	Poa group II	122	4007655	7
1279	Poa pratensis	Kentucky bluegrass	Poa p 1	Aero Plant	Poa Poa p 1	20	280414	7
1280	Poa pratensis	Kentucky bluegrass	Poa p 1	Aero Plant	Poa Poa p 1	26	320620	7
1281	Poa pratensis	Kentucky bluegrass	Poa p 1	Aero Plant	Poa Poa p 1	263	4090265	7
1282	Poa pratensis	Kentucky bluegrass	Poa p 5	Aero Plant	Poa Poa p 5	303	11991227	7
1283	Poa pratensis	Kentucky bluegrass	Unassigned	Aero Plant	Poa Poa p 9	373	113560	7
1284	Poa pratensis	Kentucky bluegrass	Unassigned	Aero Plant	Poa Poa p 9	307	113562	7
1285	Poa pratensis	Kentucky bluegrass	Unassigned	Aero Plant	Poa Poa p 9	131	539056	7
1286	Poa pratensis	Kentucky bluegrass	Unassigned	Aero Plant	Poa Poa p 9	333	113561	7
1287	Polistes annularis	Paper wasp	Pol a 1	Venom or Salivary	Polistes Pol a 1	301	14423833	7
1288	Polistes dominulus	Paper wasp	Unassigned	Venom or Salivary	Polistes Pol a 1	316	45510893	7
1289	Polistes dominulus	Paper wasp	Unassigned	Venom or Salivary	Polistes Pol a 1	316	45510891	7
1290	Polistes dominulus	Paper wasp	Unassigned	Venom or Salivary	Polistes Pol a 1	316	45510889	7
1291	Polistes	Paper wasp	Unassigned	Venom or	Polistes Pol a 1	337	45510887	7

	dominulus			Salivary				
1292	Polistes gallicus	Paper wasp	Unassigned	Venom or Salivary	Polistes Pol a 1	42	41017429	7
1293	Polistes annularis	Paper wasp	Pol a 2	Venom or Salivary	Polistes Pol a 2	367	14423735	7
1294	Polistes annularis	Paper wasp	Pol a 5	Venom or Salivary	Polistes Venom allergen 5	209	160780	7
1295	Polistes dominulus	Paper wasp	Pol d 5	Venom or Salivary	Polistes Venom allergen 5	227	51093377	7
1296	Polistes exclamans	Paper wasp	Pol e 5	Venom or Salivary	Polistes Venom allergen 5	205	549187	7
1297	Polistes exclamans	Paper wasp	Unassigned	Venom or Salivary	Polistes Venom allergen 5	226	51093375	7
1298	Polistes fuscatus	Paper wasp	Pol f 5	Venom or Salivary	Polistes Venom allergen 5	205	549188	7
1299	Polistes gallicus	Paper wasp	Pol g 5	Venom or Salivary	Polistes Venom allergen 5	206	25091511	7
1300	Polistes dominulus	Paper wasp	Unassigned	Venom or Salivary	Polistes Venom serine protease	277	30909091	7
1301	Polybia paulista	wasp	Unassigned	Venom or Salivary	Polybia p hyaluronidase	345	302201583	12
1302	Polybia paulista	wasp	Unassigned	Venom or Salivary	Polybia p hyaluronidase	288	302425085	12
1303	Polybia paulista	wasp	Unassigned	Venom or Salivary	Polybia p venom allergen 5	141	290792375	11
1304	Polybia paulista	wasp	Unassigned	Venom or Salivary	Polybia p venom allergen 5	207	302595972	12
1305	Polybia paulista	wasp	Pol p 1.0101	Venom or Salivary	Polybia Pol p 1.0101 phospholipase	322	166216292	9
1306	Polybia paulista	wasp	Unassigned	Venom or Salivary	Polybia Pol p 1.0101 phospholipase	302	315190620	12
1307	Protortonia cacti		Unassigned	Food Animal	Protortonia	335	237769615	11
1308	Prunus dulcis x Prunus persica		Unassigned	Food Plant	Prunus Almond-peach hybr profilin Pru 4	131	190613933	10
1309	Prunus dulcis x Prunus persica		Unassigned	Food Plant	Prunus Almond-peach hybr profilin Pru 4	131	190613937	10
1310	Prunus dulcis x Prunus persica		Pru p 2.0201	Food Plant	Prunus persica Pru p 2	246	190613907	10
1311	Prunus dulcis x Prunus persica		Pru p 2.0101	Food Plant	Prunus persica Pru p 2	246	190613911	10
1312	Prunus dulcis x Prunus persica		Pru p 2.0301	Food Plant	Prunus persica Pru p 2	242	190613903	10
1313	Prunus avium	Cherry	Pru av 1	Food Plant	Prunus PRP (Bet v 1 family)	160	1513216	7

1314	Prunus avium	Cherry	Pru av 1	Food Plant	Prunus PRP (Bet v 1 family)	160	44409496	7
1315	Prunus avium	Cherry	Pru av 1	Food Plant	Prunus PRP (Bet v 1 family)	160	44409474	7
1316	Prunus avium	Cherry	Pru av 1	Food Plant	Prunus PRP (Bet v 1 family)	160	44409451	7
1317	Prunus avium	Cherry	Unassigned	Food Plant	Prunus PRP (Bet v 1 family)	159	159162378	9
1318	Prunus persica	Peach	Unassigned	Food Plant	Prunus PRP (Bet v 1 family)	160	82492265	7
1319	Prunus armeniaca	Apricot	Unassigned	Food Plant	Prunus Pru 3	119	313575730	12
1320	Prunus armeniaca	Apricot	Unassigned	Food Plant	Prunus Pru 3	117	313575732	12
1321	Prunus armeniaca	Apricot	Unassigned	Food Plant	Prunus Pru 3	117	313575734	12
1322	Prunus armeniaca	Apricot	Unassigned	Food Plant	Prunus Pru 3	117	313575736	12
1323	Prunus avium	Cherry	Pru av 3	Food Plant	Prunus Pru 3	117	6715520	7
1324	Prunus avium	Cherry	Unassigned	Food Plant	Prunus Pru 3	117	313575726	12
1325	Prunus avium	Cherry	Unassigned	Food Plant	Prunus Pru 3	117	313575728	12
1326	Prunus domestica	Plum	Pru d 3	Food Plant	Prunus Pru 3	91	9297015	7
1327	Prunus persica	Peach	Pru p 3	Food Plant	Prunus Pru 3	91	3287877	7
1328	Prunus persica	Peach	Pru p 3	Food Plant	Prunus Pru 3	92	83754241	7
1329	Prunus persica	Peach	Unassigned	Food Plant	Prunus Pru 3	117	54793477	7
1330	Prunus persica	Peach	Unassigned	Food Plant	Prunus Pru 3	117	313575718	12
1331	Prunus avium	Cherry	Pru av 4	Food Plant	Prunus Pru 4 Profilin	131	4761582	7
1332	Prunus dulcis	Almond	Pru du 4	Food Plant	Prunus Pru 4 Profilin	131	24473794	7
1333	Prunus persica	Peach	Pru p 4.01	Food Plant	Prunus Pru 4 Profilin	131	27528310	7
1334	Prunus persica	Peach	Pru p 4.02	Food Plant	Prunus Pru 4 Profilin	131	27528312	7
1335	Prunus avium	Cherry	Pru av 2	Food Plant	Prunus Pru av 2	245	1144346	7
1336	Prunus dulcis	Almond	Unassigned	Food Plant	Prunus Pru du 6 Amandin	531	258588247	11
1337	Prunus dulcis	Almond	Unassigned	Food Plant	Prunus Seed allergenic protein 2 (Conglutin gamma)	25	75107131	8
1338	Pseudocardium sachalinensis		Unassigned	Food Animal	Pseudocardium tropomyosin	284	219806598	10
1339	Pyrus communis	Pear	Pyr c 1	Food Plant	Pyrus Pyr c 1	159	3044216	7
1340	Pyrus communis	Pear	Pyr c 4	Food Plant	Pyrus Pyr c 4	131	4761580	7
1341	Pyrus communis	Pear	Pyr c 5	Food Plant	Pyrus Pyr c 5	308	3243234	7

1342	Quercus alba	Oak	Que a 1	Aero Plant	Quercus Que a I	24	543675	7
1343	Quercus alba	Oak	Unassigned	Aero Plant	Quercus Que a I	159	167472847	10
1344	Quercus alba	Oak	Unassigned	Aero Plant	Quercus Que a I	160	167472849	10
1345	Rana esculenta	Frog	Ran e 1	Food Animal	Rana Ran e 1	110	20796729	7
1346	Rana sp. CH-2001	Frog	Unassigned	Food Animal	Rana Ran e 1	110	20796733	7
1347	Rana esculenta	Frog	Ran e 2	Food Animal	Rana Ran e 2	109	20797081	7
1348	Rana sp. CH-2001	Frog	Unassigned	Food Animal	Rana Ran e 2	109	20797085	7
1349	Rattus norvegicus	Rat	Rat n 1	Aero Animal	Rattus Rat n 1	181	127533	7
1350	Rattus norvegicus	Rat	Rat n 1	Aero Animal	Rattus Rat n 1	181	81890324	7
1351	Rattus norvegicus	Rat	Unassigned	Aero Animal	Rattus Rat n 1	181	109474987	8
1352	Rhodotorula mucilaginosa	Fungus	Unassigned	Aero Fungi	Rhodotorula Rho m 1	439	37078092	7
1353	Rhodotorula mucilaginosa	Fungus	Unassigned	Aero Fungi	Rhodotorula Rho m 2	342	54654335	7
1354	Ricinus communis	Castor bean	Ric c 1	Food Plant	Ricinus Ric c 1	258	112762	7
1355	Rubus idaeus		Unassigned	Food Plant	Rubus putative allergen Rub i 1	137	110180525	8
1356	Rubus idaeus		Unassigned	Food Plant	Rubus putative allergen Rub i 3	117	110180523	8
1357	Salmo salar	Salmon	Sal s 1	Food Animal	Salmo Sal s 1	109	2493445	7
1358	Salmo salar	Salmon	Sal s 1	Food Animal	Salmo Sal s 1	108	18281421	7
1359	Salmo salar	Salmon	Unassigned	Food Animal	Salmo Sal s 1	109	209734468	10
1360	Salsola kali	Thistle	Unassigned	Aero Plant	Salsola pectin methylesterase Sal k 1.01 & 1.02	362	51242679	8
1361	Salsola kali	Thistle	Unassigned	Aero Plant	Salsola pectin methylesterase Sal k 1.01 & 1.02	339	59895728	8
1362	Salsola kali	Thistle	Unassigned	Aero Plant	Salsola pectin methylesterase Sal k 1.01 & 1.02	339	59895730	8
1363	Salsola kali	Thistle	Unassigned	Aero Plant	Salsola pectin methylesterase Sal k 1.01 & 1.02	339	225810597	10
1364	Salsola kali	Thistle	Sal k 1	Aero Plant	Salsola Sal k 1	11	25090948	7

1365	Salsola kali	Thistle	Sal k 1	Aero Plant	Salsola Sal k 1	8	25090949	7
1366	Salsola kali	Thistle	Sal k 1	Aero Plant	Salsola Sal k 1	9	25090950	7
1367	Salsola kali	Thistle	Sal k 1	Aero Plant	Salsola Sal k 1	14	25090951	7
1368	Salsola kali	Thistle	Unassigned	Aero Plant	Salsola Sal k 3 pollen allergen	757	225810599	10
1369	Salsola kali	Thistle	Unassigned	Aero Plant	Salsola Sal k 4 profilin	133	239916566	11
1370	Salvelinus fontinalis	Brook trout	Unassigned	Food Animal	Salvelinus parvalbumin	109	288557438	11
1371	Salvelinus fontinalis	Brook trout	Unassigned	Food Animal	Salvelinus parvalbumin	108	288557440	11
1372	Sarcoptes scabiei type hominis	Scabies mite	Unassigned	Venom or Salivary	Sarcoptes Apolipoprotein Ssag1.2	330	27462848	7
1373	Sarcoptes scabiei type hominis	Scabies mite	Unassigned	Venom or Salivary	Sarcoptes cysteine protease C08	340	46406002	7
1374	Sarcoptes scabiei type hominis	Scabies mite	Unassigned	Venom or Salivary	Sarcoptes cysteine proteases F04	338	46406012	7
1375	Sarcoptes scabiei type hominis	Scabies mite	Unassigned	Venom or Salivary	Sarcoptes cysteine proteases F04	339	46406014	7
1376	Sarcoptes scabiei type hominis	Scabies mite	Unassigned	Venom or Salivary	Sarcoptes cysteine proteases F04	273	46406016	7
1377	Sarcoptes scabiei type hominis	Scabies mite	Unassigned	Venom or Salivary	Sarcoptes Glutathione S-transferase Mu	219	27462836	7
1378	Sarcoptes scabiei type hominis	Scabies mite	Unassigned	Venom or Salivary	Sarcoptes Glutathione S-transferase Mu	219	60920770	7
1379	Sardinops sagax		Unassigned	Food Animal	Sardinops Sar sa 1 parvalbumin	109	193247972	10
1380	Scapharca broughtonii		Unassigned	Food Animal	Scapharca tropomyosin	284	219806592	10
1381	Schistosoma japonicum	Schistosoma	Unassigned	Protozoan	Schistosoma Putative profilin	129	29841461	7
1382	Schistosoma japonicum	Schistosoma	Unassigned	Protozoan	Schistosoma tegumental antigen	191	2739154	7
1383	Scomber japonicus	Chub mackerel	Unassigned	Food Animal	Scomber Parvalbumin	109	29420793	7
1384	Scomber scombrus	Atlantic mackerel	Unassigned	Food Animal	Scomber Parvalbumin	109	288557436	11
1385	Secale cereale	Rye	Unassigned	Aero Plant	Secale 30K pollen grp 5	16	75140047	7
1386	Secale cereale	Rye	Unassigned	Food Plant	Secale 30K pollen grp 5	292	332205751	12

1387	Secale cereale	Rye	Sec c 1	Aero Plant	Secale sec c 1	26	75198875	7
1388	Secale cereale	Rye	Unassigned	Aero Plant	Secale Sec c 4	520	55859456	7
1389	Secale cereale	Rye	Unassigned	Aero Plant	Secale Sec c 4	518	55859454	7
1390	Sepia esculenta		Unassigned	Food Animal	Sepia tropomyosin	284	83715928	7
1391	Sepioteuthis lessoniana		Unassigned	Food Animal	Sepioteuthis tropomyosin	284	83715930	7
1392	Sesamum indicum	Sesame	Ses i 1	Food Plant	Sesamum Ses i 1	153	13183175	7
1393	Sesamum indicum	Sesame	Unassigned	Food Plant	Sesamum Ses i 1	153	209165427	10
1394	Sesamum indicum	Sesame	Ses i 2	Food Plant	Sesamum Ses i 2	148	5381323	7
1395	Sesamum indicum	Sesame	Ses i 3	Food Plant	Sesamum Ses i 3	585	13183177	7
1396	Sesamum indicum	Sesame	Unassigned	Food Plant	Sesamum Ses i 5	145	198250343	10
1397	Sesamum indicum	Sesame	Unassigned	Food Plant	Sesamum Ses i 5	145	75315271	10
1398	Sinapis alba	White mustard	Sin a 1	Food Plant	Sinapis Sin a 1.01	145	1009434	7
1399	Sinapis alba	White mustard	Sin a 1	Food Plant	Sinapis Sin a 1.01	145	1009436	7
1400	Sinapis alba	White mustard	Sin a 1	Food Plant	Sinapis Sin a 1.01	145	1009438	7
1401	Sinapis alba	White mustard	Sin a 1	Food Plant	Sinapis Sin a 1.01	145	1009440	7
1402	Sinapis alba	White mustard	Sin a 1	Food Plant	Sinapis Sin a 1.01	145	1009442	7
1403	Sinapis alba	White mustard	Sin a 1	Food Plant	Sinapis Sin a 1.01	145	51338758	7
1404	Sinapis alba	White mustard	Sin a 2.0101	Food Plant	Sinapis Sin a 2.01 11S globulin	510	62240390	7
1405	Sinapis alba	White mustard	Unassigned	Food Plant	Sinapis Sin a 2.01 11S globulin	523	62240392	7
1406	Sinapis alba	White mustard	Sin a 3.0101	Food Plant	Sinapis Sin a 3.01 LTP	92	156778059	12
1407	Sinapis alba	White mustard	Sin a 4.0101	Food Plant	Sinapis Sin a 4.01 profilin	131	156778061	12
1408	Solanum tuberosum	Potato	Unassigned	Food Plant	Solanum profilin-like	131	77416979	7
1409	Solanum tuberosum	Potato	Unassigned	Food Plant	Solanum profilin-like	131	77999277	7
1410	Solanum tuberosum	Potato	Unassigned	Food Plant	Solanum Sola t 1	386	21510	7
1411	Solanum tuberosum	Potato	Unassigned	Food Plant	Solanum Sola t 1	386	21512	7
1412	Solanum tuberosum	Potato	Unassigned	Food Plant	Solanum Sola t 1	386	21514	7
1413	Solanum tuberosum	Potato	Unassigned	Food Plant	Solanum Sola t 1	386	169500	7
1414	Solanum tuberosum	Potato	Sola t 1	Food Plant	Solanum Sola t 1	386	158517845	9

1415	Solanum tuberosum	Potato	Sola t 2	Food Plant	Solanum Sola t 2	188	124148	7
1416	Solanum tuberosum	Potato	Sola t 3	Food Plant	Solanum Sola t 3	222	20141344	7
1417	Solanum tuberosum	Potato	Unassigned	Food Plant	Solanum Sola t 4	217	21413	7
1418	Solanum tuberosum	Potato	Sola t 4	Food Plant	Solanum Sola t 4	221	20141714	7
1419	Solen strictus		Unassigned	Food Animal	Solen tropomyosin	284	219806602	10
1420	Solenopsis invicta	Red fire ant	Unassigned	Venom or Salivary	Solenopsis Sol i 1	58	1336809	7
1421	Solenopsis invicta	Red fire ant	Unassigned	Venom or Salivary	Solenopsis Sol i 1	25	1336811	7
1422	Solenopsis invicta	Red fire ant	Unassigned	Venom or Salivary	Solenopsis Sol i 1	26	1336812	7
1423	Solenopsis invicta	Red fire ant	Unassigned	Venom or Salivary	Solenopsis Sol i 1	26	1336813	7
1424	Solenopsis invicta	Red fire ant	Unassigned	Venom or Salivary	Solenopsis Sol i 1	346	51093373	7
1425	Solenopsis invicta	Red fire ant	Sol i 2	Venom or Salivary	Solenopsis Sol i and Sol r Venom allergen II	138	549179	7
1426	Solenopsis richteri	Black fire ant	Unassigned	Venom or Salivary	Solenopsis Sol i and Sol r Venom allergen II	119	6136162	7
1427	Solenopsis invicta	Red fire ant	Sol i 3	Venom or Salivary	Solenopsis Venom allergen III	234	14424466	7
1428	Solenopsis richteri	Black fire ant	Unassigned	Venom or Salivary	Solenopsis Venom allergen III	211	6136163	7
1429	Solenopsis geminata	Tropical Fire Ant	Sol g 4	Venom or Salivary	Solenopsis Venom allergen IV	137	7638028	7
1430	Solenopsis geminata	Tropical Fire Ant	Sol g 4	Venom or Salivary	Solenopsis Venom allergen IV	137	7638030	7
1431	Solenopsis invicta	Red fire ant	Sol i 4	Venom or Salivary	Solenopsis Venom allergen IV	137	4038411	7
1432	Solenopsis invicta	Red fire ant	Sol i 4	Venom or Salivary	Solenopsis Venom allergen IV	137	14424465	7
1433	Solenopsis saevissima	Brazilian fire ant	Unassigned	Venom or Salivary	Solenopsis Venom allergen IV	137	291092710	12
1434	Staphylococcus laureus		Unassigned	Bacteria skin	Staphylococcus enterotoxin SEA	233	1633233	9
1435	Staphylococcus laureus		Unassigned	Bacteria skin	Staphylococcus enterotoxin SEB	254	83308249	9
1436	Staphylococcus laureus		Unassigned	Bacteria skin	Staphylococcus enterotoxin SEC	266	462026	9

1437	Staphylococcus aureus		Unassigned	Bacteria skin	Staphylococcus enterotoxin SED	258	119654	9
1438	Staphylococcus aureus		Unassigned	Bacteria skin	Staphylococcus enterotoxin TSST 1	234	136457	9
1439	Suidasia medanensis		Unassigned	Aero Mite	Suidasia putative Sui m 2	141	45738062	7
1440	Sus scrofa	Pig	Unassigned	Aero Animal	Sus Porcine Pepsin	385	118572685	11
1441	Syringa vulgaris	Lilac	Syr v 1.0101	Aero Plant	Syringa Syr v I	145	631911	7
1442	Syringa vulgaris	Lilac	Syr v 1.0102	Aero Plant	Syringa Syr v I	145	631912	7
1443	Syringa vulgaris	Lilac	Syr v 1.0103	Aero Plant	Syringa Syr v I	145	631913	7
1444	Tabanus yao	Horse Fly	Tab y 1.0101	Venom or Salivary	Tabanus Tab y 1 Apyrase	554	323473390	12
1445	Tabanus yao	Horse Fly	Tab y 2.0101	Venom or Salivary	Tabanus Tab y 2 Hyaluronidase	349	304273371	12
1446	Tabanus yao	Horse Fly	Tab y 5.0101	Venom or Salivary	Tabanus Tab y 5	256	304273369	12
1447	Thaumetopoea pityocampa	Pine moth	Unassigned	Contact	Thaumetopoea Tha p 1	126	301030229	12
1448	Theragra chalcogramma	Alaska pollock	Unassigned	Food Animal	Theragra parvalbumin	109	14531020	7
1449	Theragra chalcogramma	Alaska pollock	Unassigned	Food Animal	Theragra parvalbumin	109	14531018	7
1450	Todarodes pacificus	Japanese flying squid	Unassigned	Food Animal	Todarodes tropomyosin	284	83715932	7
1451	Trachurus japonicus		Unassigned	Food Animal	Trachurus parvalbumin	107	77799800	7
1452	Tresus keenae		Unassigned	Food Animal	Tresus tropomyosin	284	219806600	10
1453	Triatoma protracta	Western conenose	Tria p 1	Venom or Salivary	Triatoma Tria p 1	169	15426413	7
1454	Arthroderma benhamiae	Fungus	Unassigned	Contact	Trichophyton (Arthroderma) Tri m 2	292	23894240	7
1455	Arthroderma benhamiae	Fungus	Unassigned	Contact	Trichophyton (Arthroderma) Tri m 2	404	23894244	7
1456	Trichophyton rubrum	Fungus	Tri r 2	Contact	Trichophyton (Arthroderma) Tri m 2	412	5813790	7
1457	Trichophyton schoenleinii	Fungus	Unassigned	Contact	Trichophyton (Arthroderma) Tri m 2	405	74663809	12
1458	Arthroderma benhamiae	Fungus	Unassigned	Contact	Trichophyton (Arthroderma) Tri m 2	726	23894232	7

					4			
1459	Arthroderma vanbreuseghemii	Fungus	Unassigned	Contact	Trichophyton (Arthroderma) Tri m 4	726	219687753	10
1460	Trichophyton rubrum	Fungus	Tri r 4	Contact	Trichophyton tri 4 allergen (Arthroderma)	726	5813788	7
1461	Trichophyton schoenleinii	Fungus	Unassigned	Contact	Trichophyton tri 4 allergen (Arthroderma)	726	23894227	7
1462	Triticum aestivum	Wheat	Unassigned	Aero Plant	Triticum Tri a 14 LTP_amylase inhibitor	113	417370	11
1463	Triticum aestivum	Wheat	Unassigned	Food Plant	Triticum 5a2 protein	94	66840998	7
1464	Triticum aestivum	Wheat	Unassigned	Aero Plant	Triticum aAI CM16_17	143	195957140	10
1465	Triticum aestivum	Wheat	Unassigned	Food Plant	Triticum aAI CM16_17	143	21711	7
1466	Triticum turgidum	Wheat	Unassigned	Aero Plant	Triticum aAI CM16_17	18	244610	7
1467	Triticum turgidum subsp. durum	Wheat	Unassigned	Food Plant	Triticum aAI CM16_17	143	21916	7
1468	Triticum aestivum	Wheat	Unassigned	Food Plant	Triticum aAI CM3	168	21713	7
1469	Triticum turgidum subsp. durum	Wheat	Unassigned	Food Plant	Triticum aAI CM3	168	100834	7
1470	Triticum aestivum	Wheat	Unassigned	Food Plant	Triticum Alpha/beta gliadin IgE & celiac	286	21755	7
1471	Triticum aestivum	Wheat	Unassigned	Gliadin	Triticum Alpha/beta gliadin IgE & celiac	307	21673	7
1472	Triticum aestivum	Wheat	Unassigned	Gliadin	Triticum Alpha/beta gliadin IgE & celiac	296	21757	7
1473	Triticum aestivum	Wheat	Unassigned	Gliadin	Triticum Alpha/beta gliadin IgE & celiac	286	21761	7
1474	Triticum aestivum	Wheat	Unassigned	Gliadin	Triticum Alpha/beta gliadin IgE & celiac	313	21765	7
1475	Triticum aestivum	Wheat	Unassigned	Gliadin	Triticum Alpha/beta gliadin IgE & celiac	318	170710	7
1476	Triticum aestivum	Wheat	Unassigned	Gliadin	Triticum Alpha/beta gliadin IgE & celiac	291	170712	7

1477	Triticum aestivum	Wheat	Unassigned	Gliadin	Triticum Alpha/beta gliadin IgE & celiac	313	170718	7
1478	Triticum aestivum	Wheat	Unassigned	Gliadin	Triticum Alpha/beta gliadin IgE & celiac	286	170720	7
1479	Triticum aestivum	Wheat	Unassigned	Gliadin	Triticum Alpha/beta gliadin IgE & celiac	262	170722	7
1480	Triticum aestivum	Wheat	Unassigned	Gliadin	Triticum Alpha/beta gliadin IgE & celiac	297	170724	7
1481	Triticum aestivum	Wheat	Unassigned	Gliadin	Triticum Alpha/beta gliadin IgE & celiac	282	170726	7
1482	Triticum aestivum	Wheat	Unassigned	Gliadin	Triticum Alpha/beta gliadin IgE & celiac	186	170728	7
1483	Triticum aestivum	Wheat	Unassigned	Gliadin	Triticum Alpha/beta gliadin IgE & celiac	287	473876	7
1484	Triticum aestivum	Wheat	Unassigned	Gliadin	Triticum Alpha/beta gliadin IgE & celiac	259	1304264	7
1485	Triticum urartu	Wheat	Unassigned	Food Plant	Triticum Alpha/beta gliadin IgE & celiac	296	170740	7
1486	Triticum aestivum	Wheat	Unassigned	Aero Plant	Triticum Bakers asthma allergen #4	27	3913017	7
1487	Triticum aestivum	Wheat	Unassigned	Gliadin	Triticum gamma gliadin IgE & celiac	302	170702	7
1488	Triticum aestivum	Wheat	Unassigned	Gliadin	Triticum gamma gliadin IgE & celiac	291	170708	7
1489	Triticum aestivum	Wheat	Unassigned	Gliadin	Triticum gamma gliadin IgE & celiac	304	170730	7
1490	Triticum aestivum	Wheat	Unassigned	Gliadin	Triticum gamma gliadin IgE & celiac	323	170732	7
1491	Triticum aestivum	Wheat	Unassigned	Gliadin	Triticum gamma gliadin IgE & celiac	244	170734	7
1492	Triticum aestivum	Wheat	Unassigned	Gliadin	Triticum gamma gliadin IgE & celiac	251	170736	7
1493	Triticum aestivum	Wheat	Unassigned	Gliadin	Triticum gamma gliadin IgE & celiac	327	170738	7
1494	Triticum aestivum	Wheat	Unassigned	Gliadin	Triticum gamma gliadin IgE & celiac	279	1063270	7

					celiac			
1495	Triticum aestivum	Wheat	Unassigned	Gliadin	Triticum gamma gliadin IgE & celiac	285	62484809	7
1496	Triticum aestivum	Wheat	Unassigned	Food Plant	Triticum HMW glutenin	830	21743	7
1497	Triticum aestivum	Wheat	Unassigned	Food Plant	Triticum HMW glutenin	648	21751	7
1498	Triticum aestivum	Wheat	Unassigned	Food Plant	Triticum HMW glutenin	660	21779	7
1499	Triticum aestivum	Wheat	Unassigned	Food Plant	Triticum HMW glutenin	39	21793	7
1500	Triticum aestivum	Wheat	Unassigned	Food Plant	Triticum HMW glutenin	705	22090	7
1501	Triticum aestivum	Wheat	Unassigned	Food Plant	Triticum HMW glutenin	815	170743	7
1502	Triticum aestivum	Wheat	Unassigned	Food Plant	Triticum HMW glutenin	838	736319	7
1503	Triticum aestivum	Wheat	Unassigned	Food Plant	Triticum HMW glutenin	101	897811	7
1504	Triticum aestivum	Wheat	Unassigned	Food Plant	Triticum LMW glutenin	307	21773	7
1505	Triticum aestivum	Wheat	Unassigned	Food Plant	Triticum LMW glutenin	356	21783	7
1506	Triticum aestivum	Wheat	Unassigned	Food Plant	Triticum LMW glutenin	373	75317968	7
1507	Triticum aestivum	Wheat	Unassigned	Food Plant	Triticum LMW glutenin	229	886963	7
1508	Triticum aestivum	Wheat	Unassigned	Food Plant	Triticum LMW glutenin	261	886965	7
1509	Triticum aestivum	Wheat	Unassigned	Food Plant	Triticum LMW glutenin	276	886967	7
1510	Triticum aestivum	Wheat	Unassigned	Food Plant	Triticum LMW glutenin	285	75219081	7
1511	Triticum aestivum	Wheat	Unassigned	Food Plant	Triticum LMW glutenin	326	62550933	7
1512	Triticum aestivum	Wheat	Unassigned	Food Plant	Triticum LMW glutenin	369	335331566	12
1513	Triticum turgidum subsp. durum	Wheat	Unassigned	Food Plant	Triticum LMW glutenin	295	21926	7
1514	Triticum turgidum subsp. durum	Wheat	Unassigned	Food Plant	Triticum LMW glutenin	285	21930	7
1515	Triticum aestivum	Wheat	Unassigned	Food Plant	Triticum omega-5 gliadin Tri a 19	439	73912496	7
1516	Triticum	Wheat	Unassigned	Food Plant	Triticum omega-5	359	208605344	10

	aestivum				gliadin Tri a 19			
1517	Triticum aestivum	Wheat	Unassigned	Food Plant	Triticum omega-5 gliadin Tri a 19	272	208605346	10
1518	Triticum aestivum	Wheat	Unassigned	Food Plant	Triticum omega-5 gliadin Tri a 19	346	208605348	10
1519	Triticum aestivum	Wheat	Unassigned	Food Plant	Triticum Profilin	141	1008443	7
1520	Triticum aestivum	Wheat	Unassigned	Food Plant	Triticum Profilin	140	1008445	7
1521	Triticum aestivum	Wheat	Unassigned	Food Plant	Triticum Profilin	138	1052817	7
1522	Triticum aestivum	Wheat	Unassigned	Food Plant	Triticum Profilin	131	190684061	11
1523	Triticum aestivum	Wheat	Unassigned	Aero Plant	Triticum putative flour allergens Constantin 2010	118	190684055	11
1524	Triticum aestivum	Wheat	Unassigned	Aero Plant	Triticum putative flour allergens Constantin 2010	222	190684057	11
1525	Triticum aestivum	Wheat	Unassigned	Aero Plant	Triticum putative flour allergens Constantin 2010	218	190684059	11
1526	Triticum aestivum	Wheat	Unassigned	Aero Plant	Triticum putative flour allergens Constantin 2010	213	190684063	11
1527	Triticum aestivum	Wheat	Unassigned	Food Plant	Triticum putative leucine-rich repeat protein	137	66840996	7
1528	Triticum aestivum	Wheat	Unassigned	Food Plant	Triticum serine carboxypeptidase II	260	66840994	7
1529	Triticum aestivum	Wheat	Unassigned	Food Plant	Triticum serine carboxypeptidase II	444	125987805	10
1530	Triticum aestivum	Wheat	Unassigned	Food Plant	Triticum Serine protease inhibitor	399	1885350	7
1531	Triticum aestivum	Wheat	Unassigned	Aero Plant	Triticum serine proteinase inhibitor-like	84	154101366	10
1532	Triticum aestivum	Wheat	Unassigned	Aero Plant	Triticum serine proteinase inhibitor-like	84	122065237	11
1533	Triticum aestivum	Wheat	Unassigned	Food Plant	Triticum Thaumatococcus-like	173	135917	12
1534	Triticum aestivum	Wheat	Unassigned	Aero Plant	Triticum Tri a 29	120	253783731	11
1535	Triticum aestivum	Wheat	Unassigned	Aero Plant	Triticum Tri a 29	120	283465827	11
1536	Triticum aestivum	Wheat	Unassigned	Food Plant	Triticum Tri a 29	145	21701	7

1537	Triticum turgidum subsp. durum	Wheat	Unassigned	Food Plant	Triticum Tri a 29	145	21920	7
1538	Triticum aestivum	Wheat	Unassigned	Food Plant	Triticum Triosephosphate isomerase	253	11124572	7
1539	Tyrophagus putrescentiae	Dust mite	Unassigned	Aero Mite	Tyrophagus Tyr p 10 tropomyosin	284	148615631	9
1540	Tyrophagus putrescentiae	Dust mite	Unassigned	Aero Mite	Tyrophagus Tyr p 10 tropomyosin	201	156938915	9
1541	Tyrophagus putrescentiae	Dust mite	Unassigned	Aero Mite	Tyrophagus Tyr p 10 tropomyosin	284	48249227	9
1542	Tyrophagus putrescentiae	Dust mite	Tyr p 13	Aero Mite	Tyrophagus Tyr p 13	131	51860756	7
1543	Tyrophagus putrescentiae	Dust mite	Unassigned	Aero Mite	Tyrophagus Tyr p 13	130	121296500	9
1544	Tyrophagus putrescentiae	Dust mite	Unassigned	Aero Mite	Tyrophagus Tyr p 13	131	156938917	9
1545	Tyrophagus putrescentiae	Dust mite	Unassigned	Aero Mite	Tyrophagus Tyr p 2	141	3182907	9
1546	Tyrophagus putrescentiae	Dust mite	Unassigned	Aero Mite	Tyrophagus Tyr p 24 Troponin C	153	219815476	11
1547	Tyrophagus putrescentiae	Dust mite	Unassigned	Aero Mite	Tyrophagus Tyr p 3	285	167540622	11
1548	Vespa crabro	European hornet	Vesp c 5	Venom or Salivary	Vespa Venom allergen 5 hornets	202	549184	7
1549	Vespa crabro	European hornet	Vesp c 5	Venom or Salivary	Vespa Venom allergen 5 hornets	202	549185	7
1550	Vespa mandarinia	Wasp	Vesp m 5	Venom or Salivary	Vespa Venom allergen 5 hornets	202	6136165	7
1551	Vespa crabro	European hornet	Unassigned	Venom or Salivary	Vespa Vesp c 1 phospholipase	301	313471397	12
1552	Vespula germanica	Wasp	Unassigned	Venom or Salivary	Vespula Phospholipase A1- Ves m/v 1	300	74035843	7
1553	Vespula maculifrons	Wasp	Ves m 1	Venom or Salivary	Vespula Phospholipase A1- Ves m/v 1	300	1709545	8
1554	Vespula vulgaris	Wasp	Ves v 1	Venom or Salivary	Vespula Phospholipase A1- Ves m/v 1	336	897647	7
1555	Vespula flavopilosa	Wasp	Ves f 5	Venom or Salivary	Vespula Venom allergen 5 yellow jackets	204	549189	7
1556	Vespula germanica	Wasp	Ves g 5	Venom or Salivary	Vespula Venom allergen 5 yellow jackets	204	549190	7
1557	Vespula germanica	Wasp	Unassigned	Venom or Salivary	Vespula Venom allergen 5 yellow	204	74035841	7

					jackets			
1558	Vespula maculifrons	Wasp	Ves m 5	Venom or Salivary	Vespula Venom allergen 5 yellow jackets	204	549191	7
1559	Vespula maculifrons	Wasp	Unassigned	Venom or Salivary	Vespula Venom allergen 5 yellow jackets	227	85681830	7
1560	Vespula pensylvanica	Wasp	Ves p 5	Venom or Salivary	Vespula Venom allergen 5 yellow jackets	204	549192	7
1561	Vespula squamosa	Wasp	Ves s 5	Venom or Salivary	Vespula Venom allergen 5 yellow jackets	205	549193	7
1562	Vespula vidua	Wasp	Ves vi 5	Venom or Salivary	Vespula Venom allergen 5 yellow jackets	206	549194	7
1563	Vespula vulgaris	Wasp	Ves v 5	Venom or Salivary	Vespula Venom allergen 5 yellow jackets	227	162551	7
1564	Vespula vulgaris	Wasp	Ves v 5	Venom or Salivary	Vespula Venom allergen 5 yellow jackets	204	4826574	7
1565	Vespula vulgaris	Wasp	Ves v 5	Venom or Salivary	Vespula Venom allergen 5 yellow jackets	209	11514279	7
1566	Vespula maculifrons	Wasp	Unassigned	Venom or Salivary	Vespula Ves m 2 Hyaluronidase	31	313118253	12
1567	Vespula squamosa	Wasp	Unassigned	Venom or Salivary	Vespula Ves s 1 phospholipase	298	313471398	12
1568	Vespula germanica	Wasp	Unassigned	Venom or Salivary	Vespula Ves v 2	331	116174180	8
1569	Vespula germanica	Wasp	Unassigned	Venom or Salivary	Vespula Ves v 2	323	116174182	8
1570	Vespula vulgaris	Wasp	Ves v 2	Venom or Salivary	Vespula Ves v 2	331	1346323	7
1571	Vespula vulgaris	Wasp	Unassigned	Venom or Salivary	Vespula Ves v 2	340	62147665	7
1572	Vespula vulgaris	Wasp	Unassigned	Venom or Salivary	Vespula Ves v 2	331	109157163	8
1573	Vespula vulgaris	Wasp	Unassigned	Venom or Salivary	Vespula Ves v 3 dipeptidylpeptidase IV	776	313471718	12
1574	Vigna radiata		Unassigned	Food Plant	Vigna Vig r 1 PR 10	155	60418924	7
1575	Vitis sp.	Grape	Unassigned	Food Plant	Vitis Lipid transfer protein P3	91	145559502	8
1576	Vitis sp.	Grape	Vit v 1	Food Plant	Vitis Vit v 1 LTP	37	462719	7
1577	Vitis sp.	Grape	Unassigned	Food Plant	Vitis Vit v 1 LTP	38	462717	7
1578	Xiphias gladius		Unassigned	Food	Xiphias Xip g 1	109	222352960	10

				Animal	beta-parvalbumin			
1579	Zea mays	Corn	Unassigned	Aero Plant	Zea m 1 isoform	263	89892721	7
1580	Zea mays	Corn	Unassigned	Aero Plant	Zea m 1 isoform	252	89892723	7
1581	Zea mays	Corn	Unassigned	Aero Plant	Zea m 1 isoform	99	105969543	8
1582	Zea mays	Corn	Unassigned	Aero Plant	Zea m 1 isoform	269	105969545	8
1583	Zea mays	Corn	Unassigned	Aero Plant	Zea m 1 isoform	270	115502167	9
1584	Zea mays	Corn	Unassigned	Aero Plant	Zea m 1 isoform	269	115502168	9
1585	Zea mays	Corn	Unassigned	Food Plant	Zea profilin	131	2642324	7
1586	Zea mays	Corn	Unassigned	Food Plant	Zea profilin	131	110644952	8
1587	Zea mays	Corn	Unassigned	Food Plant	Zea profilin	131	110644954	8
1588	Zea mays	Corn	Unassigned	Food Plant	Zea profilin	131	110644956	8
1589	Zea mays	Corn	Unassigned	Food Plant	Zea profilin	131	110644958	8
1590	Zea mays	Corn	Unassigned	Food Plant	Zea profilin	131	110644960	8
1591	Zea mays	Corn	Unassigned	Food Plant	Zea profilin	131	110644962	8
1592	Zea mays	Corn	Unassigned	Food Plant	Zea profilin	130	110644964	8
1593	Zea mays	Corn	Unassigned	Aero Plant	Zea putative Zea m 13?	410	89892725	7
1594	Zea mays	Corn	Unassigned	Aero Plant	Zea putative Zea m 13?	404	89892727	7
1595	Zea mays	Corn	Unassigned	Aero Plant	Zea putative Zea m 13?	411	89892729	7
1596	Zea mays	Corn	Unassigned	Aero Plant	Zea Zea m 13	170	1588669	7
1597	Zea mays	Corn	Zea m 14	Food Plant	Zea Zea m 14	120	128388	7
1598	Zea mays	Corn	Unassigned	Aero Plant	Zea Zea m 25 thioredoxin	128	66841002	7
1599	Zea mays	Corn	Unassigned	Aero Plant	Zea Zea m1	269	28630919	7
1600	Zea mays	Corn	Unassigned	Aero Plant	Zea Zea m1	269	28630923	7
1601	Zea mays	Corn	Unassigned	Aero Plant	Zea Zea m1	269	14193761	8
1602	Zea mays	Corn	Unassigned	Aero Plant	Zea Zea m1	245	114794319	8
1603	Ziziphus mauritiana	Chinese-date	Unassigned	Food Plant	Ziziphus Ziz m 1	330	61225281	7

D.1 Omitted allergens from allergenonline

A few of the entries were omitted, due to wrong accession codes, unpublished sequences or other errors:

Blomia tropicalis Mite UnassignedAero MiteBlomia Blo t 1.02
Brassica oleracea Cabbage UnassignedFood PlantBrassica Bra o 3 LTP manual entry

E List of allergens from allergen.org

List of allergens that have been tested by the EFSA scientific opinion recommended allergen analysis described in section 2. The sequences were downloaded via <http://www.allergen.org>.

Aca s 13.0101 076821 *Acarus siro* (Storage mite)
Act c 10.0101 P85204 *Actinidia chinensis* (Gold Kiwi fruit)
Act c 5.0101 P85261 *Actinidia chinensis* (Gold Kiwi fruit)
Act c 8.0101 D1YSM4 *Actinidia chinensis* (Gold Kiwi fruit)
Act d 1.0101 P00785 *Actinidia deliciosa* (Kiwi fruit)
Act d 10.0101 P85205 *Actinidia deliciosa* (Kiwi fruit)
Act d 10.0201 P85206 *Actinidia deliciosa* (Kiwi fruit)
Act d 11.0101 P85524 *Actinidia deliciosa* (Kiwi fruit)
Act d 2.0101 P81370 *Actinidia deliciosa* (Kiwi fruit)
Act d 3.0101 P85063 *Actinidia deliciosa* (Kiwi fruit)
Act d 4.0101 Q6TPK4 *Actinidia deliciosa* (Kiwi fruit)
Act d 5.0101 P84527 *Actinidia deliciosa* (Kiwi fruit)
Act d 6.0101 P83326 *Actinidia deliciosa* (Kiwi fruit)
Act d 7.0101 P85076 *Actinidia deliciosa* (Kiwi fruit)
Act d 8.0101 D1YSM5 *Actinidia deliciosa* (Kiwi fruit)
Aed a 1.0101 P50635 *Aedes aegypti* (Yellow fever mosquito)
Aed a 2.0101 P18153 *Aedes aegypti* (Yellow fever mosquito)
Aed a 3.0101 001949 *Aedes aegypti* (Yellow fever mosquito)
Aln g 1.0101 P38948 *Alnus glutinosa* (Alder)
Aln g 4.0101 081701 *Alnus glutinosa* (Alder)
Alt a 1.0101 P79085 *Alternaria alternata* (Alternaria rot fungus)
Alt a 1.0102 Q6Q128 *Alternaria alternata* (Alternaria rot fungus)
Alt a 10.0101 P42041 *Alternaria alternata* (Alternaria rot fungus)
Alt a 12.0101 P49148 *Alternaria alternata* (Alternaria rot fungus)
Alt a 13.0101 Q6R4B4 *Alternaria alternata* (Alternaria rot fungus)
Alt a 3.0101 P78983 *Alternaria alternata* (Alternaria rot fungus)
Alt a 4.0101 Q00002 *Alternaria alternata* (Alternaria rot fungus)
Alt a 5.0101 P42037 *Alternaria alternata* (Alternaria rot fungus)
Alt a 6.0101 Q9HDT3 *Alternaria alternata* (Alternaria rot fungus)
Alt a 7.0101 P42058 *Alternaria alternata* (Alternaria rot fungus)
Alt a 8.0101 P0C0Y4 *Alternaria alternata* (Alternaria rot fungus)
Ama r 2.0101 C3W2Q7 *Amaranthus retroflexus* (Redroot pigweed)
Amb a 1.0101 P27759 *Ambrosia artemisiifolia* (Short ragweed)
Amb a 1.0201 P27760 *Ambrosia artemisiifolia* (Short ragweed)
Amb a 1.0202 E1XUL3 *Ambrosia artemisiifolia* (Short ragweed)
Amb a 1.0301 P27761 *Ambrosia artemisiifolia* (Short ragweed)
Amb a 1.0302 P27761 *Ambrosia artemisiifolia* (Short ragweed)
Amb a 1.0304 E1XUL4 *Ambrosia artemisiifolia* (Short ragweed)
Amb a 1.0305 E1XUL5 *Ambrosia artemisiifolia* (Short ragweed)
Amb a 1.0401 P28744 *Ambrosia artemisiifolia* (Short ragweed)
Amb a 1.0402 E1XUL9 *Ambrosia artemisiifolia* (Short ragweed)
Amb a 1.0501 P27762 *Ambrosia artemisiifolia* (Short ragweed)
Amb a 1.0502 E1XUM1 *Ambrosia artemisiifolia* (Short ragweed)
Amb a 10.0101 Q2KN25 *Ambrosia artemisiifolia* (Short ragweed)
Amb a 3.0101 P00304 *Ambrosia artemisiifolia* (Short ragweed)
Amb a 5.0101 P02878 *Ambrosia artemisiifolia* (Short ragweed)
Amb a 6.0101 004004 *Ambrosia artemisiifolia* (Short ragweed)
Amb a 8.0101 Q2KN24 *Ambrosia artemisiifolia* (Short ragweed)
Amb a 8.0102 Q2KN23 *Ambrosia artemisiifolia* (Short ragweed)
Amb a 9.0101 Q2KN27 *Ambrosia artemisiifolia* (Short ragweed)
Amb a 9.0102 Q2KN26 *Ambrosia artemisiifolia* (Short ragweed)
Amb p 5.0101 P43174 *Ambrosia psilostachya* (Western ragweed)
Amb p 5.0201 P43175 *Ambrosia psilostachya* (Western ragweed)
Amb t 5.0101 P10414 *Ambrosia trifida* (Giant ragweed)
Ana c 1.0101 Q94JN2 *Ananas comosus* (Pineapple)
Ana c 2.0101 023791 *Ananas comosus* (Pineapple)
Ana o 1.0101 Q8L5L5 *Anacardium occidentale* (Cashew)
Ana o 1.0102 Q8L5L6 *Anacardium occidentale* (Cashew)
Ana o 2.0101 Q8GZP6 *Anacardium occidentale* (Cashew)

Ana o 3.0101 Q8H2B8 Anacardium occidentale (Cashew)
 Ani s 1.0101 Q7Z1K3 Anisakis simplex (Nematode)
 Ani s 2.0101 Q9NJA9 Anisakis simplex (Nematode)
 Ani s 3.0101 Q9NAS5 Anisakis simplex (Nematode)
 Ani s 4.0101 Q14QT4 Anisakis simplex (Nematode)
 Ani s 5.0101 A1IKL2 Anisakis simplex (Nematode)
 Ani s 6.0101 A1IKL3 Anisakis simplex (Nematode)
 Ani s 9.0101 B2XCP1 Anisakis simplex (Nematode)
 Ant o 1.0101 Q7M1X6 Anthoxanthum odoratum (Sweet vernal grass)
 Api c 1.0101 Q9BMK4 Apis cerana (Eastern hive bee)
 Api d 1.0101 Q7M4I5 Apis dorsata (Giant honeybee)
 Api g 1.0101 P49372 Apium graveolens (Celery)
 Api g 1.0201 P92918 Apium graveolens (Celery)
 Api g 3.0101 P92919 Apium graveolens (Celery)
 Api g 4.0101 Q9XF37 Apium graveolens (Celery)
 Api g 5.0101 P81943 Apium graveolens (Celery)
 Api m 1.0101 P00630 Apis mellifera (Honey bee)
 Api m 10.0101 Q1HHN7 Apis mellifera (Honey bee)
 Api m 2.0101 Q08169 Apis mellifera (Honey bee)
 Api m 3.0101 Q4TUB9 Apis mellifera (Honey bee)
 Api m 4.0101 P01501 Apis mellifera (Honey bee)
 Api m 5.0101 B2D0J4 Apis mellifera (Honey bee)
 Api m 7.0101 Q8MQS8 Apis mellifera (Honey bee)
 Api m 8.0101 B2D0J5 Apis mellifera (Honey bee)
 Api m 9.0101 C9WMM5 Apis mellifera (Honey bee)
 Ara h 1.0101 P43238 Arachis hypogaea (Peanut)
 Ara h 10.0101 Q647G5 Arachis hypogaea (Peanut)
 Ara h 10.0102 Q647G4 Arachis hypogaea (Peanut)
 Ara h 11.0101 Q45W87 Arachis hypogaea (Peanut)
 Ara h 2.0101 Q6PSU2 Arachis hypogaea (Peanut)
 Ara h 2.0201 Q6PSU2 Arachis hypogaea (Peanut)
 Ara h 3.0101 O82580 Arachis hypogaea (Peanut)
 Ara h 3.0201 Q9SQH7 Arachis hypogaea (Peanut)
 Ara h 5.0101 Q9SQI9 Arachis hypogaea (Peanut)
 Ara h 6.0101 Q647G9 Arachis hypogaea (Peanut)
 Ara h 7.0101 Q9SQH1 Arachis hypogaea (Peanut)
 Ara h 7.0201 B4XID4 Arachis hypogaea (Peanut)
 Ara h 8.0101 Q6VT83 Arachis hypogaea (Peanut)
 Ara h 8.0201 BOYIU5 Arachis hypogaea (Peanut)
 Ara h 9.0101 B6CEX8 Arachis hypogaea (Peanut)
 Ara h 9.0201 B6CG41 Arachis hypogaea (Peanut)
 Arc s 8.0101 Q8T5G9 Archaeopotamobius sibiricus (Crustacean species)
 Arg r 1.0101 Q5GQ85 Argas reflexus (Pigeon tick)
 Art fr 5.0101 A7L499 Artemia franciscana (Brine shrimp)
 Art v 1.0101 Q84ZX5 Artemisia vulgaris (Mugwort)
 Art v 2.0101 Q7M1G9 Artemisia vulgaris (Mugwort)
 Art v 3.0101 P0C088 Artemisia vulgaris (Mugwort)
 Art v 3.0201 C4MGG9 Artemisia vulgaris (Mugwort)
 Art v 3.0202 C4MGH0 Artemisia vulgaris (Mugwort)
 Art v 3.0301 C4MGH1 Artemisia vulgaris (Mugwort)
 Art v 4.0101 Q8H2C9 Artemisia vulgaris (Mugwort)
 Art v 4.0201 Q8H2C8 Artemisia vulgaris (Mugwort)
 Art v 5.0101 A0PJ17 Artemisia vulgaris (Mugwort)
 Art v 6.0101 A0PJ16 Artemisia vulgaris (Mugwort)
 Asc l 3.0101 COL3K2 Ascaris lumbricoides (Common roundworm)
 Asc s 1.0101 Q06811 Ascaris suum (Pig roundworm)
 Asp f 1.0101 P67875 Aspergillus fumigatus (fungus)
 Asp f 10.0101 Q12547 Aspergillus fumigatus (fungus)
 Asp f 11.0101 Q9Y7F6 Aspergillus fumigatus (fungus)
 Asp f 12.0101 P40292 Aspergillus fumigatus (fungus)
 Asp f 13.0101 P28296 Aspergillus fumigatus (fungus)
 Asp f 15.0101 O60022 Aspergillus fumigatus (fungus)
 Asp f 16.0101 O74682 Aspergillus fumigatus (fungus)
 Asp f 17.0101 O60025 Aspergillus fumigatus (fungus)
 Asp f 18.0101 P87184 Aspergillus fumigatus (fungus)
 Asp f 2.0101 P79017 Aspergillus fumigatus (fungus)
 Asp f 22.0101 Q96X30 Aspergillus fumigatus (fungus)
 Asp f 23.0101 Q8NKF4 Aspergillus fumigatus (fungus)
 Asp f 27.0101 Q4WWX5 Aspergillus fumigatus (fungus)

Asp f 28.0101 Q1RQJ1 *Aspergillus fumigatus* (fungus)
 Asp f 29.0101 Q4WV97 *Aspergillus fumigatus* (fungus)
 Asp f 3.0101 Q43099 *Aspergillus fumigatus* (fungus)
 Asp f 34.0101 A4FSH5 *Aspergillus fumigatus* (fungus)
 Asp f 4.0101 Q60024 *Aspergillus fumigatus* (fungus)
 Asp f 5.0101 P46075 *Aspergillus fumigatus* (fungus)
 Asp f 6.0101 Q92450 *Aspergillus fumigatus* (fungus)
 Asp f 7.0101 Q42799 *Aspergillus fumigatus* (fungus)
 Asp f 8.0101 Q9UWZ6 *Aspergillus fumigatus* (fungus)
 Asp f 9.0101 Q42800 *Aspergillus fumigatus* (fungus)
 Asp n 14.0101 Q93933 *Aspergillus niger*
 Asp n 25.0101 P34754 *Aspergillus niger*
 Asp o 13.0101 P12547 *Aspergillus oryzae*
 Asp o 21.0101 P10529 *Aspergillus oryzae*
 Ber e 1.0101 P04403 *Bertholletia excelsa* (Brazil nut)
 Ber e 2.0101 Q84ND2 *Bertholletia excelsa* (Brazil nut)
 Bet v 1.0101 P15494 *Betula verrucosa* (European white birch [Betula pendula])
 Bet v 1.0201 P45431 *Betula verrucosa* (European white birch [Betula pendula])
 Bet v 1.0301 P43176 *Betula verrucosa* (European white birch [Betula pendula])
 Bet v 1.0401 P43177 *Betula verrucosa* (European white birch [Betula pendula])
 Bet v 1.0501 P43178 *Betula verrucosa* (European white birch [Betula pendula])
 Bet v 1.0601 P43179 *Betula verrucosa* (European white birch [Betula pendula])
 Bet v 1.0701 P43180 *Betula verrucosa* (European white birch [Betula pendula])
 Bet v 1.0801 P43183 *Betula verrucosa* (European white birch [Betula pendula])
 Bet v 1.0901 P43184 *Betula verrucosa* (European white birch [Betula pendula])
 Bet v 1.1001 P43185 *Betula verrucosa* (European white birch [Betula pendula])
 Bet v 1.1101 Q39417 *Betula verrucosa* (European white birch [Betula pendula])
 Bet v 1.1201 Q39420 *Betula verrucosa* (European white birch [Betula pendula])
 Bet v 1.1301 Q39415 *Betula verrucosa* (European white birch [Betula pendula])
 Bet v 1.1401 P43186 *Betula verrucosa* (European white birch [Betula pendula])
 Bet v 1.1501 Q42499 *Betula verrucosa* (European white birch [Betula pendula])
 Bet v 1.1601 Q39425 *Betula verrucosa* (European white birch [Betula pendula])
 Bet v 1.1701 Q39426 *Betula verrucosa* (European white birch [Betula pendula])
 Bet v 1.1801 Q39427 *Betula verrucosa* (European white birch [Betula pendula])
 Bet v 1.1901 Q39428 *Betula verrucosa* (European white birch [Betula pendula])
 Bet v 1.2001 Q39429 *Betula verrucosa* (European white birch [Betula pendula])
 Bet v 1.2101 Q39430 *Betula verrucosa* (European white birch [Betula pendula])
 Bet v 1.2201 Q39431 *Betula verrucosa* (European white birch [Betula pendula])
 Bet v 1.2301 Q23754 *Betula verrucosa* (European white birch [Betula pendula])
 Bet v 1.2401 Q96365 *Betula verrucosa* (European white birch [Betula pendula])
 Bet v 1.2501 Q96366 *Betula verrucosa* (European white birch [Betula pendula])
 Bet v 1.2601 Q96367 *Betula verrucosa* (European white birch [Betula pendula])
 Bet v 1.2701 Q96368 *Betula verrucosa* (European white birch [Betula pendula])
 Bet v 1.2801 P15494 *Betula verrucosa* (European white birch [Betula pendula])
 Bet v 1.2901 Q96370 *Betula verrucosa* (European white birch [Betula pendula])
 Bet v 1.3001 Q96371 *Betula verrucosa* (European white birch [Betula pendula])
 Bet v 2.0101 P25816 *Betula verrucosa* (European white birch [Betula pendula])
 Bet v 3.0101 P43187 *Betula verrucosa* (European white birch [Betula pendula])
 Bet v 4.0101 Q39419 *Betula verrucosa* (European white birch [Betula pendula])
 Bet v 6.0101 Q65002 *Betula verrucosa* (European white birch [Betula pendula])
 Bet v 6.0102 Q9FUW6 *Betula verrucosa* (European white birch [Betula pendula])
 Bet v 7.0101 P81531 *Betula verrucosa* (European white birch [Betula pendula])
 Beta v 1.0101 P85983 *Beta vulgaris* (Sugar beet)
 Beta v 2.0101 P85984 *Beta vulgaris* (Sugar beet)
 Bla g 1.0101 Q9UAM5 *Blattella germanica* (German cockroach)
 Bla g 1.0201 Q96522 *Blattella germanica* (German cockroach)
 Bla g 2.0101 P54958 *Blattella germanica* (German cockroach)
 Bla g 4.0101 P54962 *Blattella germanica* (German cockroach)
 Bla g 5.0101 Q18598 *Blattella germanica* (German cockroach)
 Bla g 6.0101 Q1A7B3 *Blattella germanica* (German cockroach)
 Bla g 6.0201 Q1A7B2 *Blattella germanica* (German cockroach)
 Bla g 6.0301 Q1A7B1 *Blattella germanica* (German cockroach)
 Bla g 7.0101 Q9NG56 *Blattella germanica* (German cockroach)
 Bla g 8.0101 A0ERA8 *Blattella germanica* (German cockroach)
 Blo t 1.0101 Q95PJ4 *Blomia tropicalis* (Mite)
 Blo t 10.0101 A7XZI4 *Blomia tropicalis* (Mite)
 Blo t 11.0101 Q8MUF6 *Blomia tropicalis* (Mite)
 Blo t 12.0101 Q17282 *Blomia tropicalis* (Mite)
 Blo t 13.0101 Q17284 *Blomia tropicalis* (Mite)

Blo t 2.0101 Q1M2P1 Blomia tropicalis (Mite)
 Blo t 2.0102 Q1M2P2 Blomia tropicalis (Mite)
 Blo t 2.0103 Q1M2P3 Blomia tropicalis (Mite)
 Blo t 21.0101 A7IZE9 Blomia tropicalis (Mite)
 Blo t 3.0101 Q8I9I6 Blomia tropicalis (Mite)
 Blo t 5.0101 Q96870 Blomia tropicalis (Mite)
 Bom p 1.0101 Q7M4I6 Bombus pennsylvanicus (Bumble bee)
 Bom p 4.0101 Q7M4I3 Bombus pennsylvanicus (Bumble bee)
 Bom t 1.0101 P82971 Bombus terrestris (Bumble bee)
 Bos d 2.0101 Q28133 Bos domesticus (domestic cattle)
 Bos d 2.0102 Q28133 Bos domesticus (domestic cattle)
 Bos d 2.0103 Q28133 Bos domesticus (domestic cattle)
 Bos d 3.0101 Q28050 Bos domesticus (domestic cattle)
 Bos d 4.0101 P00711 Bos domesticus (domestic cattle)
 Bos d 5.0101 P02754 Bos domesticus (domestic cattle)
 Bos d 6.0101 P02769 Bos domesticus (domestic cattle)
 Bra j 1.0101 P80207 Brassica juncea (Oriental mustard)
 Bra n 1.0101 P80208 Brassica napus (Rapeseed)
 Bra r 1.0101 Q42473 Brassica rapa (Turnip)
 Bra r 2.0101 P81729 Brassica rapa (Turnip)
 Can f 1.0101 Q18873 Canis familiaris (dog)
 Can f 2.0101 Q18874 Canis familiaris (dog)
 Can f 3.0101 P49822 Canis familiaris (dog)
 Can f 5.0101 P09582 Canis familiaris (dog)
 Cand a 1.0101 P43067 Candida albicans (Yeast)
 Cand a 3.0101 Q6YK78 Candida albicans (Yeast)
 Cand b 2.0101 P14292 Candida boidinii (Yeast)
 Cap a 1w.0101 Q9ARG0 Capsicum annuum (Bell pepper)
 Cap a 2.0101 Q93YI9 Capsicum annuum (Bell pepper)
 Car b 1.0101 P38949 Carpinus betulus (Hornbeam)
 Car b 1.0102 P38949 Carpinus betulus (Hornbeam)
 Car b 1.0103 Q96377 Carpinus betulus (Hornbeam)
 Car b 1.0104 Q96378 Carpinus betulus (Hornbeam)
 Car b 1.0105 Q96379 Carpinus betulus (Hornbeam)
 Car b 1.0106 Q96503 Carpinus betulus (Hornbeam)
 Car b 1.0107 Q96501 Carpinus betulus (Hornbeam)
 Car b 1.0108 Q96380 Carpinus betulus (Hornbeam)
 Car b 1.0109 B6RQR6 Carpinus betulus (Hornbeam)
 Car b 1.0110 B6RQR7 Carpinus betulus (Hornbeam)
 Car b 1.0111 B6RQR8 Carpinus betulus (Hornbeam)
 Car b 1.0112 B6RQR9 Carpinus betulus (Hornbeam)
 Car b 1.0113 B6RQS0 Carpinus betulus (Hornbeam)
 Car b 1.0201 P38950 Carpinus betulus (Hornbeam)
 Car b 1.0301 Q96381 Carpinus betulus (Hornbeam)
 Car b 1.0302 Q96382 Carpinus betulus (Hornbeam)
 Car i 1.0101 Q84XA9 Carya illinoensis (Pecan)
 Car i 4.0101 B5KVH4 Carya illinoensis (Pecan)
 Cas s 1.0101 B7TWE3 Castanea sativa (Chestnut)
 Cat r 1.0101 Q39613 Catharanthus roseus (Rosy periwinkle)
 Cav p 1.0101 P83507 Cavia porcellus (guinea pig)
 Cav p 2.0101 F0UZ11 Cavia porcellus (guinea pig)
 Cav p 3.0101 F0UZ12 Cavia porcellus (guinea pig)
 Cha f 1.0101 Q9N2R3 Charybdis feriatus (Crab)
 Cha o 1.0101 Q96385 Chamaecyparis obtusa (Japanese cypress)
 Cha o 2.0101 Q7M1E7 Chamaecyparis obtusa (Japanese cypress)
 Che a 1.0101 Q8LGR0 Chenopodium album (Pigweed)
 Che a 2.0101 Q84V37 Chenopodium album (Pigweed)
 Che a 3.0101 Q84V36 Chenopodium album (Pigweed)
 Chi k 10.0101 Q96764 Chironomus kiiensis (Midge)
 Chi t 1.0101 P02229 Chironomus thummi thummi (Midge)
 Chi t 1.0201 P02230 Chironomus thummi thummi (Midge)
 Chi t 2.0101 P02221 Chironomus thummi thummi (Midge)
 Chi t 2.0102 P02221 Chironomus thummi thummi (Midge)
 Chi t 3.0101 P02222 Chironomus thummi thummi (Midge)
 Chi t 3.0201 P02224 Chironomus thummi thummi (Midge)
 Chi t 3.0301 P02226 Chironomus thummi thummi (Midge)
 Chi t 3.0401 P02223 Chironomus thummi thummi (Midge)
 Chi t 3.0501 P12548 Chironomus thummi thummi (Midge)
 Chi t 3.0601 P84296 Chironomus thummi thummi (Midge)

Chi t 3.0701 P84298 Chironomus thummi thummi (Midge)
 Chi t 3.0702 P12549 Chironomus thummi thummi (Midge)
 Chi t 3.0801 P12550 Chironomus thummi thummi (Midge)
 Chi t 3.0901 P02227 Chironomus thummi thummi (Midge)
 Chi t 4.0101 P02231 Chironomus thummi thummi (Midge)
 Chi t 9.0101 P02228 Chironomus thummi thummi (Midge)
 Cit l 3.0101 P84160 Citrus limon (Lemon)
 Cit s 1.0101 P84159 Citrus sinensis (Sweet orange)
 Cit s 2.0101 P84177 Citrus sinensis (Sweet orange)
 Cit s 3.0102 Q6EV47 Citrus sinensis (Sweet orange)
 Cla h 10.0101 P40108 Cladosporium herbarum
 Cla h 12.0101 P50344 Cladosporium herbarum
 Cla h 5.0101 P42039 Cladosporium herbarum
 Cla h 6.0101 P42040 Cladosporium herbarum
 Cla h 7.0101 P42059 Cladosporium herbarum
 Cla h 8.0101 P0C0Y5 Cladosporium herbarum
 Clu h 1.0101 C6GKU6 Clupea harengus (Atlantic herring)
 Clu h 1.0201 C6GKU7 Clupea harengus (Atlantic herring)
 Clu h 1.0301 C6GKU8 Clupea harengus (Atlantic herring)
 Cop c 1.0101 Q9Y7G3 Coprinus comatus (Shaggy mane)
 Cop c 2.0101 Q9UW02 Coprinus comatus (Shaggy mane)
 Cop c 3.0101 Q9UW01 Coprinus comatus (Shaggy mane)
 Cop c 5.0101 Q9UW00 Coprinus comatus (Shaggy mane)
 Cop c 7.0101 Q9UVZ9 Coprinus comatus (Shaggy mane)
 Cor a 1.0101 Q08407 Corylus avellana (Hazel)
 Cor a 1.0102 Q08407 Corylus avellana (Hazel)
 Cor a 1.0103 Q08407 Corylus avellana (Hazel)
 Cor a 1.0104 Q08407 Corylus avellana (Hazel)
 Cor a 1.0201 Q39453 Corylus avellana (Hazel)
 Cor a 1.0301 Q39454 Corylus avellana (Hazel)
 Cor a 1.0401 Q9SWR4 Corylus avellana (Hazel)
 Cor a 1.0402 Q9FPK4 Corylus avellana (Hazel)
 Cor a 1.0403 Q9FPK3 Corylus avellana (Hazel)
 Cor a 1.0404 Q9FPK2 Corylus avellana (Hazel)
 Cor a 10.0101 Q9FSY7 Corylus avellana (Hazel)
 Cor a 11.0101 Q8S4P9 Corylus avellana (Hazel)
 Cor a 12.0101 Q84T21 Corylus avellana (Hazel)
 Cor a 13.0101 Q84T91 Corylus avellana (Hazel)
 Cor a 14.0101 D0PWG2 Corylus avellana (Hazel)
 Cor a 2.0101 Q9AXH5 Corylus avellana (Hazel)
 Cor a 2.0102 Q9AXH4 Corylus avellana (Hazel)
 Cor a 8.0101 Q9ATH2 Corylus avellana (Hazel)
 Cor a 9.0101 Q8W1C2 Corylus avellana (Hazel)
 Cra c 1.0101 D7F1J4 Crangon crangon (North Sea shrimp)
 Cra c 2.0101 D7F1J5 Crangon crangon (North Sea shrimp)
 Cra c 4.0101 D7F1P9 Crangon crangon (North Sea shrimp)
 Cra c 5.0101 D7F1Q1 Crangon crangon (North Sea shrimp)
 Cra c 6.0101 D7F1Q2 Crangon crangon (North Sea shrimp)
 Cra c 8.0101 D7F1Q0 Crangon crangon (North Sea shrimp)
 Cry j 1.0101 P18632 Cryptomeria japonica (Sugi)
 Cry j 1.0102 P18632 Cryptomeria japonica (Sugi)
 Cry j 1.0103 P18632 Cryptomeria japonica (Sugi)
 Cry j 1.0103 Q8RUR1 Cryptomeria japonica (Sugi)
 Cry j 1.0103 Q8RUR1 Cryptomeria japonica (Sugi)
 Cry j 2.0101 P43212 Cryptomeria japonica (Sugi)
 Cte f 1.0101 Q94424 Ctenocephalides felis felis (Cat flea)
 Cte f 2.0101 Q9NH66 Ctenocephalides felis felis (Cat flea)
 Cuc m 1.0101 Q39547 Cucumis melo (Muskmelon)
 Cuc m 2.0101 Q5FX67 Cucumis melo (Muskmelon)
 Cuc m 3.0101 P83834 Cucumis melo (Muskmelon)
 Cup a 1.0101 Q9SCG9 Cupressus arizonica (Cypress)
 Cup s 1.0101 Q9M4S6 Cupressus sempervirens (Common cypress)
 Cup s 1.0102 Q9M4S5 Cupressus sempervirens (Common cypress)
 Cup s 1.0103 Q9M4S4 Cupressus sempervirens (Common cypress)
 Cup s 1.0104 Q9M4S3 Cupressus sempervirens (Common cypress)
 Cup s 1.0105 Q9M4S2 Cupressus sempervirens (Common cypress)
 Cup s 3.0101 Q69CS2 Cupressus sempervirens (Common cypress)
 Cup s 3.0102 Q69CS3 Cupressus sempervirens (Common cypress)
 Cup s 3.0103 Q69CS2 Cupressus sempervirens (Common cypress)

Cur l 2.0101 Q96VP4 *Curvularia lunata* (Synonym: *Cochliobolus lunatus*)
 Cur l 3.0101 Q96VP3 *Curvularia lunata* (Synonym: *Cochliobolus lunatus*)
 Cyn d 1.0101 004701 *Cynodon dactylon* (Bermuda grass)
 Cyn d 1.0201 Q947S7 *Cynodon dactylon* (Bermuda grass)
 Cyn d 1.0202 Q947S6 *Cynodon dactylon* (Bermuda grass)
 Cyn d 1.0203 Q947S4 *Cynodon dactylon* (Bermuda grass)
 Cyn d 1.0204 Q9FVM0 *Cynodon dactylon* (Bermuda grass)
 Cyn d 12.0101 004725 *Cynodon dactylon* (Bermuda grass)
 Cyn d 15.0101 Q7XYF2 *Cynodon dactylon* (Bermuda grass)
 Cyn d 23.0101 Q7XYF3 *Cynodon dactylon* (Bermuda grass)
 Cyn d 24.0101 Q647J6 *Cynodon dactylon* (Bermuda grass)
 Cyn d 7.0101 P94092 *Cynodon dactylon* (Bermuda grass)
 Dac g 1.0101 Q7M1X8 *Dactylis glomerata* (Orchard grass)
 Dac g 2.0101 Q41183 *Dactylis glomerata* (Orchard grass)
 Dac g 3.0101 P93124 *Dactylis glomerata* (Orchard grass)
 Dac g 4.0101 P82946 *Dactylis glomerata* (Orchard grass)
 Dau c 1.0101 004298 *Daucus carota* (Carrot)
 Dau c 1.0102 004298 *Daucus carota* (Carrot)
 Dau c 1.0103 004298 *Daucus carota* (Carrot)
 Dau c 1.0104 004298 *Daucus carota* (Carrot)
 Dau c 1.0105 004298 *Daucus carota* (Carrot)
 Dau c 1.0201 Q8SAE7 *Daucus carota* (Carrot)
 Dau c 4.0101 Q8SAE6 *Daucus carota* (Carrot)
 Der f 1.0101 Q58A71 *Dermatophagoides farinae* (American house dust mite)
 Der f 1.0102 Q3HWZ4 *Dermatophagoides farinae* (American house dust mite)
 Der f 1.0103 Q3HWZ4 *Dermatophagoides farinae* (American house dust mite)
 Der f 1.0104 Q3HWZ4 *Dermatophagoides farinae* (American house dust mite)
 Der f 1.0105 Q3HWZ4 *Dermatophagoides farinae* (American house dust mite)
 Der f 1.0106 P16311 *Dermatophagoides farinae* (American house dust mite)
 Der f 1.0108 A1YW11 *Dermatophagoides farinae* (American house dust mite)
 Der f 1.0109 A1YW12 *Dermatophagoides farinae* (American house dust mite)
 Der f 1.0110 A1YW13 *Dermatophagoides farinae* (American house dust mite)
 Der f 10.0101 Q23939 *Dermatophagoides farinae* (American house dust mite)
 Der f 11.0101 Q967Z0 *Dermatophagoides farinae* (American house dust mite)
 Der f 13.0101 Q1MZP5 *Dermatophagoides farinae* (American house dust mite)
 Der f 14.0101 Q94507 *Dermatophagoides farinae* (American house dust mite)
 Der f 15.0101 Q9U6R7 *Dermatophagoides farinae* (American house dust mite)
 Der f 16.0101 Q8MVU3 *Dermatophagoides farinae* (American house dust mite)
 Der f 18.0101 Q86R84 *Dermatophagoides farinae* (American house dust mite)
 Der f 2.0101 Q00855 *Dermatophagoides farinae* (American house dust mite)
 Der f 2.0102 Q00855 *Dermatophagoides farinae* (American house dust mite)
 Der f 2.0103 Q00855 *Dermatophagoides farinae* (American house dust mite)
 Der f 2.0104 Q8WQK5 *Dermatophagoides farinae* (American house dust mite)
 Der f 2.0105 Q8WQK5 *Dermatophagoides farinae* (American house dust mite)
 Der f 2.0109 Q3HWZ2 *Dermatophagoides farinae* (American house dust mite)
 Der f 2.0110 Q3HWZ2 *Dermatophagoides farinae* (American house dust mite)
 Der f 2.0111 Q3HWZ2 *Dermatophagoides farinae* (American house dust mite)
 Der f 2.0112 Q3HWZ2 *Dermatophagoides farinae* (American house dust mite)
 Der f 2.0113 Q3HWZ2 *Dermatophagoides farinae* (American house dust mite)
 Der f 2.0114 Q3HWZ2 *Dermatophagoides farinae* (American house dust mite)
 Der f 2.0115 Q3HWZ2 *Dermatophagoides farinae* (American house dust mite)
 Der f 2.0116 Q3HWZ2 *Dermatophagoides farinae* (American house dust mite)
 Der f 2.0117 Q3HWZ2 *Dermatophagoides farinae* (American house dust mite)
 Der f 3.0101 P49275 *Dermatophagoides farinae* (American house dust mite)
 Der f 6.0101 P49276 *Dermatophagoides farinae* (American house dust mite)
 Der f 7.0101 Q26456 *Dermatophagoides farinae* (American house dust mite)
 Der m 1.0101 P16312 *Dermatophagoides microceras* (House dust mite)
 Der p 1.0101 P08176 *Dermatophagoides pteronyssinus* (European house dust mite)
 Der p 1.0102 P08176 *Dermatophagoides pteronyssinus* (European house dust mite)
 Der p 1.0103 P08176 *Dermatophagoides pteronyssinus* (European house dust mite)
 Der p 1.0104 P08176 *Dermatophagoides pteronyssinus* (European house dust mite)
 Der p 1.0105 P08176 *Dermatophagoides pteronyssinus* (European house dust mite)
 Der p 1.0106 P08176 *Dermatophagoides pteronyssinus* (European house dust mite)
 Der p 1.0107 P08176 *Dermatophagoides pteronyssinus* (European house dust mite)
 Der p 1.0108 P08176 *Dermatophagoides pteronyssinus* (European house dust mite)
 Der p 1.0109 P08176 *Dermatophagoides pteronyssinus* (European house dust mite)
 Der p 1.0110 P08176 *Dermatophagoides pteronyssinus* (European house dust mite)
 Der p 1.0111 P08176 *Dermatophagoides pteronyssinus* (European house dust mite)
 Der p 1.0112 P08176 *Dermatophagoides pteronyssinus* (European house dust mite)

Der p 1.0113 Q3HWZ5 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 1.0114 Q3HWZ5 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 1.0115 Q3HWZ5 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 1.0116 Q3HWZ5 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 1.0117 Q3HWZ5 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 1.0118 Q3HWZ5 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 1.0119 Q3HWZ5 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 1.0120 Q3HWZ5 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 1.0121 Q3HWZ5 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 1.0122 Q3HWZ5 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 1.0123 Q3HWZ5 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 1.0124 C7T6L6 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 10.0101 018416 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 11.0101 Q6Y2F9 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 14.0101 Q8NONO Dermatophagoides pteronyssinus (European house dust mite)
 Der p 2.0101 P49278 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 2.0102 P49278 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 2.0103 P49278 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 2.0104 P49278 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 2.0105 P49278 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 2.0106 P49278 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 2.0107 P49278 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 2.0108 P49278 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 2.0109 Q3HWZ3 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 2.0110 Q3HWZ3 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 2.0111 Q3HWZ3 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 2.0112 Q3HWZ3 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 2.0113 Q3HWZ3 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 2.0114 Q1H8P8 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 2.0115 C7T6L5 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 21.0101 Q2L7C5 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 3.0101 P39675 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 4.0101 Q9Y197 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 5.0101 P14004 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 5.0102 P14004 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 6.0101 P49277 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 7.0101 P49273 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 8.0101 P46419 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 9.0101 Q7Z163 Dermatophagoides pteronyssinus (European house dust mite)
 Der p 9.0102 Q8MWR4 Dermatophagoides pteronyssinus (European house dust mite)
 Dol a 5.0101 Q05108 Dolichovespula arenaria (Yellow hornet)
 Dol m 1.0101 Q06478 Dolichovespula maculata (White face hornet)
 Dol m 1.02 P53357 Dolichovespula maculata (White face hornet)
 Dol m 2.0101 P49371 Dolichovespula maculata (White face hornet)
 Dol m 5.0101 P10736 Dolichovespula maculata (White face hornet)
 Dol m 5.02 P10737 Dolichovespula maculata (White face hornet)
 Epi p 1.0101 P83340 Epicoccum purpurascens (Soil fungus)
 Equ c 1.0101 Q95182 Equus caballus (domestic horse)
 Equ c 2.0101 P81216 Equus caballus (domestic horse)
 Equ c 2.0102 P81217 Equus caballus (domestic horse)
 Equ c 3.0101 P35747 Equus caballus (domestic horse)
 Equ c 4.0101 P82615 Equus caballus (domestic horse)
 Eur m 1.0101 P25780 Euroglyphus maynei (House dust mite)
 Eur m 1.0102 P25780 Euroglyphus maynei (House dust mite)
 Eur m 14.0101 Q9U785 Euroglyphus maynei (House dust mite)
 Eur m 2.0101 Q9TZ22 Euroglyphus maynei (House dust mite)
 Eur m 2.0102 Q9TZ22 Euroglyphus maynei (House dust mite)
 Eur m 3.0101 Q97370 Euroglyphus maynei (House dust mite)
 Eur m 4.0101 Q9Y196 Euroglyphus maynei (House dust mite)
 Fel d 1.0101 P30438 Felis domesticus (cat)
 Fel d 2.0101 P49064 Felis domesticus (cat)
 Fel d 3.0101 Q8WNR9 Felis domesticus (cat)
 Fel d 4.0101 Q5VFH6 Felis domesticus (cat)
 For t 1.0101 B2ZPG6 Forcipomyia taiwana (Biting midge)
 For t 2.0101 B2ZPG7 Forcipomyia taiwana (Biting midge)
 Fra a 1.0101 Q5ULZ4 Fragaria ananassa (Strawberry)
 Fra a 3.0101 Q8VX12 Fragaria ananassa (Strawberry)
 Fra e 1.0101 Q7XAV4 Fraxinus excelsior (Ash)
 Fra e 1.0102 Q5EXJ6 Fraxinus excelsior (Ash)

Fra e 1.0201 Q6U740 Fraxinus excelsior (Ash)
 Fus c 1.0101 Q8TFM9 Fusarium culmorum (N.A.)
 Fus c 2.0101 Q8TFM8 Fusarium culmorum (N.A.)
 Gad c 1.0101 P02622 Gadus callarias (Baltic cod)
 Gal d 1.0101 P01005 Gallus domesticus (chicken)
 Gal d 2.0101 P01012 Gallus domesticus (chicken)
 Gal d 3.0101 P02789 Gallus domesticus (chicken)
 Gal d 4.0101 P00698 Gallus domesticus (chicken)
 Gal d 5.0101 P19121 Gallus domesticus (chicken)
 Gal d 6.0101 P87498 Gallus domesticus (chicken)
 Gly d 2.0101 Q9U5P7 Glycyphagus domesticus (Storage mite)
 Gly d 2.0201 Q9NFK4 Glycyphagus domesticus (Storage mite)
 Gly m 1.0101 Q9S8F3 Glycine max (Soybean)
 Gly m 1.0102 Q9S8F2 Glycine max (Soybean)
 Gly m 3.0101 065809 Glycine max (Soybean)
 Gly m 3.0102 065810 Glycine max (Soybean)
 Gly m 4.0101 P26987 Glycine max (Soybean)
 Gly m 5.0101 022120 Glycine max (Soybean)
 Gly m 5.0201 Q9FZP9 Glycine max (Soybean)
 Gly m 5.0301 P25974 Glycine max (Soybean)
 Gly m 5.0302 P25974 Glycine max (Soybean)
 Gly m 6.0101 P04776 Glycine max (Soybean)
 Gly m 6.0201 P04405 Glycine max (Soybean)
 Gly m 6.0301 P11828 Glycine max (Soybean)
 Gly m 6.0401 Q9SB11 Glycine max (Soybean)
 Gly m 6.0501 Q7GC77 Glycine max (Soybean)
 Hel a 2.0101 081982 Helianthus annuus (Sunflower)
 Hel a 3.0101 Q7X9Q5 Helianthus annuus (Sunflower)
 Hel as 1.0101 097192 Helix aspersa (Brown garden snail)
 Hev b 1.0101 P15252 Hevea brasiliensis (Para rubber tree (latex))
 Hev b 10.0101 P35017 Hevea brasiliensis (Para rubber tree (latex))
 Hev b 10.0102 Q9STB5 Hevea brasiliensis (Para rubber tree (latex))
 Hev b 10.0103 Q9FSJ2 Hevea brasiliensis (Para rubber tree (latex))
 Hev b 11.0101 Q949H3 Hevea brasiliensis (Para rubber tree (latex))
 Hev b 11.0102 Q8GUD7 Hevea brasiliensis (Para rubber tree (latex))
 Hev b 12.0101 Q8RYA8 Hevea brasiliensis (Para rubber tree (latex))
 Hev b 13.0101 Q7Y1X1 Hevea brasiliensis (Para rubber tree (latex))
 Hev b 2.0101 P52407 Hevea brasiliensis (Para rubber tree (latex))
 Hev b 3.0101 082803 Hevea brasiliensis (Para rubber tree (latex))
 Hev b 4.0101 Q6T4P0 Hevea brasiliensis (Para rubber tree (latex))
 Hev b 5.0101 Q39967 Hevea brasiliensis (Para rubber tree (latex))
 Hev b 6.01 P02877 Hevea brasiliensis (Para rubber tree (latex))
 Hev b 6.02 P02877 Hevea brasiliensis (Para rubber tree (latex))
 Hev b 6.03 P02877 Hevea brasiliensis (Para rubber tree (latex))
 Hev b 7.01 004008 Hevea brasiliensis (Para rubber tree (latex))
 Hev b 7.02 065811 Hevea brasiliensis (Para rubber tree (latex))
 Hev b 8.0101 065812 Hevea brasiliensis (Para rubber tree (latex))
 Hev b 8.0102 Q9STB6 Hevea brasiliensis (Para rubber tree (latex))
 Hev b 8.0201 Q9M7N0 Hevea brasiliensis (Para rubber tree (latex))
 Hev b 8.0202 Q9M7M9 Hevea brasiliensis (Para rubber tree (latex))
 Hev b 8.0203 Q9M7M8 Hevea brasiliensis (Para rubber tree (latex))
 Hev b 8.0204 Q9LEI8 Hevea brasiliensis (Para rubber tree (latex))
 Hev b 9.0101 Q9LEJ0 Hevea brasiliensis (Para rubber tree (latex))
 Hol l 1.0101 P43216 Holcus lanatus (Velvet grass)
 Hol l 1.0102 P43216 Holcus lanatus (Velvet grass)
 Hol l 5.0101 023972 Holcus lanatus (Velvet grass)
 Hol l 5.0201 023971 Holcus lanatus (Velvet grass)
 Hom a 1.0101 044119 Homarus americanus (American lobster)
 Hom a 1.0102 044119 Homarus americanus (American lobster)
 Hom a 6.0101 P29291 Homarus americanus (American lobster)
 Hom s 1.0101 043290 Homo sapiens (human autoallergens)
 Hom s 2.0101 Q13765 Homo sapiens (human autoallergens)
 Hom s 3.0101 Q13845 Homo sapiens (human autoallergens)
 Hom s 4.0101 075785 Homo sapiens (human autoallergens)
 Hom s 5.0101 P02538 Homo sapiens (human autoallergens)
 Hor v 12.0101 P52184 Hordeum vulgare (Barley)
 Hor v 15.0101 P16968 Hordeum vulgare (Barley)
 Hor v 20.0101 P80198 Hordeum vulgare (Barley)
 Hor v 5.0101 004828 Hordeum vulgare (Barley)

Hum j 1.0101 Q7XBE3 Humulus japonicus (Japanese hop)
 Jug n 1.0101 Q7Y1C2 Juglans nigra (Black walnut)
 Jug n 2.0101 Q7Y1C1 Juglans nigra (Black walnut)
 Jug r 1.0101 P93198 Juglans regia (English walnut)
 Jug r 2.0101 Q9SEW4 Juglans regia (English walnut)
 Jug r 4.0101 Q2TPW5 Juglans regia (English walnut)
 Jun a 1.010101 P81294 Juniperus ashei (Mountain cedar)
 Jun a 1.010102 P81294 Juniperus ashei (Mountain cedar)
 Jun a 2.0101 Q9FY19 Juniperus ashei (Mountain cedar)
 Jun a 3.0101 P81295 Juniperus ashei (Mountain cedar)
 Jun o 4.0101 O64943 Juniperus oxycedrus (Prickly juniper)
 Jun v 1.0101 Q9LLT2 Juniperus virginiana (Eastern red cedar)
 Jun v 1.0102 Q9LLT1 Juniperus virginiana (Eastern red cedar)
 Jun v 3.010101 Q9LD79 Juniperus virginiana (Eastern red cedar)
 Jun v 3.010102 Q9LD79 Juniperus virginiana (Eastern red cedar)
 Len c 1.0101 Q84UI1 Lens culinaris (Lentil)
 Len c 1.0102 Q84UI0 Lens culinaris (Lentil)
 Lep d 10.0101 Q9NFZ4 Lepidoglyphus destructor (Storage mite)
 Lep d 13.0101 Q9U5P1 Lepidoglyphus destructor (Storage mite)
 Lep d 2.0101 P80384 Lepidoglyphus destructor (Storage mite)
 Lep d 2.0102 P80384 Lepidoglyphus destructor (Storage mite)
 Lep d 2.0201 P80384 Lepidoglyphus destructor (Storage mite)
 Lep d 2.0202 P80384 Lepidoglyphus destructor (Storage mite)
 Lep d 5.0101 Q9U5P2 Lepidoglyphus destructor (Storage mite)
 Lep d 5.0102 Q1M2N1 Lepidoglyphus destructor (Storage mite)
 Lep d 5.0103 Q1M2N0 Lepidoglyphus destructor (Storage mite)
 Lep d 7.0101 Q9U1G2 Lepidoglyphus destructor (Storage mite)
 Lep s 1.0101 Q8T380 Lepisma saccharina (Silverfish)
 Lep w 1.0101 B5WX08 Lepidodromus whiffiagonis (Megrim, Whiff, Gallo)
 Lig v 1.0101 O82015 Ligustrum vulgare (Privet)
 Lig v 1.0102 O82015 Ligustrum vulgare (Privet)
 Lit c 1.0101 Q941H7 Litchi chinensis (Litchi)
 Lit v 2.0101 Q004B5 Litopenaeus vannamei (White shrimp)
 Lol p 1.0101 P14946 Lolium perenne (Rye grass)
 Lol p 1.0102 P14946 Lolium perenne (Rye grass)
 Lol p 1.0103 Q9SC98 Lolium perenne (Rye grass)
 Lol p 11.0101 Q7M1X5 Lolium perenne (Rye grass)
 Lol p 2.0101 P14947 Lolium perenne (Rye grass)
 Lol p 3.0101 P14948 Lolium perenne (Rye grass)
 Lol p 4.0101 Q5TIW3 Lolium perenne (Rye grass)
 Lol p 5.0101 Q40237 Lolium perenne (Rye grass)
 Lol p 5.0102 Q40240 Lolium perenne (Rye grass)
 Lup an 1.0101 B8Q5G0 Lupinus angustifolius (Narrow-leaved blue lupin)
 Lyc e 1.0101 Q93YG7 Lycopersicon esculentum (Tomato)
 Lyc e 2.0101 Q547Q0 Lycopersicon esculentum (Tomato)
 Lyc e 2.0201 Q8RVW4 Lycopersicon esculentum (Tomato)
 Lyc e 3.0101 P93224 Lycopersicon esculentum (Tomato)
 Mal d 1.0101 P43211 Malus domestica (Apple)
 Mal d 1.0102 P43211 Malus domestica (Apple)
 Mal d 1.0103 Q9SYV2 Malus domestica (Apple)
 Mal d 1.0104 Q9SYV5 Malus domestica (Apple)
 Mal d 1.0105 Q9SYV6 Malus domestica (Apple)
 Mal d 1.0106 Q9SYV7 Malus domestica (Apple)
 Mal d 1.0107 Q9SYV8 Malus domestica (Apple)
 Mal d 1.0108 Q9SYW3 Malus domestica (Apple)
 Mal d 1.0109 Q941P6 Malus domestica (Apple)
 Mal d 1.0201 Q40280 Malus domestica (Apple)
 Mal d 1.0202 Q9S7M5 Malus domestica (Apple)
 Mal d 1.0203 Q9SYV3 Malus domestica (Apple)
 Mal d 1.0204 Q9SYV4 Malus domestica (Apple)
 Mal d 1.0205 Q9SYV9 Malus domestica (Apple)
 Mal d 1.0206 Q40280 Malus domestica (Apple)
 Mal d 1.0207 Q941P5 Malus domestica (Apple)
 Mal d 1.0208 Q8L6K9 Malus domestica (Apple)
 Mal d 1.0301 Q43549 Malus domestica (Apple)
 Mal d 1.0302 Q941P8 Malus domestica (Apple)
 Mal d 1.0303 Q941P7 Malus domestica (Apple)
 Mal d 1.0304 Q84LA7 Malus domestica (Apple)
 Mal d 1.0401 Q43550 Malus domestica (Apple)

Mal d 1.0402 Q43551 *Malus domestica* (Apple)
 Mal d 1.0403 Q43552 *Malus domestica* (Apple)
 Mal d 2.0101 Q9FSG7 *Malus domestica* (Apple)
 Mal d 4.0101 Q9XF42 *Malus domestica* (Apple)
 Mal d 4.0102 Q84RR5 *Malus domestica* (Apple)
 Mal d 4.0201 Q9XF41 *Malus domestica* (Apple)
 Mal d 4.0202 Q84RR6 *Malus domestica* (Apple)
 Mal d 4.0301 Q9XF40 *Malus domestica* (Apple)
 Mal d 4.0302 Q84RR7 *Malus domestica* (Apple)
 Mala f 2.0101 P56577 *Malassezia furfur* (Pityriasis versicolor infect. agent)
 Mala f 3.0101 P56578 *Malassezia furfur* (Pityriasis versicolor infect. agent)
 Mala f 4.0101 Q9Y750 *Malassezia furfur* (Pityriasis versicolor infect. agent)
 Mala s 1.0101 Q01940 *Malassezia sympodialis*
 Mala s 10.0101 Q8TGH3 *Malassezia sympodialis*
 Mala s 11.0101 Q873M4 *Malassezia sympodialis*
 Mala s 12.0101 Q5GMY3 *Malassezia sympodialis*
 Mala s 13.0101 Q1RQI9 *Malassezia sympodialis*
 Mala s 5.0101 Q93969 *Malassezia sympodialis*
 Mala s 6.0101 Q93970 *Malassezia sympodialis*
 Mala s 7.0101 Q93971 *Malassezia sympodialis*
 Mala s 8.0101 Q93972 *Malassezia sympodialis*
 Mala s 9.0101 Q93973 *Malassezia sympodialis*
 Met e 1.0101 Q25456 *Metapenaeus ensis* (Shrimp)
 Mor n 3.0101 P85894 *Morus nigra* (Mulberry)
 Mus a 1.0101 Q94JN3 *Musa acuminata* (Banana)
 Mus a 2.0101 Q8VXF1 *Musa acuminata* (Banana)
 Mus a 3.0101 P86333 *Musa acuminata* (Banana)
 Mus m 1.0101 P02762 *Mus musculus* (mouse)
 Mus m 1.0102 P11589 *Mus musculus* (mouse)
 Myr p 1.0101 Q07932 *Myrmecia pilosula* (Australian jumper ant)
 Myr p 2.0101 Q26464 *Myrmecia pilosula* (Australian jumper ant)
 Myr p 2.0102 Q26464 *Myrmecia pilosula* (Australian jumper ant)
 Myr p 3.0101 Q68Y22 *Myrmecia pilosula* (Australian jumper ant)
 Ole e 1.0101 P19963 *Olea europea* (Olive)
 Ole e 1.0105 P19963 *Olea europea* (Olive)
 Ole e 1.0106 P19963 *Olea europea* (Olive)
 Ole e 1.0107 P19963 *Olea europea* (Olive)
 Ole e 10.0101 Q84V39 *Olea europea* (Olive)
 Ole e 2.0101 Q24169 *Olea europea* (Olive)
 Ole e 3.0101 Q81092 *Olea europea* (Olive)
 Ole e 4.0101 P80741 *Olea europea* (Olive)
 Ole e 5.0101 P80740 *Olea europea* (Olive)
 Ole e 6.0101 Q24172 *Olea europea* (Olive)
 Ole e 7.0101 P81430 *Olea europea* (Olive)
 Ole e 8.0101 Q9M7R0 *Olea europea* (Olive)
 Ole e 9.0101 Q94G86 *Olea europea* (Olive)
 Ory s 1.0101 Q40638 *Oryza sativa* (Rice)
 Ory s 12.0101 Q9FUD1 *Oryza sativa* (Rice)
 Pan s 1.0101 Q61379 *Panulirus stimpsoni* (Spiny lobster)
 Par j 1.0101 P43217 *Parietaria judaica* (Pellitory-of-the-Wall)
 Par j 1.0102 Q04404 *Parietaria judaica* (Pellitory-of-the-Wall)
 Par j 1.0103 Q1JTN5 *Parietaria judaica* (Pellitory-of-the-Wall)
 Par j 1.0201 Q40905 *Parietaria judaica* (Pellitory-of-the-Wall)
 Par j 2.0101 P55958 *Parietaria judaica* (Pellitory-of-the-Wall)
 Par j 2.0102 Q04403 *Parietaria judaica* (Pellitory-of-the-Wall)
 Par j 3.0101 Q9XG85 *Parietaria judaica* (Pellitory-of-the-Wall)
 Par j 3.0102 Q9TOM8 *Parietaria judaica* (Pellitory-of-the-Wall)
 Par j 4.0101 B5QST3 *Parietaria judaica* (Pellitory-of-the-Wall)
 Pen b 26.0101 Q49KL9 *Penicillium brevicompactum*
 Pen c 13.0101 Q9URH1 *Penicillium citrinum*
 Pen c 19.0101 Q92260 *Penicillium citrinum*
 Pen c 22.0101 Q96X46 *Penicillium citrinum*
 Pen c 24.0101 Q69BZ7 *Penicillium citrinum*
 Pen c 3.0101 Q9Y8B8 *Penicillium citrinum*
 Pen c 30.0101 Q2V6Q5 *Penicillium citrinum*
 Pen ch 13.0101 Q9URR2 *Penicillium chrysogenum*
 Pen ch 18.0101 Q9P8G3 *Penicillium chrysogenum*
 Pen ch 20.0101 Q02352 *Penicillium chrysogenum*
 Pen ch 31.0101 Q2TL59 *Penicillium chrysogenum*

Pen m 1.0101 A1KYZ2 *Penaeus monodon* (Black tiger shrimp)
 Pen m 2.0101 Q8I9P7 *Penaeus monodon* (Black tiger shrimp)
 Pen o 18.0101 Q9HF12 *Penicillium oxalicum*
 Per a 1.0101 Q9TZR6 *Periplaneta americana* (American cockroach)
 Per a 1.0102 018535 *Periplaneta americana* (American cockroach)
 Per a 1.0103 018530 *Periplaneta americana* (American cockroach)
 Per a 1.0104 018528 *Periplaneta americana* (American cockroach)
 Per a 1.0201 018527 *Periplaneta americana* (American cockroach)
 Per a 3.0101 Q25641 *Periplaneta americana* (American cockroach)
 Per a 3.0201 Q94643 *Periplaneta americana* (American cockroach)
 Per a 3.0202 Q25640 *Periplaneta americana* (American cockroach)
 Per a 3.0203 Q25639 *Periplaneta americana* (American cockroach)
 Per a 6.0101 Q1M0Y3 *Periplaneta americana* (American cockroach)
 Per a 7.0101 Q9UB83 *Periplaneta americana* (American cockroach)
 Per a 7.0102 Q9UB83 *Periplaneta americana* (American cockroach)
 Pers a 1.0101 P93680 *Persea americana* (Avocado)
 Pha a 1.0101 Q41260 *Phalaris aquatica* (Canary grass)
 Pha a 5.0101 P56164 *Phalaris aquatica* (Canary grass)
 Phl p 1.0101 Q40967 *Phleum pratense* (Timothy)
 Phl p 1.0102 P43213 *Phleum pratense* (Timothy)
 Phl p 11.0101 Q8H6L7 *Phleum pratense* (Timothy)
 Phl p 12.0101 P35079 *Phleum pratense* (Timothy)
 Phl p 12.0102 024650 *Phleum pratense* (Timothy)
 Phl p 12.0103 024282 *Phleum pratense* (Timothy)
 Phl p 13.0101 Q9XG86 *Phleum pratense* (Timothy)
 Phl p 2.0101 P43214 *Phleum pratense* (Timothy)
 Phl p 4.0101 Q5ZQK5 *Phleum pratense* (Timothy)
 Phl p 4.0201 Q5ZQK4 *Phleum pratense* (Timothy)
 Phl p 5.0101 Q40960 *Phleum pratense* (Timothy)
 Phl p 5.0102 Q40962 *Phleum pratense* (Timothy)
 Phl p 5.0103 081341 *Phleum pratense* (Timothy)
 Phl p 5.0104 P93467 *Phleum pratense* (Timothy)
 Phl p 5.0105 065318 *Phleum pratense* (Timothy)
 Phl p 5.0106 065319 *Phleum pratense* (Timothy)
 Phl p 5.0107 065320 *Phleum pratense* (Timothy)
 Phl p 5.0108 065321 *Phleum pratense* (Timothy)
 Phl p 5.0109 Q84UI2 *Phleum pratense* (Timothy)
 Phl p 5.0201 Q40963 *Phleum pratense* (Timothy)
 Phl p 5.0202 P93466 *Phleum pratense* (Timothy)
 Phl p 5.0203 081342 *Phleum pratense* (Timothy)
 Phl p 5.0206 081343 *Phleum pratense* (Timothy)
 <tr id='817'><td nowrap>Phl p 5.0207</td><td><a href='http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?CMD=search&DB=nucleotide&term=AF069474' t
 Phl p 6.0101 P43215 *Phleum pratense* (Timothy)
 Phl p 6.0102 065868 *Phleum pratense* (Timothy)
 Phl p 7.0101 082040 *Phleum pratense* (Timothy)
 Pho d 2.0101 Q8L5D8 *Phoenix dactylifera* (Date palm)
 Pis s 1.0101 Q702P1 *Pisum sativum* (Pea)
 Pis s 1.0102 Q702P0 *Pisum sativum* (Pea)
 Pis v 1.0101 B7P072 *Pistacia vera* (Pistachio)
 Pis v 2.0101 B7P073 *Pistacia vera* (Pistachio)
 Pis v 2.0201 B7P074 *Pistacia vera* (Pistachio)
 Pis v 3.0101 B4X640 *Pistacia vera* (Pistachio)
 Pis v 5.0101 B7SLJ1 *Pistacia vera* (Pistachio)
 Pla a 1.0101 Q8GT41 *Platanus acerifolia* (London plane tree)
 Pla a 2.0101 Q6H9K0 *Platanus acerifolia* (London plane tree)
 Pla l 1.0101 P82242 *Plantago lanceolata* (English plantain)
 Pla l 1.0102 P82242 *Plantago lanceolata* (English plantain)
 Pla l 1.0103 P82242 *Plantago lanceolata* (English plantain)
 Pla or 1.0101 A9YUH4 *Platanus orientalis* (Oriental plane)
 Pla or 2.0101 A9YUH5 *Platanus orientalis* (Oriental plane)
 Pla or 3.0101 A9YUH6 *Platanus orientalis* (Oriental plane)
 Plo i 1.0101 Q95PM9 *Plodia interpunctella* (Indianmeal moth)
 Poa p 1.0101 Q9ZP03 *Poa pratensis* (Kentucky blue grass)
 Poa p 5.0101 Q9FPRO *Poa pratensis* (Kentucky blue grass)
 Pol a 1.0101 Q9U6W0 *Polistes annularis* (Wasp)
 Pol a 2.0101 Q9U6V9 *Polistes annularis* (Wasp)
 Pol a 5.0101 Q05109 *Polistes annularis* (Wasp)
 Pol d 1.0101 Q6Q252 *Polistes dominulus* (Mediterranean paper wasp)
 Pol d 1.0102 Q6Q251 *Polistes dominulus* (Mediterranean paper wasp)

Pol d 1.0103 Q6Q250 *Polistes dominulus* (Mediterranean paper wasp)
 Pol d 1.0104 Q6Q249 *Polistes dominulus* (Mediterranean paper wasp)
 Pol d 4.0101 Q7Z269 *Polistes dominulus* (Mediterranean paper wasp)
 Pol d 5.0101 Q68KJ8 *Polistes dominulus* (Mediterranean paper wasp)
 Pol e 5.0101 Q68KJ9 *Polistes exclamans* (Wasp)
 Pol f 5.0101 P35780 *Polistes fuscatus* (Wasp)
 Pol g 1.0101 P83542 *Polistes gallicus* (Wasp)
 Pol g 5.0101 P83377 *Polistes gallicus* (Wasp)
 Pon l 4.0101 P05946 *Pontastacus leptodactylus* (Narrow-clawed crayfish)
 Pru ar 1.0101 050001 *Prunus armeniaca* (Apricot)
 Pru ar 3.0101 P81651 *Prunus armeniaca* (Apricot)
 Pru av 1.0101 024248 *Prunus avium* (Sweet cherry)
 Pru av 1.0201 Q6QHU3 *Prunus avium* (Sweet cherry)
 Pru av 1.0202 Q6QHU2 *Prunus avium* (Sweet cherry)
 Pru av 1.0203 Q6QHU1 *Prunus avium* (Sweet cherry)
 Pru av 2.0101 P50694 *Prunus avium* (Sweet cherry)
 Pru av 3.0101 Q9M5X8 *Prunus avium* (Sweet cherry)
 Pru av 4.0101 Q9XF39 *Prunus avium* (Sweet cherry)
 Pru d 3.0101 P82534 *Prunus domestica* (European plum)
 Pru du 3.0101 C0LOI5 *Prunus dulcis* (Almond)
 Pru du 4.0101 Q8GSL5 *Prunus dulcis* (Almond)
 Pru du 4.0102 Q8GSL5 *Prunus dulcis* (Almond)
 Pru du 5.0101 Q8H2B9 *Prunus dulcis* (Almond)
 Pru p 1.0101 Q2I6V8 *Prunus persica* (Peach)
 Pru p 3.0101 P81402 *Prunus persica* (Peach)
 Pru p 4.0101 Q8GT40 *Prunus persica* (Peach)
 Pru p 4.0201 Q8GT39 *Prunus persica* (Peach)
 Pyr c 1.0101 065200 *Pyrus communis* (Pear)
 Pyr c 3.0101 Q9M5X6 *Pyrus communis* (Pear)
 Pyr c 4.0101 Q9XF38 *Pyrus communis* (Pear)
 Pyr c 5.0101 081355 *Pyrus communis* (Pear)
 Que a 1.0201 B6RQS1 *Quercus alba* (White oak)
 Que a 1.0301 B6RQS2 *Quercus alba* (White oak)
 Que a 1.0401 B6RQS3 *Quercus alba* (White oak)
 Ran e 1.0101 Q8JIU2 *Rana esculenta* (edible frog)
 Ran e 2.0101 Q8JIU1 *Rana esculenta* (edible frog)
 Rat n 1.0101 P02761 *Rattus norvegicus* (Rat)
 Rho m 1.0101 Q870B9 *Rhodotorula mucilaginosa* (Yeast)
 Rho m 2.0101 Q32ZM1 *Rhodotorula mucilaginosa* (Yeast)
 Ric c 1.0101 P01089 *Ricinus communis* (Castor bean)
 Rub i 1.0101 Q0Z8U9 *Rubus idaeus* (Red raspberry)
 Rub i 3.0101 Q0Z8V0 *Rubus idaeus* (Red raspberry)
 Sal k 1.0101 P83181 *Salsola kali* (Russian thistle)
 Sal k 1.0301 Q17ST3 *Salsola kali* (Russian thistle)
 Sal k 1.0302 Q17ST4 *Salsola kali* (Russian thistle)
 Sal k 2.0101 Q8L5K9 *Salsola kali* (Russian thistle)
 Sal k 3.0101 C1KEU0 *Salsola kali* (Russian thistle)
 Sal k 4.0101 C6JWH0 *Salsola kali* (Russian thistle)
 Sal s 1.0101 Q91482 *Salmo salar* (Atlantic salmon)
 Sar sa 1.0101 B3WFF7 *Sardinops sagax* (Pacific pilchard)
 Seb m 1.0101 C6GKU4 *Sebastes marinus* (Ocean perch, redfish, snapper)
 Seb m 1.0201 C6GKU5 *Sebastes marinus* (Ocean perch, redfish, snapper)
 Sec c 38.0101 Q9S8H2 *Secale cereale* (Rye)
 Sec c 20.0101 Q9S8B0 *Secale cereale* (Rye)
 Sec c 20.0201 Q9S8A7 *Secale cereale* (Rye)
 Ses i 1.0101 Q9AUD1 *Sesamum indicum* (Sesame)
 Ses i 2.0101 Q9XHP1 *Sesamum indicum* (Sesame)
 Ses i 3.0101 Q9AUD0 *Sesamum indicum* (Sesame)
 Ses i 4.0101 Q9FUJ9 *Sesamum indicum* (Sesame)
 Ses i 5.0101 Q9XHP2 *Sesamum indicum* (Sesame)
 Ses i 6.0101 Q9XHP0 *Sesamum indicum* (Sesame)
 Ses i 7.0101 Q9AUD2 *Sesamum indicum* (Sesame)
 Sin a 1.0101 P15322 *Sinapis alba* (Yellow mustard)
 Sin a 2.0101 Q2TLW0 *Sinapis alba* (Yellow mustard)
 Sol g 4.0101 Q9NH75 *Solenopsis geminata* (Tropical fire ant)
 Sol g 4.0201 Q9NH75 *Solenopsis geminata* (Tropical fire ant)
 Sol i 1.0101 Q68KK0 *Solenopsis invicta* (Red imported fire ant)
 Sol i 2.0101 P35775 *Solenopsis invicta* (Red imported fire ant)
 Sol i 3.0101 P35778 *Solenopsis invicta* (Red imported fire ant)

Sol i 4.0101 P35777 *Solenopsis invicta* (Red imported fire ant)
 Sol r 2.0101 P35776 *Solenopsis richteri* (Black fire ant)
 Sol r 3.0101 P35779 *Solenopsis richteri* (Black fire ant)
 Sola t 1.0101 P15476 *Solanum tuberosum* (Potato)
 Sola t 2.0101 P16348 *Solanum tuberosum* (Potato)
 Sola t 3.0101 024383 *Solanum tuberosum* (Potato)
 Sola t 3.0102 P20347 *Solanum tuberosum* (Potato)
 Sola t 4.0101 P30941 *Solanum tuberosum* (Potato)
 Syr v 3.0101 P58171 *Syringa vulgaris* (Lilac)
 Tha p 1.0101 Q7M4K8 *Thaumetopoea pityocampa* (Pine processionary moth)
 Thu a 1.0101 C6GKU3 *Thunnus albacares* (Yellowfin tuna)
 Tri a 12.0101 P49232 *Triticum aestivum* (Wheat)
 Tri a 12.0102 P49233 *Triticum aestivum* (Wheat)
 Tri a 12.0103 P49234 *Triticum aestivum* (Wheat)
 Tri a 14.0201 D2T2K2 *Triticum aestivum* (Wheat)
 Tri a 18.0101 P10968 *Triticum aestivum* (Wheat)
 Tri a 19.0101 P08453 *Triticum aestivum* (Wheat)
 Tri a 25.0101 Q9LX4 *Triticum aestivum* (Wheat)
 Tri a 26.0101 P10388 *Triticum aestivum* (Wheat)
 Tri a 27.0101 Q7Y1Z2 *Triticum aestivum* (Wheat)
 Tri a 28.0101 Q4W0V7 *Triticum aestivum* (Wheat)
 Tri a 29.0101 C7C4X0 *Triticum aestivum* (Wheat)
 Tri a 29.0201 D2TGC2 *Triticum aestivum* (Wheat)
 Tri a 30.0101 P17314 *Triticum aestivum* (Wheat)
 Tri r 2.0101 Q9UW97 *Trichophyton rubrum*
 Tri r 4.0101 Q9UW98 *Trichophyton rubrum*
 Tri t 4.0101 P80514 *Trichophyton tonsurans*
 Tria p 1.0101 Q9U6R6 *Triatoma protracta* (California kissing bug)
 Tyr p 13.0101 Q66RP5 *Tyrophagus putrescentiae* (Storage mite)
 Tyr p 2.0101 002380 *Tyrophagus putrescentiae* (Storage mite)
 Ves f 5.0101 P35783 *Vespula flavopilosa* (Yellow jacket)
 Ves g 5.0101 P35784 *Vespula germanica* (Yellow jacket)
 Ves m 1.0101 P51528 *Vespula maculifrons* (Yellow jacket)
 Ves m 5.0101 P35760 *Vespula maculifrons* (Yellow jacket)
 Ves p 5.0101 P35785 *Vespula pensylvanica* (Yellow jacket)
 Ves s 5.0101 P35786 *Vespula squamosa* (Yellow jacket)
 Ves v 1.0101 P49369 *Vespula vulgaris* (Yellow jacket)
 Ves v 2.0101 P49370 *Vespula vulgaris* (Yellow jacket)
 Ves v 2.0201 Q5D7H4 *Vespula vulgaris* (Yellow jacket)
 Ves v 3.0101 B1A4F7 *Vespula vulgaris* (Yellow jacket)
 Ves v 5.0101 Q05110 *Vespula vulgaris* (Yellow jacket)
 Ves vi 5.0101 P35787 *Vespula vidua* (Wasp)
 Vesp c 5.0101 P35781 *Vespa crabro* (European hornet)
 Vesp c 5.0102 P35782 *Vespa crabro* (European hornet)
 Vesp m 5.0101 P81657 *Vespa mandarinia* (Giant asian hornet)
 Vig r 1.0101 Q2VU97 *Vigna radiata* (Mung bean)
 Vit v 1.0101 P80274 *Vitis vinifera* (Grape)
 Zea m 1.0101 Q07154 *Zea mays* (Maize)
 Zea m 12.0101 P35081 *Zea mays* (Maize)
 Zea m 12.0102 P35082 *Zea mays* (Maize)
 Zea m 12.0103 P35083 *Zea mays* (Maize)
 Zea m 12.0104 022655 *Zea mays* (Maize)
 Zea m 12.0105 Q9FR39 *Zea mays* (Maize)
 Zea m 14.0101 P19656 *Zea mays* (Maize)
 Zea m 14.0102 P19656 *Zea mays* (Maize)
 Zea m 25.0101 Q4W1F7 *Zea mays* (Maize)
 Ziz m 1.0101 Q2VST0 *Ziziphus mauritiana* (Chinese-date)
 Cur l 4.0101 B3VOK8 *Curvularia lunata* (Synonym: *Cochliobolus lunatus*)
 Pru du 6.0101 E3SH28 *Prunus dulcis* (Almond)
 Pru du 6.0201 E3SH29 *Prunus dulcis* (Almond)
 Pru p 2.0101 B6CQT7 *Prunus persica* (Peach)
 Pru p 2.0201 B6CQT5 *Prunus persica* (Peach)
 Pru p 2.0301 B6CQT3 *Prunus persica* (Peach)
 Cas s 9.0101 Q9ZS24 *Castanea sativa* (Chestnut)
 Tha p 2.0101 P86360 *Thaumetopoea pityocampa* (Pine processionary moth)
 Glo m 5.0101 Q9NBA6 *Glossina morsitans* (Savannah Tsetse Fly)
 Bomb m 1.0101 Q2F5T5 *Bombyx mori* (Silk moth)
 Fag e 2.0101 Q2PS07 *Fagopyrum esculentum* (Common buckwheat)
 Len c 3.0101 A0AT29 *Lens culinaris* (Lentil)

Ole e 11.0101 ACZ57582 *Olea europea* (Olive)
 Hev b 14.0101 E7BQV3 *Hevea brasiliensis* (Para rubber tree (latex))
 Pen m 3.0101 E1A683 *Penaeus monodon* (Black tiger shrimp)
 Lyc e 4.0101 049881 *Lycopersicon esculentum* (Tomato)
 Fag s 1.0101 B7TWE6 *Fagus sylvatica* (European beech)
 Lip b 1.0101 P86712 *Liposcelis bostrichophila* (Booklouse)
 Gad m 1.0101 Q90YL0 *Gadus morhua* (Atlantic cod)
 Gad m 1.0102 A5I873 *Gadus morhua* (Atlantic cod)
 Gad m 1.0201 Q90YK9 *Gadus morhua* (Atlantic cod)
 Gad m 1.0202 A5I874 *Gadus morhua* (Atlantic cod)
 Can f 6.0101 H2B3G5 *Canis familiaris* (dog)
 Plo i 2.0101 E1XUQ3 *Plodia interpunctella* (Indianmeal moth)
 Tyr p 3.0101 C6ZDB5 *Tyrophagus putrescentiae* (Storage mite)
 Pan b 1.0101 E5BBS3 *Pandalus borealis* (Northern shrimp)
 Tri a 15.0101 D2TGC3 *Triticum aestivum* (Wheat)
 Tri a 21.0101 D2T2K3 *Triticum aestivum* (Wheat)
 Tri a 31.0101 Q9FS79 *Triticum aestivum* (Wheat)
 Tri a 32.0101 Q6W8Q2 *Triticum aestivum* (Wheat)
 Tri a 33.0101 Q9ST57 *Triticum aestivum* (Wheat)
 Tri a 34.0101 C7C4X1 *Triticum aestivum* (Wheat)
 Tri a 35.0101 D2TE72 *Triticum aestivum* (Wheat)
 Asp v 13.0101 ADE74975 *Aspergillus versicolor*
 Sta c 3.0101 C7E9W0 *Stachybotrys chartarum*
 Cof a 1.0101 D7REL9 *Coffea arabica* (Arabian coffe)
 Fag t 2.0101 E9NX73 *Fagopyrum tataricum* (Tartarian buckwheat)
 Api g 6.0101 P86809 *Apium graveolens* (Celery)
 Onc m 1.0101 P86431 *Oncorhynchus mykiss* (Rainbow trout)
 Onc m 1.0201 P86432 *Oncorhynchus mykiss* (Rainbow trout)
 Api m 11.0101 B3GM11 *Apis mellifera* (Honey bee)
 Api m 11.0201 Q4ZJX1 *Apis mellifera* (Honey bee)
 Sal s 2.0101 B5DGQ7 *Salmo salar* (Atlantic salmon)
 Tri a 37.0101 Q9TOP1 *Triticum aestivum* (Wheat)
 Api m 12.0101 Q868N5 *Apis mellifera* (Honey bee)
 Ves v 6.0101 G8IIT0 *Vespula vulgaris* (Yellow jacket)
 Dau c 5.0101 H2DF86 *Daucus carota* (Carrot)
 Fag e 3.0101 A5HIX6 *Fagopyrum esculentum* (Common buckwheat)
 Vig r 2.0101 Q198W3 *Vigna radiata* (Mung bean)
 Vig r 2.0201 B1NPN8 *Vigna radiata* (Mung bean)
 Vig r 4.0101 Q43680 *Vigna radiata* (Mung bean)
 Vig r 6.0101 Q9ZWP8 *Vigna radiata* (Mung bean)
 Bra r 5.0101 P69197 *Brassica rapa* (Turnip)
 Sch c 1.0101 D8Q9M3 *Schizophyllum commune*
 Gad m 2.0101 B3AOL6 *Gadus morhua* (Atlantic cod)
 Gad m 3.0101 P86980 *Gadus morhua* (Atlantic cod)
 Sal s 3.0101 B5DGM7 *Salmo salar* (Atlantic salmon)
 Thu a 2.0101 P86978 *Thunnus albacares* (Yellowfin tuna)
 Thu a 3.0101 P86979 *Thunnus albacares* (Yellowfin tuna)
 Bos d 9.0101 P02662 *Bos domesticus* (domestic cattle)
 Bos d 10.0101 P02663 *Bos domesticus* (domestic cattle)
 Bos d 11.0101 P02666 *Bos domesticus* (domestic cattle)
 Bos d 12.0101 P02668 *Bos domesticus* (domestic cattle)
 Pru p 7.0101 P86888 *Prunus persica* (Peach)
 Bla g 3.0101 D0VNY7 *Blattella germanica* (German cockroach)
 Gly m 7.0101 C6K8D1 *Glycine max* (Soybean)
 Onc k 5.0101 D5MU14 *Oncorhynchus* (Chum salmon)
 Cav p 4.0101 Q6WDN9 *Cavia porcellus* (guinea pig)
 Ory c 3. Q9GK63 *Oryctolagus cuniculus* (rabbit)
 Ory c 3. Q9GK67 *Oryctolagus cuniculus* (rabbit)
 Tri a 39.0101 J7QW61 *Triticum aestivum* (Wheat)
 Der p 15.0101 Q4JK69 *Dermatophagoides pteronyssinus* (European house dust mite)
 Der p 15.0102 Q4JK70 *Dermatophagoides pteronyssinus* (European house dust mite)
 Der p 18.0101 Q4JK71 *Dermatophagoides pteronyssinus* (European house dust mite)

E.1 Omitted allergens from allergen.org

A few of the entries were omitted, due to wrong accession codes, unpublished sequences or other errors:

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Pen c 13.0101 Q9URH1 Penicillium citrinum
Ole e 11.0101 ACZ57582 Olea europea (Olive)
Asp v 13.0101 ADE74975 Aspergillus versicolor
Api g 6.0101 P86809 Apium graveolens (Celery)
Gad m 2.0101 B3A0L6 Gadus morhua (Atlantic cod)
Gad m 3.0101 P86980 Gadus morhua (Atlantic cod)
Thu a 2.0101 P86978 Thunnus albacares (Yellowfin tuna)
Thu a 3.0101 P86979 Thunnus albacares (Yellowfin tuna)
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F Results from the EFSA scientific opinion recommended allergen analysis of Xylanase from HyGe329 using allergenonline database

F.1 35% or larger identity over any 80 amino acid window

(No hits found)

(blank=No matches found) Count of significant hits described in text based on identity > 35%.

F.2 35% or larger identity over any 80 amino acid window (with scaling)

(No hits found)

(blank=No matches found) Count of significant hits described in text based on identity > 35%.

F.3 Identities calculated from Needleman-Wuncsh alignment

Matches \geq 10% are shown

gi_23894244_emb_CAD23614.1__tri_m_2_allergen_[Arthroderma_benhamiae]	93/505	= 18.4%
gi_963013_emb_CAA59419.1__aspergillopepsin_i_[Aspergillus_fumigatus]	89/488	= 18.2%
gi_61225281_gb_AAX40948.1__allergen_Ziz_m_1_[Ziziphus_mauritiana]	86/473	= 18.2%
gi_23894240_emb_CAD23613.1__tri_m_2_allergen_[Arthroderma_benhamiae]	79/437	= 18.1%
gi_2143220_emb_CAA73782.1__cellular_serine_proteinase_[Aspergillus_fumigatus]	99/550	= 18.0%
gi_14423687_sp_Q9LEI9.1_ENO2_HEVBR_RecName__Full=Enolase_2__AltName__Full=2-phos	94/523	= 18.0%
gi_15826578_pdb_1JTI_A_Chain_A,_Loop-Inserted_Structure_Of_P1-P1'_Cleaved_Ovalbu	84/468	= 17.9%
gi_118197955_gb_ABK78766.1__major_allergen_Cup_a_1_[Hesperocyparis_arizonica]	85/475	= 17.9%
gi_8843917_gb_AAF80164.1__pollen_major_allergen_1-2_[Juniperus_virginiana]	87/488	= 17.8%
gi_9087167_sp_Q9SCG9.1_MPAC1_CUPAR_RecName__Full=Major_pollen_allergen_Cup_a_1__	84/475	= 17.7%
gi_8843921_gb_AAF80166.1__pollen_major_allergen_1-1_[Juniperus_virginiana]	87/492	= 17.7%
gi_15139849_emb_CAC48400.1__putative_allergen_jun_o_1_[Juniperus_oxycedrus]	86/487	= 17.7%
gi_74665726_sp_Q9UVU3_Q9UVU3_ASPFL_Allergen_Asp_fl_1	84/476	= 17.6%
gi_14423688_sp_Q9LEJ0.1_ENO1_HEVBR_RecName__Full=Enolase_1__AltName__Full=2-phos	93/527	= 17.6%
gi_129235_sp_P12547.2_ORYZ_ASPOR_RecName__Full=Alkaline_protease_1__Short=ALP__A	84/476	= 17.6%
gi_85540942_sp_Q8J0P4.2_CRF1_ASPFU_RecName__Full=Probable_glycosidase_crf1__AltN	86/492	= 17.5%
gi_21069093_gb_AAM33821.1__alkaline_serine_protease_[Penicillium_chrysogenum]	87/496	= 17.5%
gi_4588118_gb_AAD25995.1_AF098517.1_alkaline_serine_protease_Pen_c2_[Penicillium	95/547	= 17.4%
gi_89892727_gb_ABD79097.1__Zea_m_13_allergen_[Zea_mays]	86/505	= 17.0%
gi_808969_emb_CAA23682.1__unnamed_protein_product_[Gallus_gallus]	80/470	= 17.0%
gi_204324083_gb_ACIO1048.1__arginine_kinase_[Bombyx_mori]	83/488	= 17.0%

gi_129293_sp_P01012.2_OVAL_CHICK_RecName__Full=Ovalbumin__AltName__Full=Allergen	80/470	= 17.0%
gi_8101719_gb_AAF72629.1_AF257495_1_Cup_s_1_pollen_allergen_precursor_[Cupressus]	84/496	= 16.9%
gi_8101717_gb_AAF72628.1_AF257494_1_Cup_s_1_pollen_allergen_precursor_[Cupressus]	84/496	= 16.9%
gi_8101711_gb_AAF72625.1_AF257491_1_Cup_s_1_pollen_allergen_precursor_[Cupressus]	84/498	= 16.9%
gi_9087152_sp_P81294.1_MPAJ1_JUNAS_RecName__Full=Major_pollen_allergen_Jun_a_1__	84/499	= 16.8%
gi_89892725_gb_ABD79096.1__Zea_m_13_allergen_[Zea_mays]	86/511	= 16.8%
gi_6684758_gb_AAF23726.1_AF193420_1_allergen_Pen_n_13_[Penicillium_chrysogenum]	86/511	= 16.8%
gi_1580794_gb_AAB62731.1__allergen__partial_[Periplaneta_americana]	95/565	= 16.8%
gi_14279169_gb_AAK58515.1_AF249675_1_beta-1,3-glucanase-like_protein_[Olea_europ]	92/550	= 16.7%
gi_11991227_gb_AAG42254.1_AF306707_1_pollen_allergen_Poa_p_5_[Poa_pratensis]	75/454	= 16.5%
gi_34811333_pdb_1UHG_D_Chain_D_Crystal_Structure_Of_S-ovalbumin_At_1.9_Angstrom	79/481	= 16.4%
gi_125987805_sp_P08819.2_CBP2_WHEAT_RecName__Full=Serine_carboxypeptidase_2__Alt	88/535	= 16.4%
gi_8101715_gb_AAF72627.1_AF257493_1_Cup_s_1_pollen_allergen_precursor_[Cupressus]	81/498	= 16.3%
gi_8101713_gb_AAF72626.1_AF257492_1_Cup_s_1_pollen_allergen_precursor_[Cupressus]	81/498	= 16.3%
gi_15886861_emb_CAC85911.1__arginine_kinase_[Plodia_interpunctella]	79/486	= 16.3%
gi_11991229_gb_AAG42255.1_AF306708_1_pollen_allergen_Hol_l_5b_[Holcus_lanatus]	73/448	= 16.3%
gi_4587983_gb_AAD25926.1_AF084546_1_Pen_c_1_[Penicillium_citrinum]	83/513	= 16.2%
gi_114841683_dbj_BAF32143.1__pollen_allergen_[Chamaecyparis_obtusa]	82/514	= 16.0%
gi_125659386_dbj_BAF46896.1__tropomyosin_[Balanus_rostratus]	69/433	= 15.9%
gi_302201583_gb_ADL09135.1__hyaluronidase_precursor_[Polybia_paulista]	75/474	= 15.8%
gi_219806600_dbj_BAH10155.1__tropomyosin_[Tresus_keenae]	69/436	= 15.8%
gi_166216292_sp_A2VBC4.1_PA1_POLPI_RecName__Full=Venom_phospholipase_A1__AltName	77/488	= 15.8%
gi_129614_sp_P00784.1_PAPA1_CARPA_RecName__Full=Papain__AltName__Full=Papaya_pro	78/493	= 15.8%
gi_46406002_gb_AAS93669.1__Sar_s_1_allergen_Yv5032C08_[Sarcoptes_scabiei_type_ho	73/469	= 15.6%
gi_74663809_sp_Q8J077.1_SUB6_TRISH_RecName__Full=Subtilisin-like_protease_6__Alt	83/536	= 15.5%
gi_313471397_sp_POCH87.1_PA1_VESCR_RecName__Full=Venom_phospholipase_A1__AltName	69/444	= 15.5%
gi_219806596_dbj_BAH10153.1__tropomyosin_[Fulvia_mutica]	69/446	= 15.5%
gi_21591547_gb_AAM64112.1__gelsolin-like_allergen_Der_f_16_[Dermatophagoides_far	87/560	= 15.5%
gi_219806602_dbj_BAH10156.1__tropomyosin_[Solen_strictus]	67/438	= 15.3%
gi_14423684_sp_Q9HDT3.2_ENO_ALTAL_RecName__Full=Enolase__AltName__Full=2-phospho	88/574	= 15.3%
gi_1359600_emb_CAA64868.1__chitinase_Ib_[Castanea_sativa]	74/484	= 15.3%
gi_338930674_emb_CBM42661.1__group_13_grass_pollen_allergen_[Paspalum_notatum]	78/512	= 15.2%
gi_1684720_emb_CAB05372.1__major_allergen_Phl_p_5_[Phleum_pratense]	67/441	= 15.2%
gi_114841635_dbj_BAF32119.1__pollen_allergen_[Cryptomeria_japonica]	87/573	= 15.2%
gi_302127822_emb_CBW30992.1__putative_pectate_lyase_precursor_[Ambrosia_artemisi	86/568	= 15.1%
gi_302127820_emb_CBW30991.1__putative_pectate_lyase_precursor_[Ambrosia_artemisi	86/568	= 15.1%
gi_302127816_emb_CBW30989.1__putative_pectate_lyase_precursor_[Ambrosia_artemisi	85/564	= 15.1%
gi_302127814_emb_CBW30988.1__putative_pectate_lyase_precursor_[Ambrosia_artemisi	85/564	= 15.1%
gi_21725618_emb_CAD38390.1__unnamed_protein_product_[Phleum_pratense]	69/458	= 15.1%
gi_21725608_emb_CAD38385.1__unnamed_protein_product_[Phleum_pratense]	69/458	= 15.1%
gi_84029333_sp_Q948T6.2_LGUL_ORYSJ_RecName__Full=Lactoylglutathione_lyase__AltNa	70/467	= 15.0%
gi_302127828_emb_CBW30995.1__putative_pectate_lyase_precursor_[Ambrosia_artemisi	82/547	= 15.0%
gi_302127818_emb_CBW30990.1__putative_pectate_lyase_precursor_[Ambrosia_artemisi	85/568	= 15.0%
gi_24898904_dbj_BAC23082.1__allergen_Cry_j_2_[Cryptomeria_japonica]	87/579	= 15.0%
gi_16580747_dbj_BAB71741.1__glyoxalase_I_[Oryza_sativa_Japonica_Group]	70/467	= 15.0%
gi_1173367_sp_P18632.2_SBP_CRYJA_RecName__Full=Sugi_basic_protein__Short=SBP__Al	80/534	= 15.0%
gi_83288046_sp_Q96X30.3_ENO_ASFFU_RecName__Full=Enolase__AltName__Full=2-phospho	84/562	= 14.9%
gi_62147665_emb_CAI77218.1__hyaluronidase_b_[Vespula_vulgaris]	71/475	= 14.9%
gi_55859464_emb_CAH92637.1__pollen_allergen_Lol_p_4_[Lolium_perenne]	79/530	= 14.9%
gi_493634_dbj_BAA05543.1__Cry_j_IB_precursor_[Cryptomeria_japonica]	79/530	= 14.9%
gi_238477265_gb_ACR43474.1__arginine_kinase_[Crangon_crangon]	75/502	= 14.9%
gi_19570315_dbj_BAB86286.1__Cry_j_1_precursor_[Cryptomeria_japonica]	79/531	= 14.9%
gi_60116876_gb_AAX14379.1__vacuolar_serine_protease_[Davidiella_tassiana]	88/594	= 14.8%
gi_302127826_emb_CBW30994.1__putative_pectate_lyase_precursor_[Ambrosia_artemisi	81/547	= 14.8%
gi_27550039_gb_AAM19082.1__60_kDa_allergen_Der_f_18p_[Dermatophagoides_farinae]	82/555	= 14.8%
gi_2498582_sp_Q40237.1_MPA5B_LOLPR_RecName__Full=Major_pollen_allergen_Lol_p_5b_	75/506	= 14.8%
gi_219806598_dbj_BAH10154.1__tropomyosin_[Pseudocardium_sachalinensis]	67/453	= 14.8%
gi_113479_sp_P27762.1_MPAA2_AMBAR_RecName__Full=Pollen_allergen_Amb_a_2__AltName	81/547	= 14.8%

gi_307159110_gb_ADN39439.1__class_I_chitinase_isoform_2,_partial_[Castanea_sativ	70/475	= 14.7%
gi_30313867_gb_AA038859.1__11S_globulin_[Bertholletia_excelsa]	86/585	= 14.7%
gi_13925873_gb_AAK49451.1_AF284645_1_enolase_[Aspergillus_fumigatus]	82/559	= 14.7%
gi_57283137_emb_CAE17316.1__villin_1_[Nicotiana_tabacum]	95/650	= 14.6%
gi_33667928_gb_AAQ24541.1__Blo_t_1_allergen_[Blomia_tropicalis]	71/490	= 14.5%
gi_38456230_gb_AAR21075.1__PR5_allergen_Cup_s_3.3_precursor_[Cupressus_sempervir	61/425	= 14.4%
gi_8453086_gb_AAF75225.1_AF208981_1_paramyosin_isoform_[Anisakis_simplex]	81/568	= 14.3%
gi_74664773_sp_Q96X46.3_ENO_PENCI_RecName__Full=Enolase__AltName__Full=2-phospho	82/572	= 14.3%
gi_62738637_pdb_1YG9_A_Chain_A_The_Structure_Of_Mutant_(N93q)_Of_Bla_G_2	70/488	= 14.3%
gi_238477263_gb_ACR43473.1__tropomyosin_[Crangon_crangon]	65/453	= 14.3%
gi_116174180_emb_CAL59818.1__hyaluronidase_[Vespula_germanica]	69/481	= 14.3%
gi_112380623_gb_ABI17154.1__iso-Ara_h3_[Arachis_hypogaea]	84/588	= 14.3%
gi_2266623_emb_CAD10766.1__group_V_grass_pollen_allergen_[Holcus_lanatus]	63/443	= 14.2%
gi_18093971_emb_CAD20405.1__unnamed_protein_product_[Dactylis_glomerata]	61/430	= 14.2%
gi_89892729_gb_ABD79098.1__Zea_m_13_allergen_[Zea_mays]	78/552	= 14.1%
gi_66840994_emb_CAI64396.1__serine_carboxypeptidase_II_[Triticum_aestivum]	66/467	= 14.1%
gi_398830_emb_CAA52753.1__Phlp5_[Phleum_pratense]	68/481	= 14.1%
gi_288819271_gb_ADC55380.1__tropomyosin_[Macrobrachium_rosenbergii]	64/453	= 14.1%
gi_188572343_gb_ACD65081.1__eukaryotic_translation_initiation_factor_[Forcipomyi	65/462	= 14.1%
gi_113560_sp_P22284.1_MPA91_POAPR_RecName__Full=Pollen_allergen_KBG_31__AltName_	77/545	= 14.1%
gi_38456228_gb_AAR21074.1__PR5_allergen_Cup_s_3.2_precursor_[Cupressus_sempervir	59/420	= 14.0%
gi_323473390_gb_ADX78255.1__Tab_y_3_allergen_[Tabanus_yao]	88/627	= 14.0%
gi_315190620_gb_ADT89774.1__phospholipase_A1_[Polybia_paulista]	69/493	= 14.0%
gi_1346323_sp_P49370.1_HUGAA_VESVU_RecName__Full=Hyaluronidase_A__Short=Hya_A__A	68/486	= 14.0%
gi_109157163_pdb_2ATM_A_Chain_A_Crystal_Structure_Of_The_Recombinant_Allergen_V	68/486	= 14.0%
gi_8927462_gb_AAF82096.1_AF259957_1_antigen_5_precursor_[Glossina_morsitans_mors	64/460	= 13.9%
gi_219806592_dbj_BAH10151.1__tropomyosin_[Scapharca_broughtonii]	60/432	= 13.9%
gi_4240395_gb_AAD13531.1__major_allergen_Bla_g_1.02_[Blattella_germanica]	82/599	= 13.7%
gi_156938889_gb_ABU97466.1__group_10_allergen_Blo_t_10_[Blomia_tropicalis]	66/483	= 13.7%
gi_1531589_gb_AAB09632.1__allergen,_partial_[Periplaneta_americana]	98/716	= 13.7%
gi_145105726_gb_ABP35603.1__Bla_g_2_allergen_variant_[Blattella_germanica]	69/502	= 13.7%
gi_116174182_emb_CAL59819.1__hyaluronidase_homologue_[Vespula_germanica]	65/475	= 13.7%
gi_9087163_sp_Q96385.1_MPAC1_CHAOB_RecName__Full=Major_pollen_allergen_Cha_o_1__	75/550	= 13.6%
gi_5813790_gb_AAD52013.1_AF082515_1_Tri_r_2_allergen_[Trichophyton_rubrum]	77/565	= 13.6%
gi_57283139_emb_CAE17317.1__villin_2_[Nicotiana_tabacum]	89/656	= 13.6%
gi_38456224_gb_AAR21072.1__PR5_allergen_Jun_r_3.2_precursor_[Juniperus_rigida]	58/428	= 13.6%
gi_47606004_sp_Q7M1E7.1_PGLR2_CHAOB_RecName__Full=Polygalacturonase__Short=PG__A	82/609	= 13.5%
gi_304273371_gb_ADM18346.1__putative_Tab_y_2_allergen_[Tabanus_yao]	67/498	= 13.5%
gi_1580797_gb_AAB63595.1__allergen,_partial_[Periplaneta_americana]	74/549	= 13.5%
gi_14423735_sp_Q9U6V9.1_HUGA_POLAN_RecName__Full=Hyaluronidase__Short=Hya__AltNa	68/505	= 13.5%
gi_78038796_emb_CAI43283.4__mala_s_12_allergen_precursor_[Malassezia_symphodialis	94/699	= 13.4%
gi_548449_sp_Q06478.1_PA11_DOLMA_RecName__Full=Phospholipase_A1_1__AltName__Full	65/486	= 13.4%
gi_4826572_emb_CAB42886.1__polygalacturonase_[Phleum_pratense]	69/516	= 13.4%
gi_315113421_pdb_3LIZ_A_Chain_A_Crystal_Structure_Of_Bla_G_2_Complexed_With_Fab	66/491	= 13.4%
gi_289742483_gb_ADD19989.1__salivary_antigen_5_precursor_variant_[Glossina_morsi	58/434	= 13.4%
gi_1885350_emb_CAA72273.1__serpin_[Triticum_aestivum]	68/507	= 13.4%
gi_1346322_sp_P49371.1_HUGA_DOLMA_RecName__Full=Hyaluronidase__Short=Hya__AltNam	65/484	= 13.4%
gi_49523394_emb_CAE52833.1__polygalacturonase_[Platanus_x_acerifolia]	70/527	= 13.3%
gi_42559556_sp_Q96764.2_TPM_CHIKI_RecName__Full=Tropomyosin__AltName__Allergen=C	62/467	= 13.3%
gi_2440053_emb_CAA75141.1__tropomyosin_[Dermatophagoides_apteronyssinus]	64/480	= 13.3%
gi_2353266_gb_AAB69424.1__tropomyosin_[Dermatophagoides_apteronyssinus]	64/480	= 13.3%
gi_13959403_sp_Q01940.1_MALF1_MALFU_RecName__Full=Major_allergen_Mal_f_1__AltNam	67/503	= 13.3%
gi_80553470_gb_ABB52642.1__tropomyosin_[Dermatophagoides_apteronyssinus]	63/476	= 13.2%
gi_56550550_dbj_BAD77932.1__class_IV_chitinase_[Cryptomeria_japonica]	60/456	= 13.2%
gi_302425085_sp_P86687.1_HUGA_POLPI_RecName__Full=Hyaluronidase__Short=Hya__AltN	63/476	= 13.2%
gi_161137518_gb_ABX57814.1__delta_class_glutathione_S-transferase_[Blattella_ger	57/431	= 13.2%
gi_14423956_sp_Q9NF24.1_TPM_LEPDS_RecName__Full=Tropomyosin__AltName__Allergen=L	63/479	= 13.2%
gi_6015094_sp_P42040.2_ENO_DAVTA_RecName__Full=Enolase__AltName__Full=2-phospho-	78/594	= 13.1%

gi_467660_emb_CAA55070.1__enolase,_allergen_Cla_h_6_[Davidiella_tassiana]	78/594	= 13.1%
gi_42559584_sp_Q23939.2_TPM_DERFA_RecName__Full=Tropomyosin__AltName__Full=Mag44	62/475	= 13.1%
gi_219806590_dbj_BAH10150.1__tropomyosin_[Neptunea_polycostata]	57/434	= 13.1%
gi_19069497_emb_CAC37790.2__putative_allergen_Cup_a_1_[Hesperocyparis_arizonica]	72/549	= 13.1%
gi_125995165_dbj_BAF47266.1__tropomyosin_slow-tonic_isoform_[Paralithodes_camtschaticu]	62/473	= 13.1%
gi_27462848_gb_AAO15613.1_AF462196.1_major_allergen_1_[Sarcoptes_scabiei_type_ho]	66/506	= 13.0%
gi_2660868_gb_AAC48288.1__fast_tropomyosin_isoform_[Homarus_americanus]	62/477	= 13.0%
gi_189014272_emb_CAQ55941.1__pollen_allergen_Ph1_p_4.0204_[Phleum_pratense]	79/608	= 13.0%
gi_189014270_emb_CAQ55940.1__pollen_allergen_Ph1_p_4.0203_[Phleum_pratense]	79/608	= 13.0%
gi_189014268_emb_CAQ55939.1__pollen_allergen_Ph1_p_4.0202_[Phleum_pratense]	79/608	= 13.0%
gi_18615_emb_CAA26723.1__unnamed_protein_product_[Glycine_max]	77/593	= 13.0%
gi_125995163_dbj_BAF47265.1__tropomyosin_fast_isoform_[Paralithodes_camtschaticu]	62/477	= 13.0%
gi_113562_sp_P22286.1_MPA93_POAPR_RecName__Full=Pollen_allergen_KBG_60__AltName__	69/531	= 13.0%
gi_6094504_sp_Q25456.1_TPM_METEN_RecName__Full=Tropomyosin__AltName__Full=Allerg	60/465	= 12.9%
gi_3309047_gb_AAC25998.1__group_V_allergen_Ph1_p_5.0207_precursor_[Phleum_praten]	67/520	= 12.9%
gi_21914823_gb_AAM73730.2_AF395894.1_vicilin-like_protein_[Anacardium_occident]	84/653	= 12.9%
gi_21666498_gb_AAM73729.1_AF395893.1_vicilin-like_protein_[Anacardium_occident]	84/651	= 12.9%
gi_1545803_dbj_BAA04558.1__Mag3_[Dermatophagoides_farinae]	66/512	= 12.9%
gi_83715932_dbj_BAE54431.1__tropomyosin_[Todarodes_pacificus]	57/447	= 12.8%
gi_73532979_gb_AAZ76743.1__Pen_a_1_allergen_[Farfantepenaeus_aztecus]	61/475	= 12.8%
gi_308191588_sp_A2V735.1_TPM_CHIOP_RecName__Full=Tropomyosin__AltName__Full=Trop	57/447	= 12.8%
gi_21510_emb_CAA31575.1__unnamed_protein_product_[Solanum_tuberosum]	69/541	= 12.8%
gi_162286975_dbj_BAF95206.1__tropomyosin_[Oratosquilla_oratoria]	61/477	= 12.8%
gi_148615631_gb_ABQ96644.1__tropomyosin_[Tyrophagus_putrescentiae]	61/475	= 12.8%
gi_14585753_gb_AAK67491.1__enolase_[Cochliobolus_lunatus]	74/579	= 12.8%
gi_125995159_dbj_BAF47263.1__tropomyosin_fast_isoform_[Marsupenaeus_japonicus]	61/475	= 12.8%
gi_125995157_dbj_BAF47262.1__tropomyosin_fast_isoform_[Penaeus_monodon]	61/475	= 12.8%
gi_83303658_sp_P40292.3_HSP90_ASPFU_RecName__Full=Heat_shock_protein_90__AltName	99/777	= 12.7%
gi_556272_gb_AAC37218.1__apyrase_[Aedes_aegypti]	83/654	= 12.7%
gi_48249227_gb_AAT40866.1__tropomyosin,_partial_[Tyrophagus_putrescentiae]	62/490	= 12.7%
gi_18542115_gb_AAL75450.1_AF465613.1_minor_allergen_beta-fructofuranosidase_prec	94/739	= 12.7%
gi_1351295_sp_P02789.2_TRFE_CHICK_RecName__Full=Ovotransferrin__AltName__Full=Al	100/787	= 12.7%
gi_13183177_gb_AAK15089.1_AF240006.1_7S_globulin_[Sesamum_indicum]	84/660	= 12.7%
gi_9954251_gb_AAG08988.1_AF216519.1_tropomyosin_[Perna_viridis]	57/451	= 12.6%
gi_67975085_gb_AAY84563.1__group_18_allergen_protein_[Dermatophagoides_pteronys]	76/603	= 12.6%
gi_51093373_gb_AAT95008.1__allergen_Sol_i_1_precursor_[Solenopsis_invicta]	67/531	= 12.6%
gi_2833325_sp_Q25641.1_CRPI_PERAM_RecName__Full=Allergen_Cr-PI__AltName__Allerge	96/760	= 12.6%
gi_238477327_gb_ACR43475.1__sarcoplasmic_calcium-binding_protein_[Crangon_crago]	53/419	= 12.6%
gi_189014266_emb_CAQ55938.1__pollen_allergen_Ph1_p_4.0102_[Phleum_pratense]	78/619	= 12.6%
gi_152031631_sp_P82615.3_LATH_HORSE_RecName__Full=Latherin__AltName__Full=Dander	60/478	= 12.6%
gi_14285796_sp_O44119.1_TPM_HOMAM_RecName__Full=Tropomyosin__AltName__Allergen=H	60/476	= 12.6%
gi_12005497_gb_AAG44478.1_AF243425.1_vacuolar_serine_protease_[Penicillium_oxali]	77/613	= 12.6%
gi_9929163_emb_CAC05258.1__Cup_a_3_protein_[Hesperocyparis_arizonica]	53/425	= 12.5%
gi_82492267_gb_ABB78007.1__major_pollen_allergen_Ph1_p_4_precursor_[Phleum_prate]	79/633	= 12.5%
gi_2498580_sp_P56167.1_MPA54_PHAHQ_RecName__Full=Major_pollen_allergen_Pha_a_5.4	52/416	= 12.5%
gi_21314465_gb_AAM46958.1_AF510854.1_allergen_Arah3/Arah4_[Arachis_hypogaea]	81/647	= 12.5%
gi_18635_emb_CAA33215.1__glycinin_subunit_G1_[Glycine_max]	75/599	= 12.5%
gi_757851_emb_CAA26040.1__ovotransferrin_[Gallus_gallus]	99/797	= 12.4%
gi_29539111_emb_CAD87731.1__allergen_Len_c_1.0102_[Lens_culinaris]	68/548	= 12.4%
gi_9087177_sp_P81295.1_PRR3_JUNAS_RecName__Full=Pathogenesis-related_protein__Al	52/423	= 12.3%
gi_45108973_emb_CAF32567.2__unnamed_protein_product_[Phleum_pratense]	76/617	= 12.3%
gi_45108967_emb_CAF32566.2__unnamed_protein_product_[Phleum_pratense]	76/617	= 12.3%
gi_38258932_sp_P82615_LATH_HORSE_Latherin_precursor_(Dander_allergen_Equ_c_4/Equ	59/478	= 12.3%
gi_313471398_sp_POCH86.1_PA1_VESSQ_RecName__Full=Venom_phospholipase_A1__AltName	59/479	= 12.3%
gi_21514_emb_CAA27588.1__patatin_[Solanum_tuberosum]	64/520	= 12.3%
gi_14423833_sp_Q9U6W0.1_PA1_POLAN_RecName__Full=Phospholipase_A1__AltName__Aller	64/522	= 12.3%
gi_113478_sp_P28744.1_MPA14_AMBAR_RecName__Full=Pollen_allergen_Amb_a_1.4__AltNa	66/537	= 12.3%
gi_54144332_emb_CAD54670.2__pollen_allergen_Ph1_p_4_[Phleum_pratense]	76/625	= 12.2%

gi_312831088_emb_CBY17558.1__tropomyosin__allergen_Pan_b_1_[Pandalus_borealis]	57/466	= 12.2%
gi_289721058_gb_ADD17628.1__Per_a_3_allergen_[Periplaneta_americana]	92/757	= 12.2%
gi_219806594_dbj_BAH10152.1__tropomyosin_[Crassostrea_gigas]	57/469	= 12.2%
gi_208970286_gb_ACI32128.1__tropomyosin_[Dermatophagoides_ptonysinus]	59/482	= 12.2%
gi_166443_gb_AAA32669.1__antigen_E_[Ambrosia_artemisiifolia]	70/576	= 12.2%
gi_14285797_sp_061379.1__TPM_PANST_RecName__Full=Tropomyosin__AltName__Full=Aller	57/467	= 12.2%
gi_125995169_dbj_BAF47268.1__tropomyosin_slow-twitch_isoform_[Erimacrus_isenbecki]	58/476	= 12.2%
gi_125995161_dbj_BAF47264.1__tropomyosin_fast_isoform_[Pandalus_eous]	57/466	= 12.2%
gi_113477_sp_P27761.1__MPA13_AMBAR_RecName__Full=Pollen_allergen_Amb_a_1.3__AltNa	70/576	= 12.2%
gi_83715934_dbj_BAE54432.1__tropomyosin_[Ommastrephes_bartramii]	55/455	= 12.1%
gi_83715928_dbj_BAE54429.1__tropomyosin_[Sepia_esculenta]	55/455	= 12.1%
gi_302127824_emb_CBW30993.1__putative_pectate_lyase_precursor_[Ambrosia_artemisi	65/536	= 12.1%
gi_3005839_emb_CAA04959.1__rAsp_f_4_[Aspergillus_fumigatus]	57/473	= 12.1%
gi_193806340_sp_P50635.2__APY_AEDAE_RecName__Full=Apyrase__AltName__Full=ATP-diph	79/655	= 12.1%
gi_74611808_sp_Q6R4B4.1__GST_ALTAL_RecName__Full=Glutathione-S-transferase__AltNa	52/433	= 12.0%
gi_42414629_emb_CAF25233.1__Vicilin_[Pisum_sativum]	67/559	= 12.0%
gi_42414627_emb_CAF25232.1__Vicilin_[Pisum_sativum]	67/559	= 12.0%
gi_303387468_gb_ADM15668.1__lipid_binding_protein_[Felis_catus]	54/450	= 12.0%
gi_284518363_gb_ADB92493.1__major_allergen_Cr-PI_[Periplaneta_americana]	90/749	= 12.0%
gi_2498579_sp_P56166.1__MPA53_PHAHQ_RecName__Full=Major_pollen_allergen_Pha_a_5.3	63/525	= 12.0%
gi_224016002_gb_ACN32322.1__tropomyosin_[Ascaris_lumbricoides]	56/466	= 12.0%
gi_195933901_gb_ACG58378.1__Der_p_1_allergen_precursor_[Dermatophagoides_ptonony	60/502	= 12.0%
gi_125995171_dbj_BAF47269.1__tropomyosin_slow-tonic_isoform_[Erimacrus_isenbecki]	57/476	= 12.0%
gi_3309041_gb_AAC25995.1__group_V_allergen_Phl_p_5.0203_precursor_[Phleum_praten	61/512	= 11.9%
gi_302127812_emb_CBW30987.1__putative_pectate_lyase_precursor_[Ambrosia_artemisi	68/570	= 11.9%
gi_113476_sp_P27760.1__MPA12_AMBAR_RecName__Full=Pollen_allergen_Amb_a_1.2__AltNa	68/570	= 11.9%
gi_3309045_gb_AAC25997.1__group_V_allergen_Phl_p_5.0206_precursor_[Phleum_praten	60/509	= 11.8%
gi_289172_gb_AAA32702.1__serine_protease_[Aspergillus_niger]	76/644	= 11.8%
gi_21725632_emb_CAD38397.1__unnamed_protein_product_[Phleum_pratense]	60/510	= 11.8%
gi_21725630_emb_CAD38396.1__unnamed_protein_product_[Phleum_pratense]	60/510	= 11.8%
gi_21725628_emb_CAD38395.1__unnamed_protein_product_[Phleum_pratense]	60/510	= 11.8%
gi_21725626_emb_CAD38394.1__unnamed_protein_product_[Phleum_pratense]	60/510	= 11.8%
gi_21725616_emb_CAD38389.1__unnamed_protein_product_[Phleum_pratense]	60/510	= 11.8%
gi_21725614_emb_CAD38388.1__unnamed_protein_product_[Phleum_pratense]	60/510	= 11.8%
gi_156712754_dbj_BAF76431.1__tropomyosin_[Euphausia_pacifica]	56/473	= 11.8%
gi_156712752_dbj_BAF76430.1__tropomyosin_[Euphausia_superba]	56/473	= 11.8%
gi_54654335_gb_AAT37679.1__vacuolar_serine_protease_[Rhodotorula_mucilaginosa]	64/546	= 11.7%
gi_481397_pir_S38584_allergen_Phl_p_Vb_-common_timothy	60/513	= 11.7%
gi_14423124_gb_AAK62278.1__AF325267_1_group_5_allergen_precursor_[Dactylis_glomer	59/505	= 11.7%
gi_730036_sp_P08176.2__PEPT1_DERPT_RecName__Full=Peptidase_1__AltName__Full=Aller	58/502	= 11.6%
gi_219687753_dbj_BAH09387.1__allergen_[Trichophyton_interdigitale]	97/837	= 11.6%
gi_208342441_gb_ACI25605.1__venom_acid_phosphatase_[Apis_mellifera]	69/593	= 11.6%
gi_169500_gb_AAA33819.1__patatin_[Solanum_tuberosum]	65/561	= 11.6%
gi_83305645_sp_Q92450.3__SODM_ASPFU_RecName__Full=Superoxide_dismutase_[Mn]__mito	49/427	= 11.5%
gi_7963902_gb_AAF71379.1__AF264027_1_allergen_Pen_n_18_[Penicillium_chrysogenum]	74/645	= 11.5%
gi_75277440_sp_Q23791.1__BROM1_ANACO_RecName__Full=Fruit_bromelain__AltName__Alle	63/546	= 11.5%
gi_74035843_emb_CAJ28931.1__Ves_g_1_allergen_precursor_[Vespula_germanica]	57/496	= 11.5%
gi_60652325_gb_AAX33235.1__venom_acid_phosphatase_precursor_[Apis_mellifera]	68/593	= 11.5%
gi_5813788_gb_AAD52012.1__AF082514_1_Tri_r_4_allergen_[Trichophyton_rubrum]	91/790	= 11.5%
gi_31321944_gb_AAM54366.1__vicilin_seed_storage_protein_[Juglans_nigra]	70/607	= 11.5%
gi_2851457_sp_Q40963.2__MPA5B_PHLPR_RecName__Full=Pollen_allergen_Phl_p_5b__AltNa	58/507	= 11.4%
gi_2266625_emb_CAB10765.1__group_V_allergen_[Holcus_lanatus]	57/500	= 11.4%
gi_1173557_gb_AAA86533.1__Ory_s_1_[Oryza_sativa]	52/457	= 11.4%
gi_11514279_pdb_1QNX_A_Chain_A__Ves_V_5__An_Allergen_From_Vespula_Vulgaris_Venom	50/439	= 11.4%
gi_664852_gb_AAB07620.1__Asp_FII_[Aspergillus_fumigatus]	54/477	= 11.3%
gi_549184_sp_P35781.1__VA51_VESCR_RecName__Full=Venom_allergen_5.01__AltName__Ful	49/433	= 11.3%
gi_4416516_gb_AAD20386.1__pollen_allergen_Lol_p_VA_precursor_[Lolium_perenne]	59/521	= 11.3%
gi_332205751_emb_CBG76811.1__pollen_allergen_Sec_c_5_[Secale_cereale]	60/532	= 11.3%

gi_239740599_gb_ACS14052.1__tropomyosin_[Periplaneta_americana]	53/471	= 11.3%
gi_94471622_gb_ABF21077.1__icarapin_variant_1_precursor_[Apis_mellifera]	51/454	= 11.2%
gi_4138175_emb_CAA09885.1__allergen_[Malassezia_symphodialis]	49/438	= 11.2%
gi_269996495_gb_ACZ57582.1__Ole_e_11.0101_allergen_precursor_[Olea_europaea]	66/590	= 11.2%
gi_1684718_emb_CAB05371.1__major_allergen_Ph1_p_5_[Phleum_pratense]	57/508	= 11.2%
gi_158517845_sp_P15476.2_PATB1_SOLTU_RecName__Full=Patatin-B1__Flags__Precursor	63/560	= 11.2%
gi_1168696_sp_P43187.1_ALLB3_BETPN_RecName__Full=Calcium-binding_allergen_Bet_v_	51/455	= 11.2%
gi_21725622_emb_CAD38392.1__unnamed_protein_product_[Phleum_pratense]	58/524	= 11.1%
gi_18536_emb_CAA35691.1__unnamed_protein_product_[Glycine_max]	78/702	= 11.1%
gi_83300369_sp_O60024.2_ALL4_ASPFU_RecName__Full=Allergen_Asp_f_4__AltName__Alle	56/510	= 11.0%
gi_66847146_gb_EAL87477.1__allergen_Asp_F4_[Aspergillus_fumigatus_Af293]	56/510	= 11.0%
gi_549185_sp_P35782.1_VA52_VESCR_RecName__Full=Venom_allergen_5.02__AltName__Ful	48/435	= 11.0%
gi_29500897_emb_CAD87529.1__phl_p5a_allergen_precursor_[Phleum_pratense]	58/526	= 11.0%
gi_20141344_sp_P20347.3_CPI1_SOLTU_RecName__Full=Cysteine_protease_inhibitor_1__	51/463	= 11.0%
gi_18479082_gb_AAL73404.1_AF449424_1_11S_globulin-like_protein_[Corylus_avellana]	71/645	= 11.0%
gi_29539109_emb_CAD87730.1__allergen_Len_c_1.0101_[Lens_culinaris]	65/594	= 10.9%
gi_1633233_pdb_1ESF_B_Chain_B__Staphylococcal_Enterotoxin_A	47/433	= 10.9%
gi_162551_gb_AAA30333.1__allergen_5_[Vespula_vulgaris]	50/457	= 10.9%
gi_156001070_gb_ABU42022.1__11S_globulin_[Pistacia_vera]	65/596	= 10.9%
gi_1092249_prf__2023228A_major_allergen_Ph1_p_Va	57/525	= 10.9%
gi_68270856_gb_AAY88919.1__Ole_e_11.0102_allergen_precursor_[Olea_europaea]	64/591	= 10.8%
gi_66849502_gb_EAL89830.1__major_allergen_Asp_F2_[Aspergillus_fumigatus_Af293]	55/509	= 10.8%
gi_37958165_gb_AAP35077.1__Der_f_7_allergen_[Dermatophagoides_farinae]	48/444	= 10.8%
gi_2498299_sp_QB26456.1_ALL7_DERFA_RecName__Full=Mite_allergen_Der_f_7__AltName__	48/444	= 10.8%
gi_218203832_gb_ACK76299.1__Der_f_7_allergen_[Dermatophagoides_farinae]	48/444	= 10.8%
gi_21725610_emb_CAD38386.1__unnamed_protein_product_[Phleum_pratense]	57/527	= 10.8%
gi_187766749_gb_ACD36975.1__Gly_m_Bd_28K_allergen_[Glycine_max]	58/535	= 10.8%
gi_14285800_sp_Q9N2R3.1_TPM_CHAFE_RecName__Full=Tropomyosin__AltName__Full=Aller	51/471	= 10.8%
gi_114794319_pdb_2HCZ_X_Chain_X__Crystal_Structure_Of_Expb1_(Zea_M_1)_A_Beta-Ex	49/453	= 10.8%
gi_83300352_sp_P79017.2_ALL2_ASPFU_RecName__Full=Major_allergen_Asp_f_2__AltName	55/515	= 10.7%
gi_3135503_gb_AAC16528.1__major_allergen_Ph1_p_5_[Phleum_pratense]	56/523	= 10.7%
gi_3135501_gb_AAC16527.1__major_allergen_Ph1_p_5_[Phleum_pratense]	56/523	= 10.7%
gi_3135499_gb_AAC16526.1__major_allergen_Ph1_p_5_[Phleum_pratense]	56/523	= 10.7%
gi_313471719_sp_B2D0J4.1_VDPP4_APIME_RecName__Full=Venom_dipeptidyl_peptidase_4_	92/857	= 10.7%
gi_168316_gb_AAA63279.1__pollen_allergen_[Lolium_perenne]	54/504	= 10.7%
gi_15419048_gb_AAK96889.1__tropomyosin_[Crassostrea_gigas]	46/431	= 10.7%
gi_126385_sp_P14946.2_MPAL1_LOLPR_RecName__Full=Pollen_allergen_Lol_p_1__AltName	54/504	= 10.7%
gi_549194_sp_P35787.1_VA5_VESVI_RecName__Full=Venom_allergen_5__AltName__Full=Al	46/433	= 10.6%
gi_5059162_gb_AAD38942.1_AF144060_1_alpha-amylase_[Dermatophagoides_pteronyssinu]	69/652	= 10.6%
gi_4587985_gb_AAD25927.1_AF084828_1_major_allergenic_protein_Mal_f4_[Malassezia]	58/548	= 10.6%
gi_21725624_emb_CAD38393.1__unnamed_protein_product_[Phleum_pratense]	55/518	= 10.6%
gi_18637_emb_CAA33216.1__glycinin_subunit_G2_[Glycine_max]	69/650	= 10.6%
gi_18609_emb_CAA26575.1__unnamed_protein_product_[Glycine_max]	69/650	= 10.6%
gi_46406016_gb_AAS93676.1__Sar_s_1_allergen_SMIPP-C_Yv6018B11__partial_[Sarcopte	53/503	= 10.5%
gi_293329689_dbj_BAJ04354.1__pollen_allergen_CPA63_[Cryptomeria_japonica]	66/629	= 10.5%
gi_28630919_gb_AA045607.1__beta-expansin_9_protein_[Zea_mays]	50/477	= 10.5%
gi_2735096_gb_AAD13644.1__ABA-1_allergen__partial_[Ascaris_lumbricoides]	43/410	= 10.5%
gi_149208401_gb_ABR21771.1__conglutin_beta_[Lupinus_angustifolius]	66/631	= 10.5%
gi_1352240_sp_P49273.1_ALL7_DERPT_RecName__Full=Mite_allergen_Der_p_7__AltName__	47/446	= 10.5%
gi_121259_sp_P02228.1_GLB10_CHITH_RecName__Full=Globin_CTT-X	44/419	= 10.5%
gi_110349083_gb_ABG73109.1__Pis_v_2.0101_allergen11S_globulin_precursor_[Pistacia]	67/639	= 10.5%
gi_10189811_emb_CAC09234.1__unnamed_protein_product_[Dermatophagoides_pteronyssi]	47/446	= 10.5%
gi_58371884_emb_CAG26895.1__Arg_r_1_precursor_[Argas_reflexus]	45/432	= 10.4%
gi_4138173_emb_CAA09884.1__allergen_[Malassezia_symphodialis]	45/433	= 10.4%
gi_3309039_gb_AAC25994.1__group_V_allergen_Ph1_p_5.0103_precursor_[Phleum_praten	57/546	= 10.4%
gi_29839255_sp_O23880.1_13S2_FAGES_RecName__Full=13S_globulin_seed_storage_prote	67/647	= 10.4%
gi_289740263_gb_ADD18879.1__salivary_antigen_5_precursor_[Glossina_morsitans_mor	53/511	= 10.4%
gi_256636_gb_AAB23483.1__Kunitz_trypsin_inhibitor_KTi2_[Glycine_max]	47/453	= 10.4%

gi_256635_gb_AAB23482.1__Kunitz_trypsin_inhibitor_KT11_[Glycine_max]	46/441	= 10.4%
gi_23894232_emb_CAD23611.1__tri_m_4_allergen_[Arthroderma_benhamiae]	88/843	= 10.4%
gi_23894227_emb_CAD23374.1__tri_s_4_allergen_[Trichophyton_schoenleinii]	88/843	= 10.4%
gi_218203828_gb_ACK76297.1__Der_f_6_allergen_[Dermatophagoides_farinae]	53/510	= 10.4%
gi_21725612_emb_CAD38387.1__unnamed_protein_product_[Phleum_pratense]	54/521	= 10.4%
gi_21725580_emb_CAD38371.1__unnamed_protein_product_[Dermatophagoides_pteronysii]	47/453	= 10.4%
gi_187766755_gb_ACD36978.1__Gly_m_Bd_28K_allergen_[Glycine_max]	63/607	= 10.4%
gi_15984_emb_CAA34486.1__unnamed_protein_product_[Actinidia_deliciosa]	59/567	= 10.4%
gi_83305621_sp_Q8NKF4.2_RL3_ASFFU_RecName__Full=60S_ribosomal_protein_L3__AltNam	59/575	= 10.3%
gi_28630923_gb_AAO45608.1__beta-expansin_1_protein_[Zea_mays]	49/477	= 10.3%
gi_21215170_gb_AAM43909.1_AF464911_1_large_subunit_ribosomal_protein_L3_[Aspergi	59/575	= 10.3%
gi_169927_gb_AAA33947.1__beta-conglycinin-alpha_subunit,_partial_[Glycine_max]	47/458	= 10.3%
gi_14193761_gb_AAK56124.1_AF332174_1_beta-expansin_1_[Zea_mays]	49/477	= 10.3%
gi_60920770_gb_AAX37321.1__glutathione_transferase_mu_class_Yv5004H11_[Sarcoptes	48/471	= 10.2%
gi_4572592_gb_AAD13530.2__major_allergen_Bla_g_1.0101_[Blattella_germanica]	62/610	= 10.2%
gi_33667930_gb_AAQ24542.1__Blo_t_3_allergen_[Blomia_tropicalis]	51/501	= 10.2%
gi_322812205_pdb_2X45_A.Chain_A,_Crystal_Structure_Of_Arg_R_1_In_Complex_With_Hi	43/423	= 10.2%
gi_25989482_gb_AAM10779.1__trypsin_[Blomia_tropicalis]	51/501	= 10.2%
gi_21725620_emb_CAD38391.1__unnamed_protein_product_[Phleum_pratense]	53/521	= 10.2%
gi_21725606_emb_CAD38384.1__unnamed_protein_product_[Phleum_pratense]	53/521	= 10.2%
gi_21413_emb_CAA45723.1__aspartic_proteinase_inhibitor_[Solanum_tuberosum]	47/461	= 10.2%
gi_1582250_prf__2118271A_allergen_PhI_p_I	52/512	= 10.2%
gi_137395_sp_P10736.1_VA52_DOLMA_RecName__Full=Venom_allergen_5.01__AltName__Ful	47/460	= 10.2%
gi_1321726_emb_CAA96544.1__major_allergen_Bet_v_1_[Betula_pendula]	43/421	= 10.2%
gi_110349085_gb_ABG73110.1__Pis_v_2.0201_allergen_11S_globulin_precusor_[Pistaci	64/625	= 10.2%
gi_6634467_emb_CAB64344.1__pollen_allergen_[Lolium_perenne]	52/514	= 10.1%
gi_2398757_emb_CAA50281.1__Major_Pollen_Allergen_PhI_p_Va_[Phleum_pratense]	52/515	= 10.1%
gi_13430402_gb_AAK25823.1__group_V_allergen_PhI_p_5_precursor_[Phleum_pratense]	53/524	= 10.1%
gi_113561_sp_P22285.1_MPA92_POAPR_RecName__Full=Pollen_allergen_KBG_41__AltName_	56/557	= 10.1%
gi_60920878_gb_AAX37326.1__glutathione_transferase_mu_class_Dp7019C10_[Dermatoph	44/442	= 10.0%
gi_45823012_emb_CAG24374.1__unnamed_protein_product_[Phleum_pratense]	49/492	= 10.0%
gi_332278195_sp_Q40240.2_MPA5A_LOLPR_RecName__Full=Major_pollen_allergen_Lol_p_5	54/538	= 10.0%
gi_32765543_gb_AAP87281.1__beta-1,3-glucanase_[Hevea_brasiliensis]	58/578	= 10.0%
gi_325910590_emb_CAX62129.1__allergen_lipocalin_Cav_p_2.0101_precursor_[Cavia_po	43/430	= 10.0%
gi_2498577_sp_P56164.1_MPA51_PHAAQ_RecName__Full=Major_pollen_allergen_Pha_a_5.1	54/542	= 10.0%
gi_20387029_emb_CAC84593.2__tropomyosin_[Lepisma_saccharina]	47/469	= 10.0%
gi_15384338_gb_AAK96255.1_AF177030_1_acidic_allergen_Cyn_d_1_precursor_[Cynodon_	50/498	= 10.0%
gi_14423933_sp_082803.1_SRPP_HEVBR_RecName__Full=Small_rubber_particle_protein__	45/449	= 10.0%
gi_14423757_sp_004701.1_MPAC1_CYNDA_RecName__Full=Major_pollen_allergen_Cyn_d_1	50/499	= 10.0%
gi_10314021_gb_AAF80379.2__acidic_Cyn_d_1_isoallergen_isoform_1_precursor_[Cynod	50/498	= 10.0%

G Results from the EFSA scientific opinion recommended allergen analysis of Xylanase from HyGe329 using allergen.org database

G.1 35% or larger identity over any 80 amino acid window

(No hits found)

(blank=No matches found) Count of significant hits described in text based on identity > 35%.

G.2 35% or larger identity over any 80 amino acid window (with scaling)

(No hits found)

(blank=No matches found) Count of significant hits described in text based on scaled identity > 35%.

G.3 Identities calculated from Needleman-Wuncsh alignment

Matches $\geq 10\%$ are shown

Q2VST0_Allergen_Ziz_m_1	86/473	= 18.2%
P41748_Aspartic_protease_pep1	89/488	= 18.2%
P87184_Alkaline_protease_2	99/550	= 18.0%
C7C4X1_Glyceraldehyde_3_phosphate_dehydrogenase	82/455	= 18.0%
Q9SCG9_Major_pollen_allergen_Cup_a_1	84/475	= 17.7%
Q9LLT1_Major_pollen_allergen_Jun_v_1	87/492	= 17.7%
Q9LLT1_Major_pollen_allergen_Jun_v_1	87/492	= 17.7%
Q9LEJ0_Enolase_1	93/527	= 17.6%
P12547_Alkaline_protease_1	84/476	= 17.6%
Q8JOP4_Probable_glycosidase_crf1	86/492	= 17.5%
Q8JOP4_Probable_glycosidase_crf1	86/492	= 17.5%
P28296_Alkaline_protease_1	89/509	= 17.5%
Q2F5T5_Arginine_kinase	83/488	= 17.0%
P01012_Ovalbumin	80/470	= 17.0%
Q9M4S6_Cup_s_1_pollen_allergen	84/498	= 16.9%
Q9M4S3_Cup_s_1_pollen_allergen	84/496	= 16.9%
Q9M4S2_Cup_s_1_pollen_allergen	84/496	= 16.9%
Q9URR2_Allergen_Pen_n_13	86/511	= 16.8%
Q25640_Allergen	95/565	= 16.8%
P81294_Major_pollen_allergen_Jun_a_1	84/499	= 16.8%

P81294_Major_pollen_allergen_Jun_a_1	84/499	= 16.8%
Q94G86_Glucan_endo_1_3_beta_D_glucosidase	92/550	= 16.7%
Q9FPR0_Pollen_allergen_Poa_p_5	75/454	= 16.5%
Q9M4S5_Cup_s_1_pollen_allergen	81/498	= 16.3%
Q9M4S4_Cup_s_1_pollen_allergen	81/498	= 16.3%
Q95PM9_Arginine_kinase	79/486	= 16.3%
B3VOK8_Subtilisin_like_serine_protease	96/589	= 16.3%
Q8MVU3_Gelsolin_like_allergen_Der_f_16	87/560	= 15.5%
Q9HDT3_Enolase	88/574	= 15.3%
P93467_Major_allergen_Phl_p_5	67/441	= 15.2%
P34754_3_phytase_B	89/587	= 15.2%
E1XUL5_Putative_pectate_lyase	85/564	= 15.1%
E1XUL4_Putative_pectate_lyase	85/564	= 15.1%
P18632_Sugi_basic_protein	80/534	= 15.0%
P18632_Sugi_basic_protein	80/534	= 15.0%
P18632_Sugi_basic_protein	80/534	= 15.0%
E1XUM1_Putative_pectate_lyase	82/547	= 15.0%
Q96X30_Enolase	84/562	= 14.9%
Q8RUR1_Cry_j_1	79/531	= 14.9%
Q8RUR1_Cry_j_1	79/531	= 14.9%
Q5TIW3_Pollen_allergen_Lol_p_4	79/530	= 14.9%
Q5D7H4_Inactive_hyaluronidase_B	71/475	= 14.9%
D7F1J5_Arginine_kinase	75/502	= 14.9%
Q86R84_60_kDa_allergen_Der_f_18p	82/555	= 14.8%
Q40237_Major_pollen_allergen_Lol_p_5b	75/506	= 14.8%
P27762_Pollen_allergen_Amb_a_2	81/547	= 14.8%
Q84ND2_11S_globulin	86/585	= 14.7%
Q2TL59_Calreticulin	91/617	= 14.7%
Q69CS2_PR5_allergen_Cup_s_3_1	61/425	= 14.4%
Q69CS2_PR5_allergen_Cup_s_3_1	61/425	= 14.4%
Q9UW01_RCoP_c3	69/482	= 14.3%
Q96X46_Enolase	82/572	= 14.3%
D7F1J4_Tropomyosin	65/453	= 14.3%
O23971_Group_V_grass_pollen_allergen	63/443	= 14.2%
Q40960_Phlp5	68/481	= 14.1%
B2ZPG7_Eukaryotic_translation_initiation_factor	65/462	= 14.1%
Q9U6R7_98kDa_HDM_allergen	93/666	= 14.0%
Q69CS3_PR5_allergen_Cup_s_3_2	59/420	= 14.0%
P49370_Hyaluronidase_A	68/486	= 14.0%
D0VNY7_Allergen_Bla_g_3_isoform_2	100/713	= 14.0%
Q9NBA6_Antigen_5	64/460	= 13.9%
A9YUH5_Pollen_allergen_Pla_o_2	74/536	= 13.8%
Q94643_Allergen	98/716	= 13.7%
O96522_Major_allergen_Bla_g_1_02	82/599	= 13.7%
D8Q9M3_Glucoamylase	87/633	= 13.7%
A7XZI4_Group_10_allergen_Blo_t_10	66/483	= 13.7%
Q9UW97_Subtilisin_like_protease_6	77/565	= 13.6%
Q96385_Major_pollen_allergen_Cha_o_1	75/550	= 13.6%
Q9U6V9_Hyaluronidase	68/505	= 13.5%
Q7M1E7_Polygalacturonase	82/609	= 13.5%
Q25639_Allergen	74/549	= 13.5%
P43067_Alcohol_dehydrogenase_1	69/512	= 13.5%
B5KVH4_11S_legumin_protein	84/621	= 13.5%
Q9XG86_Polygalacturonase	69/516	= 13.4%
Q5GMY3_Mala_s_12_allergen	94/699	= 13.4%
Q06478_Phospholipase_A1_1	65/486	= 13.4%
P49371_Hyaluronidase	65/484	= 13.4%
Q6H9K0_Exopolygalacturonase	70/527	= 13.3%

Q2V6Q5_Catalase	103/777	= 13.3%
Q01940_Major_allergen_Mal_f_1	67/503	= 13.3%
O96764_Tropomyosin	62/467	= 13.3%
O18416_Tropomyosin	64/480	= 13.3%
Q9NFZ4_Tropomyosin	63/479	= 13.2%
O65002_Isoflavone_reductase_homolog_Bet_v_6_0101	61/461	= 13.2%
Q23939_Tropomyosin	62/475	= 13.1%
P42040_Enolase	78/594	= 13.1%
P46075_Extracellular_metalloproteinase_mep	90/692	= 13.0%
Q9NAS5_Tropomyosin	60/466	= 12.9%
Q94507_Mag3	66/512	= 12.9%
Q8L5L6_Vicilin_like_protein	84/651	= 12.9%
Q8L5L5_Vicilin_like_protein	84/653	= 12.9%
Q4JK69_Group_15_allergen_protein_short_isoform	84/652	= 12.9%
Q25456_Tropomyosin	60/465	= 12.9%
O81344_Group_V_allergen_Ph1_p_5_0207	67/520	= 12.9%
Q96VP4_Enolase	74/579	= 12.8%
Q5ZQK4_Pollen_allergen_Ph1_p_4	79/616	= 12.8%
C9WMM5_Venom_serine_carboxypeptidase	75/588	= 12.8%
A1KYZ2_Tropomyosin	61/475	= 12.8%
Q9AUD0_7S_globulin	84/660	= 12.7%
Q8RVW4_Minor_allergen_beta_fructofuranosidase	94/739	= 12.7%
P40292_Heat_shock_protein_90	99/777	= 12.7%
P02789_Ovotransferrin	100/787	= 12.7%
Q9ST57_Serpin_Z2A	75/595	= 12.6%
Q9HF12_Vacuolar_serine_protease	77/613	= 12.6%
Q68KK0_Venom_phospholipase_A1	67/531	= 12.6%
Q4JK71_Group_18_allergen_protein	76/603	= 12.6%
Q25641_Allergen_Cr_PI	96/760	= 12.6%
P82615_Latherin	60/478	= 12.6%
O44119_Tropomyosin	60/476	= 12.6%
O44119_Tropomyosin	60/476	= 12.6%
D7F1P9_Sarcoplasmic_calcium_binding_protein	53/419	= 12.6%
P04776_Glycinin_G1	75/599	= 12.5%
Q84UI0_Allergen_Len_c_1_0102	68/548	= 12.4%
Q9U6W0_Phospholipase_A1	64/522	= 12.3%
Q8MQS8_Venom_serine_protease_34	68/553	= 12.3%
P81295_Pathogenesis_related_protein	52/423	= 12.3%
P28744_Pollen_allergen_Amb_a_1_4	66/537	= 12.3%
Q5ZQK5_Pollen_allergen_Ph1_p_4	76/625	= 12.2%
Q4JK70_Group_15_allergen_protein	83/678	= 12.2%
P27761_Pollen_allergen_Amb_a_1_3	70/576	= 12.2%
P27761_Pollen_allergen_Amb_a_1_3	70/576	= 12.2%
O61379_Tropomyosin	57/467	= 12.2%
O22120_Alpha_subunit_of_beta_conglycinin	78/640	= 12.2%
E5BBS3_Tropomyosin__allergen_Pan_b_1	57/466	= 12.2%
P85076_Pectinesterase	61/504	= 12.1%
P50635_Apyrase	79/655	= 12.1%
P05946_Sarcoplasmic_calcium_binding_protein_1	52/431	= 12.1%
E1XUL9_Putative_pectate_lyase	65/536	= 12.1%
Q702P1_Vicilin	67/559	= 12.0%
Q702P0_Vicilin	67/559	= 12.0%
Q6R4B4_Glutathione_S_transferase	52/433	= 12.0%
COL3K2_Tropomyosin	56/466	= 12.0%
P27760_Pollen_allergen_Amb_a_1_2	68/570	= 11.9%
O81342_Group_V_allergen_Ph1_p_5_0203	61/512	= 11.9%
E1XUL3_Putative_pectate_lyase	68/570	= 11.9%
C6K8D1_Seed_biotinylated_protein_68_kDa_isoform	89/751	= 11.9%

081343_Group_V_allergen_Phl_p_5_0206	60/509	= 11.8%
B1NPN8_8S_globulin_alpha_subunit	69/585	= 11.8%
Q32ZM1_Vacuolar_serine_protease	64/546	= 11.7%
E3SH29_Prunin_2	74/633	= 11.7%
P08176_Peptidase_1	58/502	= 11.6%
P08176_Peptidase_1	58/502	= 11.6%
P08176_Peptidase_1	58/502	= 11.6%
P08176_Peptidase_1	58/502	= 11.6%
P08176_Peptidase_1	58/502	= 11.6%
P08176_Peptidase_1	58/502	= 11.6%
P08176_Peptidase_1	58/502	= 11.6%
P08176_Peptidase_1	58/502	= 11.6%
P08176_Peptidase_1	58/502	= 11.6%
P08176_Peptidase_1	58/502	= 11.6%
P08176_Peptidase_1	58/502	= 11.6%
Q9UW98_Dipeptidyl_peptidase_5	91/790	= 11.5%
Q9P8G3_Allergen_Pen_n_18	74/645	= 11.5%
Q92450_Superoxide_dismutase_Mn_mitochondrial	49/427	= 11.5%
Q7Y1C1_Vicilin_seed_storage_protein	70/607	= 11.5%
Q5BLY5_Venom_acid_phosphatase_Acph_1	68/593	= 11.5%
O23791_Fruit_bromelain	63/546	= 11.5%
Q40963_Pollen_allergen_Phl_p_5b	58/507	= 11.4%
O23972_Group_V_allergen	57/500	= 11.4%
P35781_Venom_allergen_5_01	49/433	= 11.3%
Q8L5K9_Major_antigen_like_protein	58/520	= 11.2%
Q5EF78_Icarapin	51/454	= 11.2%
P93466_Major_allergen_Phl_p_5	57/508	= 11.2%
P43187_Calcium_binding_allergen_Bet_v_3	51/455	= 11.2%
P15476_Patatin_B1	63/560	= 11.2%
O93971_Allergen	49/438	= 11.2%
Q8W1C2_11S_globulin_like_protein	71/645	= 11.0%
Q84UI2_Phl_p5a_allergen	58/526	= 11.0%
P35782_Venom_allergen_5_02	48/435	= 11.0%
P20347_Cysteine_protease_inhibitor_1	51/463	= 11.0%
O60024_Allergen_Asp_f_4	56/510	= 11.0%
Q84UI1_Allergen_Len_c_1_0101	65/594	= 10.9%
Q05110_Venom_allergen_5	50/457	= 10.9%
Q9N2R3_Tropomyosin	51/471	= 10.8%
Q26456_Mite_allergen_Der_f_7	48/444	= 10.8%
P79017_Major_allergen_Asp_f_2	55/515	= 10.7%
P14946_Pollen_allergen_Lol_p_1	54/504	= 10.7%
P14946_Pollen_allergen_Lol_p_1	54/504	= 10.7%
O65321_Major_allergen_Phl_p_5	56/523	= 10.7%
O65320_Major_allergen_Phl_p_5	56/523	= 10.7%
O65319_Major_allergen_Phl_p_5	56/523	= 10.7%
B2D0J4_Venom_dipeptidyl_peptidase_4	92/857	= 10.7%
Q9Y750_Malate_dehydrogenase	58/548	= 10.6%
Q9Y197_Alpha_amylase	69/652	= 10.6%
P35787_Venom_allergen_5	46/433	= 10.6%
P04405_Glycinin_G2	69/650	= 10.6%
Q07154_Expansin_B9	50/477	= 10.5%
P49273_Mite_allergen_Der_p_7	47/446	= 10.5%
P02228_Globin_CTT_X	44/419	= 10.5%
B7P073_Pis_v_2_0101_allergen11S_globulin_precursor	67/639	= 10.5%
Q5GQ85_Allergen_Arg_r_1	45/432	= 10.4%
O93970_Peptidyl_prolyl_cis_trans_isomerase	45/433	= 10.4%
081341_Group_V_allergen_Phl_p_5_0103	57/546	= 10.4%

B3GM11_Major_royal_jelly_protein_8	61/585	= 10.4%
Q8NKF4_60S_ribosomal_protein_L3	59/575	= 10.3%
O04828_Pollen_allergen	55/535	= 10.3%
Q9UAM5_Major_allergen_Bla_g_1_0101	62/610	= 10.2%
Q8I916_Trypsin	51/501	= 10.2%
Q43680_Mung_bean_seed_albumin	52/511	= 10.2%
Q39430_Major_allergen_Bet_v_1	43/421	= 10.2%
P10736_Venom_allergen_5_01	47/460	= 10.2%
B7P074_Pis_v_2_0201_allergen_11S_globulin_precursor	64/625	= 10.2%
Q7Y1Z2_27K_protein	46/455	= 10.1%
Q40962_Pollen_allergen_Phl_p_5a	52/515	= 10.1%
P02538_Keratin__type_II_cytoskeletal_6A	69/681	= 10.1%
Q9FVM0_Acidic_Cyn_d_1_isoallergen_isoform_1	50/498	= 10.0%
Q947S7_Acidic_allergen_Cyn_d_1	50/498	= 10.0%
Q40240_Major_pollen_allergen_Lol_p_5a	54/538	= 10.0%
P56164_Major_pollen_allergen_Pha_a_5_1	54/542	= 10.0%
O97370_Mite_allergen_Eur_m_3	51/510	= 10.0%
O82803_Small_rubber_particle_protein	45/449	= 10.0%
O04701_Major_pollen_allergen_Cyn_d_1	50/499	= 10.0%
FOUZ11_Allergen_lipocalin_Cav_p_2_0101	43/430	= 10.0%

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April 29, 2013

Toxicology

Date : 27 February 2013

File : 2013-03354-01

Ref.: BTR/PBjP

SUMMARY OF TOXICITY DATA

Xylanase, PPQ33502 from *Bacillus licheniformis*

Authors:

████████████████████
██

Issued by:

Novozymes A/S
Krogshøjvej 36
DK-2880 Bagsvaerd
Denmark

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1. ABSTRACT

The below series of toxicological studies were undertaken to evaluate the safety of Xylanase, batch PPQ33502.

All studies were carried out in accordance with current OECD guidelines and in compliance with the OECD principles of Good Laboratory Practice (GLP). The studies were performed at Novozymes A/S, Denmark, Covance Laboratories, England and CiToxLAB Scantox A/S, Denmark during the period May 2012 to February 2013.

The main conclusions of the safety studies can be summarized as follows:

- Xylanase, PPQ33502 did not induce gene mutations in the Ames test, neither in the presence or absence of S-9 mix.
- Xylanase, PPQ33502 did not show any clastogenic activity, neither in the presence or absence of S-9 mix, when tested in the *in vitro* micronucleus assay.
- In a 13 weeks oral toxicity study in rats Xylanase, PPQ33502 was well tolerated and did not cause any toxicologically significant changes at any dose level.

Based on the present toxicity data it can be concluded that Xylanase, represented by batch PPQ33502, exhibits no toxicological effects under the experimental conditions described.

2. TEST SUBSTANCE

Xylanase is a liquid enzyme concentrate containing an Endo-1,4-beta-xylanase (E.C. number 3.2.1.8) which degrades starch (amylopectin and amylose) by hydrolysis of α -1,4-glucosidic linkages, forming dextrans and maltose.

2.1 Production organism

Xylanase is produced by a strain of *Bacillus licheniformis*, containing a genetically engineered variant of the GH8 xylanase gene obtained from a *Bacillus sp.* strain. This genetically modified production strain meets the criteria for a safe production microorganism. It is constructed by common transformation procedures using well-known plasmid vectors with strictly defined and well-characterized DNA sequences that are not known to encode or express any harmful or toxic substances. The strain is free of any antibiotic resistance marker. The development of the production strain was evaluated at every step to assess incorporation of the desired functional genetic information and to ensure that no unintended sequences were incorporated.

Bacillus licheniformis has long history of safe use. This species has been used for decades in the production of enzymes, and in the last decade as recombinant organism for production of a variety of bio-industrial products.

Bacillus licheniformis is generally regarded as non-pathogenic and non-toxigenic. Further investigations have revealed that the strain lineage to which the production strain belongs do not produce any known *Bacillus* toxins.

The test substance does not contain the production strain. Absence of the production strain is part of the complete specification of the product.

2.2 Characterization

The toxbatch PPQ33502 was used for the conduct of all the toxicological studies. The characterization of the toxbatch is presented in Table 1.

Table 1. Characterization data of Xylanase, batch PPQ33502

Batch number	PPQ33502
Activity	3670 GH8XU/g
Water (KF) (% w/w)	88.3
Dry matter (% w/w)	11.7
Ash (% w/w)	2.0
Total Organic Solids (TOS ¹)	9.7%
Specific gravity (g/mL)	1.052

¹ % TOS is calculated as 100% - % water - % ash - % diluents.

3. MUTAGENICITY

3.1 Bacterial Reverse Mutation assay (Ames test)

Xylanase, PPQ33502 was examined for mutagenic activity in the bacterial reverse mutation assay using *Salmonella typhimurium* strain TA1535, TA100, TA1537, and TA98 and *Escherichia coli* WP2uvrA. The study was carried out according to the OECD test guideline 471 (adopted in 1997) and in compliance with GLP.

Crude enzyme preparations, like the present batch of Xylanase, contain the free amino acids histidine and tryptophan, most often in an amount, which exceeds the critical concentration for incorporation in the direct standard assay.

To overcome this problem all strains were exposed to Xylanase in liquid culture ("treat and plate assay").

Two independent experiments were performed, with and without the inclusion of metabolic activation (S-9 mix). In each experiment cultures of bacteria were exposed to six doses of the test substance (5000, 2500, 1250, 625, 313, and 156 µg dry matter/mL) in a phosphate buffered nutrient broth for 3 hours. After incubation, the test substance was removed by centrifugation prior to plating.

No treatments of any of the bacterial strains with the test substance resulted in dose related and reproducible increases in revertant numbers that exceeded a doubling in the mean number of revertants per plate compared to the appropriate solvent control either in the presence or absence of S-9 mix.

The results obtained with the diagnostic mutagens and the solvent control demonstrated the sensitivity of the tests and the efficacy of the S-9 mix metabolic activation system.

It was concluded that Xylanase, PPQ33502 did not induce gene mutations in bacteria either in the presence or absence of metabolic activation when tested under the conditions employed in this study.

3.2 *In vitro* Micronucleus assay

In order to assess the clastogenic and the aneugenic activity of Xylanase, PPQ33502 its effects on the frequency of micronuclei was investigated in cultured human peripheral blood lymphocytes applying the cytokinesis-block methodology.

The study was conducted according to GLP, in compliance with the OECD draft guideline: Genetic Toxicology: OECD Guideline for the testing of chemicals. Guideline 487: *In vitro* micronucleus test (2009).

Heparinized whole blood cultures, pooled from two female donors, were established, and division of the lymphocytes was stimulated by adding phytohaemagglutinin (PHA) to the cultures.

Sets of duplicate cultures were treated with the solvent (purified water), test substance or appropriate positive controls. Treatments with the test substance covered a broad range of doses, separated by narrow intervals. The highest concentrations used was 5000 µg/mL (expressed in terms of the test substance as supplied), which is the highest dose level recommended in the guidelines for *in vitro* cytogenetic assays.

Cell cultures were exposed to the test substance for 3 hours in the presence and absence of metabolic activation (S-9 mix) and harvested 24 hours after the beginning of treatment (3+21 hour treatment). Additionally, a continuous 24-hour treatment without S-9 mix was included with harvesting 24 hours after removal of the test substance (24+24 hour treatment). The cultures were treated with cytochalasin-B after removal of the test substance. Three concentrations, covering an appropriate range of cytotoxicity, were selected for scoring of micronuclei by evaluating the effect of the test substance on the replication Index (RI). 2000 cells per concentration (1000 cells from each replicate culture) were scored.

The proportion of binucleate cells with micronuclei in all cultures of the vehicle controls (purified water) was within the limits of the historical ranges. The positive controls induced statistically significant increases in the proportion of cells with micronuclei, thus demonstrating the sensitivity of the test procedure and the metabolic activity of the S-9 mix employed.

Treatment of the cells with the test substance resulted in frequencies of micronucleated binuclear cells (MNBN cells), which were similar to and not significantly ($p \leq 0.05$) higher than those observed in concurrent vehicle controls for all concentrations analysed.

It was concluded that Xylanase, PPQ33502 did not induce micronuclei in cultured human peripheral blood lymphocytes either in the absence or presence of S-9 mix under the experimental conditions employed for this study.

4. GENERAL TOXICITY

4.1 A 90-Day Gavage Toxicity Study in Rats

The objective of this study conducted at CiToxLAB Scantox A/S, was to assess the systemic toxicity of Xylanase, PPQ33502, when administered daily by oral treatment (gavage) to rats for 90/91 days.

The study was conducted in 40 male and 40 female SPF Sprague Dawley rats of the Ntac:SD strain, approximately 5 weeks old. The animals were randomly allocated to four groups: Group 1 (Vehicle (Ion-exchanged water), 0 mg TOS/kg bw and 0 GH8XU/kg), Group 2 (102 mg TOS/kg bw and 3861 GH8XU/kg), Group 3 (336.7 mg TOS/ kg bw and 12741 GH8XU/kg) and Group 4 (1020 mg TOS/kg bw and 38608 GH8XU/kg). Treatment was performed by oral treatment (gavage) once daily for 90/91 days with a dose volume of 10 mL/kg.

Clinical signs were recorded daily and once weekly detailed clinical observations outside the cage were performed. Body weight and food consumption were recorded once weekly, while water consumption was recorded twice weekly. Pre-treatment and before termination, the animals were examined with respect to motor activity (open field test) and reactivity to different types of stimuli. Blood and urine samples were collected from all animals before termination of treatment in Week 13 for evaluation of clinical chemistry (blood and urine) and haematology (blood) parameters. At termination of the study, the animals were euthanised and subjected to a full macroscopic examination and selected organs were weighed, fixed and examined histopathologically.

No treatment related signs were recorded at the clinical examination (clinical observations, open field and stimuli tests and ophthalmoscopy), on body weight gain, on food or water consumption. The test item had no treatment related effects on the clinical chemistry, haematology, and coagulation parameters or on the urinalysis and urine microscopy. At necropsy, no microscopic or macroscopic treatment related findings were observed.

In conclusion, 90/91-days of daily oral (gavage) treatment of rats with Xylanase, PPQ33502, at dose levels of up to 1,020 mg TOS/kg bw/day or 38608 GH8XU/kg bw/day administered in a dose volume of 10 mL/kg bw/day did not cause any test item related changes. The NOAEL (No Observed Adverse Effect Level) for both females and males for Xylanase, PPQ33502, was 1,020 mg TOS/kg bw/day corresponding to 38608 GH8XU/kg bw/day.

5. REFERENCES

5.1 Study reports

Novozymes A/S: Study No.: 20128049. Xylanase, PPQ33502: Test for mutagenic activity with strains of *Salmonella typhimurium* and *Escherichia coli*. (October 2012). LUNA file: 2012-13362.

Covance Laboratories: Study No.: 8261061. Novozymes Reference No.: 20126017: Xylanase, PPQ33502: Induction of micronuclei in cultured human peripheral blood lymphocytes. (July 2012). LUNA file: 2013-02893.

CiToxLAB, Scantox: Study No.: 74852. Novozymes Reference No.: 20126010: Xylanase, PPQ33502, A 90-Day Gavage Toxicity Study in Rats. (February 2013). LUNA file: 2013-02669.

Toxicology

Date: 11 July 2012
Project: DEV00649
File: 2012-13362-01
Ref.: JNP/PBJP

R E P O R T

**Xylanase PPQ33502:
Test for Mutagenic Activity with Strains of
Salmonella typhimurium and *Escherichia coli*.**

Study No. 20128049

Author :

[REDACTED]

Issued by :
**Novozymes A/S
Krogshøjvej 36
DK- 2880 Bagsværd
Denmark**

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GLP - Compliance Statement

REPORT: Xylanase, PPQ33502: Test for Mutagenic Activity with Strains of *Salmonella typhimurium* and *Escherichia coli* .

STUDY No.: 20128049

A sample of Xylanase, Batch Number: PPQ33502 was received from Recovery Pilot Plant, Novozymes A/S.

This study was conducted at the department of Toxicology, Novozymes A/S in compliance with the following current Good Laboratory Practice Regulations:

OECD, ENV/MC/CHEM(98)17, 1998

Date:

2 Oct. 2012

Study Director

Quality assurance statement

REPORT: Xylanase PPQ33502:
Test for Mutagenic Activity with Strains of
Salmonella typhimurium and Escherichia coli.

STUDY NUMBER 20128049

The conduct of this study has been subject to appropriate inspections and the report has been reviewed according to the relevant Standard Operation Procedures of Novozymes A/S Quality Assurance.

Inspection/Audit	Dates of inspection	Inspection results reported to Study Director and Study Management
Protocol	25 MAY 2012	25 MAY 2012
Preparation of test solution	7 JUN 2012	7 JUN 2012
Report	10 AUG 2012	10 AUG 2012

I hereby confirm that the report reflects the raw data.

2 Oct 2012

Date

Quality Assurance

1. General Information

STUDY Xylanase, PPQ33502: Test for Mutagenic Activity with Strains of *Salmonella typhimurium* and *Escherichia coli*.
Study No. 20128049

STUDY DIRECTOR [REDACTED]
Toxicology
Novozymes A/S
Krogshøjvej 36
DK - 2880 Bagsværd

**MANAGEMENT/
SPONSOR** [REDACTED]
Toxicology
Novozymes A/S
Krogshøjvej 36
DK - 2880 Bagsværd

TEST FACILITIES Toxicology
Novozymes A/S
Krogshøjvej 36
DK - 2880 Bagsværd

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Novozymes A/S
Krogshøjvej 36
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DATES OF STUDY
Study initiation date: 25.May 2012
Experimental start date: 07.June 2012
Experimental termination: 29.June 2012

PERSONNEL INVOLVED IN THE STUDY

[REDACTED] - Toxicology
[REDACTED] - Toxicology
[REDACTED] - Toxicology

DATE OF FINAL REPORT

Date: 2. Oct. 2012

[REDACTED]
Toxicology

2. Summary

Xylanase (Batch Number: PPQ33502) was examined for mutagenic activity in the bacterial reverse mutation assay using *Salmonella typhimurium* strain TA1535, TA100, TA1537, TA98 and *Escherichia coli* WP2uvrApKM101.

Crude enzyme preparations, like the present batch of Xylanase contain the free amino acid histidine and tryptophan, most often in an amount, which exceeds the critical concentration for incorporation in the direct standard assay.

To overcome this problem all strains were exposed to Xylanase in liquid culture ("treat and plate assay"). Bacteria were exposed to 6 doses of the test substance in a phosphate buffered nutrient broth for 3 hours with 5 mg (dry matter) per ml as highest concentration. After incubation the test substance was removed by centrifugation prior to plating.

The study was conducted with and without the metabolic activation system S9 - a liver preparation from male rats, pre-treated with Aroclor 1254, and the co-factors required for mixed function oxidase activity (S9 mix). All results were confirmed by conducting two complete and independent experiments.

Xylanase contains an abundance of various nutrients, and composes a rich growth medium to the test bacteria. These circumstances are to minor extent reflected in the present study.

No toxicity of the test substance to the bacteria is observed.

A weak stimulation of bacterial growth ("feeding effect") is present in some test as demonstrated by increases in the viable count of exposed cultures compared to the solvent control. This conditions had no obvious influence on the revertant colony count.

No treatments of any of the *Salmonella* and *E.coli* strains with Xylanase resulted in any increases in revertant numbers that meet the criteria for a positive or equivocal response.

3. Introduction

Bacterial reverse mutation assays have been recognized and used for more than three decades as a rapid, sensitive and reliable method of evaluating the mutagenic potential of chemicals. Bacterial systems offer several advantages to other test systems. They can be grown in large numbers in a short time, enabling the detection of very rare mutational events. Further, extensive knowledge of bacterial genetics has allowed the construction of special strains, which are more sensitive than wild-type strains are to a variety of agents. The reversion of bacteria from growth-dependence on a particular amino acid to growth in the absence of that amino acid is the most widely used marker in reverse-mutation assays. The genetic target is small, specific and selective, and the phenotypic effect of the reverse mutation is easily detected.

A wide range of strains within the species *Salmonella typhimurium* (Ames strains) and *Escherichia coli* have been constructed in order to make the test system more sensitive and selective to different classes of chemical mutagens.

By incorporation of the post-mitochondrial supernatant (S9) from the livers of rats pre-treated with an enzyme inducer Aroclor 1254, the metabolising systems present in mammalian cells are mimicked to facilitate the detection of a wide range of pro-mutagens.

This report describes experiments performed to assess the activity of Xylanase (Batch Number: PPQ33502) in amino acid dependent strains of *Salmonella typhimurium* and *Escherichia coli* capable of detecting both induced frame-shift (TA1537 and TA98) and base-pair substitution mutations (TA1535, TA100, and *E. coli* WP2uvrA pKM101).

Xylanase (Batch No PPQ33502) is a microbial enzyme preparation derived from submerged pure culture fermentation of a non-pathogenic and non-toxicogenic strain. It contains a variety of unspent medium residues, including low concentrations of free amino acids like histidine and tryptophan.

This complexity poses several problems during mutagenicity testing in vitro. In the Ames test it composes a rich growth medium to the test bacteria, resulting in completely different and poorly defined environments of exposed cultures compared to control cultures. The main problem is the content of utilizable histidine and tryptophan in the test material, since the principle of the Ames test is the histidine auxotrophy of the *Salmonella* strains and tryptophan auxotrophy of the *E. coli* strains.

As a result, the density of the bacterial background lawn increase with increasing doses ("feeding effect") followed by dose related increases in the number of spontaneous revertant. These increases are obviously artificial.

To overcome this problem all strains applied in the present study were treated with Xylanase in liquid culture ("treat and plate assay").

The study was conducted in accordance with the general recommendations in OECD Guideline for testing of chemicals, No. 471: Bacterial Reverse Mutation Assay" (July 1997 concerning the general specifications of the test. However the exposure of test bacteria in liquid culture ("treat and plate") is not specifically described in any guidelines.

4. Materials

4.1 Test substance

Xylanase (Batch Number: PPQ33502, TKS number 223/2012 027) was received from Recovery Pilot Plant 12.March 2012, and immediately stored in a freezer. The substance was a brown liquid with a declared content of 11.7 % (w/w) dry matter.

A standard solution of 5% (w/v) dry matter was prepared in deionised water and sterilised by filtration. The sterility was confirmed by plate counting. Solution was stored refrigerated and used as test substance.

4.2 Positive control substances

Chemical	Source	Lot.No.
2-Nitrofluorene (2-NF)	Aldrich-Chemie	S 43858 V
Acridine mutagen (ICR-191)	Sigma	031M 1947 V
1-Methyl-3-Nitro-N-NitrosoGuanidine (MNNG)	Aldrich-Chemie	15427 LO
2-Aminoanthracene (2-AA)	Aldrich-Chemie	STBB1901

All positive control substances were dissolved in dimethyl sulphoxide (spectrophotometric grade).

4.3 Liver homogenate – S9

A commercial preparation of S9 from Aroclor 1254 induced Sprague Dawley rats was obtained from Cappel/MP Biomedicals, LLC, 29525 Fountain Parkway, Solon, Ohio 44139. Specifications of the preparation, the enzymatic properties and metabolic activation from the supplier are archived as raw data.

The tubes with S9 were received frozen in dry ice and were immediately stored in a -80°C ultra low freezer at Toxicology, Novozymes.

4.4 Plates

As selective substrate for reverted bacteria Vogel-Bonner medium E agar plates with 2% glucose was prepared in-house as described in Appendix 3.

All plates were stored refrigerated in closed plastic bags and examined for contamination and dryness before use.

4.5 Bacteria

Salmonella typhimurium

Four strains of *Salmonella typhimurium* were used:

- S. typhimurium* TA1535
- S. typhimurium* TA100
- S. typhimurium* TA1537
- S. typhimurium* TA98

All these strains contain mutations in the histidine operon, thereby imposing a requirement for histidine in the growth medium. They all contain GC base-pairs at the site of the histidine mutation, and are therefore selective for agents which react predominantly with these bases. Three mutations in the histidine operon are involved: his G 46 (TA1535 and TA100) is a missense mutation which is reverted to prototrophy by a variety of mutagens that cause base-pair substitutions.

his C 3076 (TA1537) contains a frame-shift which appears to have added a GC base-pair. This mutation is reverted for example by ICR-191 and epoxides of polycyclic hydrocarbon. his D 3052 (TA98) also contains a frame-shift mutation with a sequence of repeated GC, which is reverted with the deletion of 2 of these base-pairs. It is readily reverted by aromatic amines and derivatives.

All four strains contain the deep rough (rfa) mutation, which deletes the polysaccharide side chain of the polysaccharide coat of the bacterial cell surface. This deletion increases cell permeability to more hydrophobic substances and, furthermore, greatly decreases the pathogenicity of these organisms.

The uvrB deletion renders the strains incapable of excision repair, making them more sensitive both to the mutagenic and lethal effects of a wide variety of mutagens (e.g. poly-aromatic hydrocarbons), since the strains cannot excise DNA adducts.

These two deletions include the nitrate reductase (chl) and biotin (bio) genes also.

Strain TA98 and TA100 are derived from strain TA1538 and TA1535 respectively by the addition of a plasmid, pKM101, which confers resistance to ampicillin. This plasmid also carries a gene (*muc⁺*), which in some strains (*recA⁺/lexA⁺*) have proven to participate in "SOS" DNA-repair. This repair pathway is induced by DNA damage and confers resistance to the lethal effects of many mutagens at the expense of increased mutability. Bacteria carrying pKM101 have therefore a higher spontaneous mutation rate.

Escherichia coli

One strain was used:
Escherichia coli WP2uvrApKM101

This strain contains an ochre mutation in the *trpE* locus and can be mutated to tryptophan independence either by a base-pair reversion of an A-T base-pair in the *trpE* locus, or more likely, by a base-pair substitution within a number of transfer RNA loci elsewhere in the chromosome. The latter causes the original defect to be suppressed (ochre suppression) and involves only base-pair substitution transitions at G-C base-pairs.

Like the *uvrB* mutation in the *Salmonella* strains, the *uvrA* mutation causes the bacteria to be deficient in the excision of bulky lesions from the DNA, so, it is more readily mutated by certain agents (ultraviolet radiation, polycyclic hydrocarbons). Further the strain contains the pKM101 plasmid as described above for the *Salmonella* strains.

4.6 Bacterial cultures

The test strains of *Salmonella typhimurium* LT2 were obtained from Prof. B.N. Ames, Biochemistry Department, University of California, Berkeley, CA 94720, U.S.A.

Escherichia coli WP2uvrApKM101 was obtained from Covance Laboratories Ltd, Otley road, Harrogate, North Yorkshire HG3 1PY, England.

New batches of culture stocks frozen in 8% dimethyl sulphoxide are prepared at intervals from a central stock held in a $\pm 150^{\circ}\text{C}$ freezer. They are regularly checked for appropriate amino acid requirement, spontaneous reversion rate, genetic characters and response to diagnostic mutagens.

Samples of each strain were grown up overnight in Nutrient broth in a $37 \pm 1^{\circ}\text{C}$ water bath with shaking. Fresh cultures were prepared before each test.

4.7 S9 mix

Composition of a 10% V/V S9 mix (final concentrations):

Co-factors:

-phosphate buffer (0.2M, pH 7.4)	100 mM
-salts (1.65M KCl, 0.4 M MgCl ₂)	33 and 8 mM
-glucose-6-phosphate, mono-Na salt (0.2M)	5 mM
-NADP, di-Na salt (0.1M)	4 mM
S9 preparation	10% V/V

A freshly prepared solution of the co-factors was filter-sterilised by passage through a 0.2 μm membrane filter and mixed 9:1 (v/v) with freshly thawed still cold S9 preparation. This S9 mix was prepared freshly each day, and immediately used. Unused reagent was discarded.

4.8 Test material

Serial dilutions of a sterile standard solution of 5% (w/v) Xylanase PPQ33502 were prepared in sterile deionised water corresponding to the final dose levels:

5000 μg - 2500 μg - 1250 μg - 625 μg - 313 μg - 156 μg substance per mL.
The dilutions were prepared freshly each day just before use.
This range of doses was applied in experiments with respectively without S9.

4.9 Top agar

0.6 % soft agar was sterilised by autoclaving.

Bottles with 200 ml melted soft agar were kept at about 55°C and added 20 ml 0.5 mM L-histidine/biotin solution for strains of *Salmonella* or 20 ml 0.5 mM tryptophan solution for *Escherichia coli*. This molten agar was divided into 2 ml aliquots in sterile glass tubes and placed in a heat-block at $45 \pm 1^\circ\text{C}$.

5. Methods

5.1. Treat and plate assay

This procedure was applied with all strains.

For each assay sterile tubes were added:

- 4 ml Nutrient broth
- 4 ml S9 mix or 0.2M phosphate buffer (pH 7.4)
- 1 ml bacterial culture
- 1 ml test substance solution (6 doses) or diagnostic mutagen solution (positive control) or sterile deionised water (solvent control).

These incubation mixtures were incubated with shaking at $37 \pm 1^\circ\text{C}$ for 3 hours.

After incubation all bacterial suspensions were washed two times by centrifugation for 10 minutes at 1272 X g. After the first washing the bacterial pellets were resuspended in 5 ml phosphate buffer (pH 7.4, 0.2M) and finally they were re-suspended in 1 ml phosphate buffer.

Tubes with top agar were added 0.1 ml of all washed bacterial suspensions.

5.2 Selective incubation

For each dose of the test substance and the standard mutagens three similar tubes with top agar were prepared and five tubes were prepared for the solvent control.

These tubes were poured on to minimal glucose agar plates. When the soft agar set, the plates were inverted and incubated at $37 \pm 2^\circ\text{C}$ for about 72 hours as described in the standard operating procedures.

After incubation the numbers of revertant colonies were counted automatically (Perceptive Instruments). Plates with less than about 20 colonies were counted manually.

5.3 Viable cell count

0.1 ml aliquots of a 10^{-6} dilution of each bacterial suspension were poured on to minimal glucose agar plates (added the required amino acids in excess) in duplicates.

5.4 Controls

The following controls were run with each experiment:

Genotype checking:

Sensitivity for crystal violet (rfa-character), (all *Salmonella* strains)

Sensitivity for Mitomycin C uvrB (*Salmonella*) and uvrA pKM101 (*E.coli*).

Resistance to ampicillin TA98 & TA100 (*Salmonella*) and uvrA pKM101 (*E.coli*).

0.1 ml bacterial culture was spread on to nutrient agar medium. To the surface of the dried plate was added a disc of ampicillin/(Rosco Neo-Sensitabs) and two 6 mm ϕ sterile filter discs, one with 10 μ l 0.1% crystal violet and the other with 10 μ l 0.01% Mitomycin C. The plate was incubated for 48-72 hours at $37 \pm 2^\circ\text{C}$.

Sterility of Xylanase standard solution and S9 mix:

0.1 ml of standard solution or S9 mix was plated on to complete medium and incubated for 48-72 hours at $37 \pm 2^\circ\text{C}$.

Diagnostic mutagens were used for each strain with and without S9 mix, as follows:

Mutagen	S9	Strain	µg/ml
MNNG	-	TA 1535	1.0
MNNG	-	TA 100	1.0
2-NF	-	TA 98	20.0
ICR-191	-	TA 1537	0.01
MNNG	-	WP2uvrApKM101	7.5
2-AA	+	TA 98	5.0
2-AA	+	TA 1537	5.0
2-AA	+	TA 1535	5.0
2-AA	+	TA 100	5.0
2-AA	+	WP2uvrApKM101	20.0

6. Results and discussion

Genetic characters

All *Salmonella* strains used in these experiments were sensitive to crystal violet and Mitomycin C. TA98, TA100 and *E.coli* WP2uvrApKM101 were all resistant to ampicillin and the *E.coli* strain was sensitive to Mitomycin C. These results are as expected.

Solvent and positive controls

In general the solvent control values presented in this report are within the normal ranges experienced in our laboratory (Appendix 1) and/or the ranges reported in the literature with these strains. It should be noted that the spontaneous revertant levels are in general a bit lower in a treat and plate method than by direct plate incorporation.

All positive control chemicals induced significant increases in revertant colony numbers which fulfilled our criteria for an acceptable response and thereby confirmed the sensitivity of the test system.

Therefore all data were considered as valid.

Xylanase (Batch Number: PPQ33502)

The results are represented in Table 1-10.

We consider a test substance as positive when it has induced at least a doubling in the mean number of revertant colonies per plate compared to the appropriate solvent control in one or more of the strains, in the presence or absence of S9 mix, if this response is dose related (at least 3 doses) and reproducible.

In case of a dose related and reproducible numerical increase, which is below a doubling but at least 50% higher than the solvent control, the result is considered as equivocal and needs further clarification.

Xylanase is a fluid enzyme preparation. It contains an abundance of various nutrients, and composes a rich growth medium to the test bacteria. This means, that comparison of viable counts between exposed cultures and control culture in a "treat and plate" assay reflects growth stimulation/inhibition as well as cell killing. Variation in the viable counts may cause some variation in the number of spontaneous revertant colonies.

These circumstances are to minor extent reflected in the present study. No notable toxicity of the test substance to the bacteria is evident. In both test series with TA1537 without S9 treatment with Xylanase caused a slight reduction in the viable colony counts. Opposite to

this weak growth stimulation was observed in other test series. These conditions have no obvious influence on the revertant colony count of any of the bacterial strains.

No treatments of any of the *Salmonella* and *E.coli* strains with Xylanase resulted in any increases in revertant numbers that meet the criteria for a positive or equivocal response.

7. Conclusion

The results of the bacterial mutagenicity tests described in this report give no indication of the presence of mutagenic components in this preparation of Xylanase (Batch No. PPQ33502), when tested under the conditions applied in this study.

Table 1-10**Table 1.**

Number of revertant colonies per plate obtained with *Salmonella typhimurium TA100* following exposure to Xylanase PPQ33502 in the absence and presence of metabolic activation in the Treat and plate assay.

20128049 EXP 1.

Test Substance Concentration µg per mL	Number of revertants (number of colonies/plate) Base-pair substitution type							
	Without S9				With S9			
	Revertants		Viable cells		Revertants		Viable cells	
	Single plates	Mean	Single plates	Mean	Single plates	Mean	Single plates	Mean
5000	135 96 156	129	182 106	144	167 148 156	157	140 182	161
2500	135 142 135	137	142 107	125	159 167 127	151	220 231	226
1250	111 104 122	112	163 161	162	157 140 156	151	192 205	199
625	117 148 109	125	115 153	134	147 130 115	131	149 142	146
313	140 133 110	128	101 88	95	110 116 136	121	146 137	142
156	116 104 98	106	115 135	125	132 124 154	137	145 143	144
Solvent control	124 93 111 100 94	104	89 85	87	120 128 147 154 136	137	130 124	127
2AA 5.0	-	-	-	-	1835 1937 1887	1886	90 98	94
MNNG 1.0	3557 3577 3770	3635	147 136	142	-	-	-	-

Abbreviations:

MNNG - N-Methyl-N-Nitrosoguanidine

2AA - 2-Aminoanthracene

Table 2.

Number of revertant colonies per plate obtained with *Salmonella typhimurium* TA1535 following exposure to Xylanase PPQ33502 in the absence and presence of metabolic activation in the treat and plate assay.

20128049 EXP 1.

Test Substance Concentration µg per mL	Number of revertants (number of colonies/plate) Base-pair substitution type							
	Without S9				With S9			
	Revertants		Viable cells		Revertants		Viable cells	
	Single plates	Mean	Single plates	Mean	Single plates	Mean	Single plates	Mean
5000	9 13 14	12	237 234	236	8 12 9	10	208 159	184
2500	13 7 10	10	73 89	81	10 9 13	11	201 187	194
1250	11 12 14	12	187 125	156	7 12 14	11	185 156	171
625	6 11 7	8	177 105	141	11 8 15	11	193 177	185
313	11 13 7	10	192 190	191	14 8 14	12	138 153	146
156	5 11 12	9	133 122	128	8 11 12	10	151 122	137
Solvent control	7 12 12 7 10	10	163 137	150	10 13 12 7 14	11	149 126	138
2AA 5.0	-	-	-	-	236 206 194	212	74 70	72
MNNG 1.0	3289 3331 3771	3464	91 100	96	-	-	-	-

Abbreviations:

MNNG - N-Methyl-N-Nitrosoguanidine

2AA - 2-Aminoanthracene

Table 3.

Number of revertant colonies per plate obtained with *Salmonella typhimurium* TA98 following exposure to Xylanase PPQ33502 in the absence and presence of metabolic activation in the Treat and plate assay.

20128049 EXP 1.

Test Substance Concentration µg per mL	Number of revertants (number of colonies/plate) Frame-shift mutation type							
	Without S9				With S9			
	Revertants		Viable cells		Revertants		Viable cells	
	Single plates	Mean	Single plates	Mean	Single plates	Mean	Single plates	Mean
5000	20 31 19	23	85 90	88	40 33 22	32	112 130	121
2500	20 32 14	22	159 135	147	38 31 27	32	138 115	127
1250	14 28 25	22	145 153	149	37 29 31	32	94 120	107
625	22 30 22	25	126 117	122	27 26 40	31	125 127	126
313	25 31 25	27	138 163	151	20 25 35	27	115 121	118
156	17 30 25	24	119 121	120	40 23 31	31	116 136	126
Solvent control	40 21 22 21 27	26	156 149	153	31 32 31 28 19	28	111 122	117
2-NF 20.0	1024 1022 865	970	65 59	62	-	-	-	-
2AA 5.0	-	-	-	-	2556 2601 2842	2666	70 106	88

Abbreviations:

2-NF - 2-Nitrofluorene

2AA - 2-Aminoanthracene

Table 4.

Number of revertant colonies per plate obtained with *Salmonella typhimurium* TA1537 following exposure to Xylanase PPQ33502 in the absence and presence of metabolic activation in the Treat and plate assay.

20128049 EXP 1.

Test Substance Concentration µg per mL	Number of revertants (number of colonies/plate) Frame-shift mutation type							
	Without S9				With S9			
	Revertants		Viable cells		Revertants		Viable cells	
	Single plates	Mean	Single plates	Mean	Single plates	Mean	Single plates	Mean
5000	4 4 5	4	48 47	48	6 5 4	5	95 75	85
2500	6 5 4	5	65 62	64	7 6 7	7	128 93	111
1250	8 5 5	6	32 44	38	8 5 7	7	111 100	106
625	8 3 6	6	61 65	63	9 5 8	7	163 125	144
313	11 4 9	8	89 82	86	5 4 8	6	112 89	101
156	*) 6 6	6	120 122	121	7 9 5	7	79 70	75
Solvent control	8 8 5 4 7	6	156 148	152	8 8 9 6 9	8	75 68	72
2AA 5.0	-	-	-	-	221 240 262	241	47 42	45
ICR-191 0.01	1819 1861 1997	1892	141 162	152	-	-	-	-

*) Missing determination due to keying error.

Abbreviations:

ICR-191 - Acridine Mutagen

2AA - 2-Aminoanthracene

Table 5.

Number of revertant colonies per plate obtained with *E.coli* WP2uvrApKM101 following exposure to Xylanase PPQ33502 in the absence and presence of metabolic activation in the Treat and plate assay.

20128049 EXP 1.

Test Substance Concentration µg per mL	Number of revertants (number of colonies/plate) Base-pair substitution type							
	Without S9				With S9			
	Revertants		Viable cells		Revertants		Viable cells	
	Single plates	Mean	Single plates	Mean	Single plates	Mean	Single plates	Mean
5000	264 240 246	250	301 272	287	294 319 217	277	373 371	372
2500	248 257 217	241	472 423	448	261 271 213	248	273 318	296
1250	261 229 248	246	304 300	302	283 246 276	268	404 435	420
625	232 215 188	212	416 418	417	192 205 268	222	273 259	266
313	242 226 178	215	287 319	303	246 226 245	239	193 273	233
156	227 232 221	227	374 319	347	266 243 177	229	161 201	181
Solvent control	213 214 184 177 172	192	258 246	252	226 242 232 206 225	226	398 383	391
2AA 20.0	-	-	-	-	1583 1497 1707	1596	248 229	239
MNNG 7.5	2679 2271 2377	2442	230 177	204	-	-	-	-

Abbreviations:

MNNG - N-Methyl-N-Nitrosoguanidine

2AA - 2-Aminoanthracene

Table 6.

Number of revertant colonies per plate obtained with *Salmonella typhimurium TA100* following exposure to Xylanase PPQ33502 in the absence and presence of metabolic activation in the Treat and plate assay.

20128049 EXP 2.

Test Substance Concentration µg per mL	Number of revertants (number of colonies/plate) Base-pair substitution type							
	Without S9				With S9			
	Revertants		Viable cells		Revertants		Viable cells	
	Single plates	Mean	Single plates	Mean	Single plates	Mean	Single plates	Mean
5000	120 131 110	120	156 136	146	161 140 161	154	224 204	214
2500	136 114 119	123	112 120	116	171 168 146	162	152 145	149
1250	153 128 109	130	166 147	157	153 117 157	142	164 172	168
625	130 85 114	110	89 75	82	153 131 135	140	121 74	98
313	93 126 111	110	120 125	123	132 98 132	121	107 107	107
156	161 133 89	128	112 107	110	148 127 121	132	89 128	109
Solvent control	112 96 115 114 126	113	152 133	143	140 120 110 141 126	127	95 140	118
2AA 5.0	-	-	-	-	1920 2008 1791	1906	80 93	87
MNNG 1.0	3944 4019 3956	3973	122 120	121	-	-	-	-

Abbreviations:

MNNG - N-Methyl-N-Nitrosoguanidine

2AA - 2-Aminoanthracene

Table 7.

Number of revertant colonies per plate obtained with *Salmonella typhimurium TA1535* following exposure to Xylanase PPQ33502 in the absence and presence of metabolic activation in the treat and plate assay.

20128049 EXP2.

Test Substance Concentration µg per mL	Number of revertants (number of colonies/plate) Base-pair substitution type							
	Without S9				With S9			
	Revertants		Viable cells		Revertants		Viable cells	
	Single plates	Mean	Single plates	Mean	Single plates	Mean	Single plates	Mean
5000	12 18 11	14	166 213	190	12 15 8	12	198 177	188
2500	8 11 9	9	151 149	150	6 17 13	12	195 204	200
1250	10 11 8	10	195 167	181	14 9 8	10	159 178	169
625	10 10 9	10	166 141	154	7 8 14	10	209 206	208
313	11 14 18	14	174 204	189	10 13 7	10	180 168	174
156	11 12 14	12	208 192	200	7 9 8	8	199 188	194
Solvent control	15 7 6 13 15	11	145 169	157	12 10 17 6 9	11	138 133	136
2AA 5.0	-	-	-	-	167 203 157	176	110 104	107
MNNG 1.0	3451 3451 3328	3410	166 159	163	-	-	-	-

Abbreviations:

MNNG - N-Methyl-N-Nitrosoguanidine

2AA - 2-Aminoanthracene

Table 8.

Number of revertant colonies per plate obtained with *Salmonella typhimurium* TA98 following exposure to Xylanase, PPQ33502 in the absence and presence of metabolic activation in the Treat and plate assay.

20128049 EXP2.

Test Substance Concentration µg per mL	Number of revertants (number of colonies/plate) Frame-shift mutation type							
	Without S9				With S9			
	Revertants		Viable cells		Revertants		Viable cells	
	Single plates	Mean	Single plates	Mean	Single plates	Mean	Single plates	Mean
5000	30 17 20	22	152 140	146	50 25 25	33	164 177	171
2500	14 19 19	17	147 156	152	41 51 42	45	149 161	155
1250	30 30 16	25	161 195	178	32 21 20	24	135 148	142
625	17 30 17	21	192 141	167	22 26 26	25	152 184	168
313	22 27 27	25	216 194	205	42 23 35	33	128 143	136
156	17 25 27	23	205 188	197	27 38 25	30	138 149	144
Solvent control	22 23 22 25 23	23	168 173	171	35 32 32 33 33	33	188 178	183
2-NF 20.0	1114 1196 1130	1147	162 147	155	-	-	-	-
2AA 5.0	-	-	-	-	2153 2318 2278	2250	195 200	198

Abbreviations:

2-NF - 2-Nitrofluorene

2AA - 2-Aminoanthracene

Table 9.

Number of revertant colonies per plate obtained with *Salmonella typhimurium TA1537* following exposure to Xylanase, PPQ33502 in the absence and presence of metabolic activation in the Treat and plate assay.

20128049 EXP2.

Test Substance Concentration µg per mL	Number of revertants (number of colonies/plate) Frame-shift mutation type							
	Without S9				With S9			
	Revertants		Viable cells		Revertants		Viable cells	
	Single plates	Mean	Single plates	Mean	Single plates	Mean	Single plates	Mean
5000	5 7 9	7	68 54	61	7 6 8	7	93 89	91
2500	7 3 8	6	53 74	64	8 8 10	9	112 82	97
1250	6 8 5	6	64 64	64	6 9 7	7	89 85	87
625	8 9 5	7	65 69	67	9 6 6	7	119 101	110
313	4 11 5	7	100 101	101	12 4 6	7	98 98	98
156	7 3 6	5	105 103	104	10 7 13	10	58 65	62
Solvent control	5 6 5 6 7	6	143 116	130	9 9 8 8 7	8	78 68	73
2AA 5.0	-	-	-	-	175 174 187	179	37 48	43
ICR-191 0.01	4494 4581 4759	4611	184 185	185	-	-	-	-

Abbreviations:

ICR-191 - Acridine Mutagen

2AA - 2-Aminoanthracene

Table 10.

Number of revertant colonies per plate obtained with *E.coli WP2uvrApKM101* following exposure to Xylanase, PPQ33502 in the absence and presence of metabolic activation in the Treat and plate assay.

20128049 EXP2.

Test Substance Concentration µg per mL	Number of revertants (number of colonies/plate) Base-pair substitution type							
	Without S9				With S9			
	Revertants		Viable cells		Revertants		Viable cells	
	Single plates	Mean	Single plates	Mean	Single plates	Mean	Single plates	Mean
5000	198 210 151	186	213 217	215	238 285 256	260	424 348	386
2500	203 204 237	215	403 326	365	287 278 245	270	240 258	249
1250	277 213 204	231	434 385	410	272 230 264	255	388 267	328
625	220 221 168	203	237 267	252	232 246 215	231	378 335	357
313	195 168 164	176	271 205	238	206 205 227	213	279 219	249
156	198 184 210	197	210 209	210	258 250 255	254	347 384	366
Solvent control	193 177 180 200 200	190	225 143	184	222 230 247 222 193	223	399 405	402
2AA 20.0	-	-	-	-	1082 1154 1103	1113	352 308	330
MNNG 7.5	962 987 1017	989	166 161	164	-	-	-	-

Abbreviations:

MNNG - N-Methyl-N-Nitrosoguanidine

2AA - 2-Aminoanthracene

Appendix 1

Historical control data

Negative control (purified water) for *S. typhimurium* strains and *E.coli* WP2uvrA pKM101 in the treat and plate assay. (SOP: TOX-SM-1006 and TOX-SM-1007)

Strain	S9	Number of determinations	Mean number of revertants per plate	SD	Range *)	
					lower	upper
TA1535	÷	17	9	2	4	15
	+	16	11	3	8	18
TA100	÷	17	89	10	70	111
	+	17	109	15	87	140
TA1537	÷	17	9	4	4	18
	+	17	12	3	3	22
TA98	÷	17	22	6	13	33
	+	17	29	8	20	41
WP2 uvrA pKM101	÷	17	186	27	122	241
	+	17	203	21	175	241

The above are pooled data from a number of independent determinations selected from studies conducted over the period January 2011 to December 2011. Only determinations, which were obviously vitiated by errors, have been omitted.

*) Ranges stated are the maximum and minimum mean revertant colony counts from the data sets sampled.

Appendix 2

Historical control data

Positive control ranges for *S. typhimurium* strains and *E.coli* WP2uvrA pKM101 in the treat and plate assay. (SOP: TOX-SM-1006 and TOX-SM-1007).

Strain	S9	Number of determinations	Chemical	Mean number of revertants per plate	SD	Range *)	
						lower	upper
TA1535	÷	17	MNNG 1 µg/ml	3650	1061	1849	5426
	+	16	2-AA 5 µg/ml	170	24	121	209
TA100	÷	17	MNNG 1 µg/ml	3498	757	1792	4639
	+	17	2-AA 5 µg/ml	2233	318	1624	2681
TA1537	÷	17	ICR-191 0.01 µg/ml	1571	299	1032	2071
	+	17	2-AA 5 µg/ml	171	58	92	310
TA98	÷	17	2-NF 20 µg/ml	970	244	646	1415
	+	17	2-AA 5 µg/ml	2009	514	1116	2972
WP2 uvrA pKM101	÷	17	MNNG 7.5 µg/ml	1187	337	639	2035
	+	17	2-AA 20 µg/ml	1407	251	878	1878

The above are pooled data from a number of independent determinations selected from studies conducted over the period January 2011 to December 2011. Only determinations, which were obviously vitiated by errors, have been omitted.

*) Ranges stated are the maximum and minimum mean revertant colony counts from the data sets sampled.

Appendix 3

PREPARATION OF MEDIA

1. Top-agar - histidine-deficient soft agar

Agar, Merck	0.6 g
NaCl	0.5 g
Distilled water to	100 ml

The medium was autoclaved for 15 minutes at 121°C. After cooling to about 60°C, 10 ml of a sterile aqueous solution of 0.5 mM biotin - 0.5 mM histidine was added aseptically.

2. Nutrient broth - histidine-rich broth

Difco nutrient broth	8 g
NaCl	5 g
Distilled water to	1 litre

The medium was autoclaved for 15 minutes at 121°C.

3. Nutrient agar - histidine-rich agar medium

Agar, Merck	15 g
Oxoid nutrient broth No. 2	25 g
Distilled water to	1 litre

The medium was autoclaved for 15 minutes at 121°C.

4. Minimal medium

This was Vogel-Bonner minimal "E" medium with 2% glucose, prepared as follows:

Solution A (Vogel-Bonner medium E, 20X)

MgSO ₄ 7H ₂ O	4 g
Citric acid, monohydrate	40 g
K ₂ HPO ₄	200 g
NaH ₂ NH ₄ 4H ₂ O	70 g
Distilled water to	1000 ml

The solution was sterilized by filtration.

Solution B (40% glucose)

Glucose	40 g
Distilled water to	100 ml

This solution was sterilized by filtration.

Solution C (Agar base)

Agar, Merck	16.7 g
Distilled water to	1000 ml

Solution C was autoclaved for 15 minutes at 121°C. After cooling to 60°C, 450 ml of solution C was aseptically added 25 ml solution A and 25 ml solution B.

Final Report

Study Title	Induction of micronuclei in cultured human peripheral blood lymphocytes
Test Article	Xylanase, PPQ 33502
Author	[REDACTED]
Sponsor	Novozymes A/S Toxicology Krogshøjvej 36 DK-2880 Bagsvaerd DENMARK
Study Monitor	[REDACTED]
Test Facility	Covance Laboratories Ltd Otley Road, Harrogate North Yorkshire HG3 1PY, ENGLAND
Covance Client Identifier	1002135
Covance Study Number	8261061
Novozymes Reference number	20126017
Report Issued	July 2012
Page Number	1 of 41

**STUDY DIRECTOR AUTHENTICATION
AND GLP COMPLIANCE STATEMENT**

**Xylanase, PPQ 33502: Induction of micronuclei in cultured human peripheral
blood lymphocytes**

I, the undersigned, hereby declare that the work was performed under my supervision and that the findings provide a true and accurate record of the results obtained.

The study was performed in accordance with the agreed protocol and with Covance Laboratories Limited Standard Operating Procedures, unless otherwise stated, and the study objectives were achieved.

The study was conducted in compliance with the United Kingdom Good Laboratory Practice Regulations 1999, Statutory Instrument No. 3106 as amended by the Good Laboratory Practice (Codification Amendments Etc.) Regulations 2004 and the OECD Principles on Good Laboratory Practice (revised 1997, issued January 1998) ENV/MC/CHEM (98) 17.


Study Director

23 July 2012
Date

QUALITY ASSURANCE STATEMENT

Xylanase, PPQ 33502: Induction of micronuclei in cultured human peripheral blood lymphocytes

This study has been reviewed by the GLP Quality Assurance Unit of Covance and the report accurately reflects the raw data. The following inspections were conducted and findings reported to the Study Director (SD) and associated management.

Critical procedures, which are performed routinely in an operational area, may be audited as part of a "process" inspection programme. This can be in addition to phases scheduled on an individual study basis. Selected process inspections conducted and considered applicable to this study are included below.

In addition to the inspection programmes detailed below, a facility inspection programme is also operated. Details of this programme, which covers all areas of the facility annually (at a minimum), are set out in standard operating procedures.

Inspection Dates		Phase	Date Reported to SD and SD Management
From	To		
19 Apr 2012	19 Apr 2012	Protocol Review	19 Apr 2012
28 Jun 2012	02 Jul 2012	Draft Report and Data Review	02 Jul 2012
17 Jul 2012	17 Jul 2012	Final Report Review	17 Jul 2012

Inspection Dates		Phase	Date Reported to SD and SD Management
From	To		
19 Apr 2012	19 Apr 2012	Dose Preparation	19 Apr 2012
20 Apr 2012	20 Apr 2012	Slide Staining	20 Apr 2012
08 May 2012	08 May 2012	Dose Preparation	08 May 2012
09 May 2012	09 May 2012	Cell line checks	09 May 2012
10 May 2012	10 May 2012	eArchiving Procedure	10 May 2012
10 May 2012	10 May 2012	Slide Analysis	10 May 2012
14 May 2012	14 May 2012	Slide Coding	14 May 2012
17 May 2012	17 May 2012	eArchiving Procedure	17 May 2012
17 May 2012	17 May 2012	Harvest	17 May 2012
23 May 2012	23 May 2012	Data Collation and Transfer	23 May 2012

Quality Assurance Unit

Date

23/07/12

REVIEWING SCIENTIST'S STATEMENT

**Xylanase, PPQ 33502: Induction of micronuclei in cultured human peripheral
blood lymphocytes**

I, the undersigned, hereby declare that I have reviewed this report in conjunction with the Study Director and that the interpretation and presentation of the data in the report are consistent with the results obtained.



Scientist

9 July 2012
Date

RESPONSIBLE PERSONNEL

Xylanase, PPQ 33502: Induction of micronuclei in cultured human peripheral blood lymphocytes

The following personnel were responsible for key elements of the study:

Study Director
Laboratory Supervisor
Study Monitor ¹



¹ Located at Novozymes A/S, Denmark.

ARCHIVE STATEMENT

Xylanase, PPQ 33502: Induction of micronuclei in cultured human peripheral blood lymphocytes

All primary data, or authenticated copies thereof, specimens and the final report will be retained in the Covance Laboratories Limited archives for five years after issue of the final report. At the end of the specified archive period the Sponsor will be contacted to determine whether the data should be returned, retained or destroyed on their behalf. Sponsors will be notified of the financial implications of each of these options at that time. One copy of the protocol and final report will be held in the Covance Laboratories Limited archives as per Covance company policy.

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SUMMARY

Xylanase, PPQ 33502 was tested in an *in vitro* micronucleus assay using duplicate human lymphocyte cultures prepared from the pooled blood of two male donors in a single experiment. Treatments covering a broad range of concentrations, separated by narrow intervals, were performed both in the absence and presence of a rat liver metabolic activation (S-9) from Aroclor 1254 induced animals. The test article was formulated in water for irrigation (purified water) and the highest concentration tested in the Micronucleus Experiment, 5000 µg/mL (an acceptable maximum concentration for *in vitro* micronucleus studies according to current regulatory guidelines), was determined following a preliminary cytotoxicity Range-Finder Experiment.

Treatments were conducted (as detailed in the following summary table) 48 hours following mitogen stimulation by phytohaemagglutinin (PHA). The test article concentrations for micronucleus analysis were selected by evaluating the effect of Xylanase, PPQ 33502 on the replication index (RI). In the Micronucleus Experiment, micronuclei were analysed at three or more concentrations and a summary of the micronucleus data is presented in [Table 1](#):

Table 1: Micronucleus Experiment (48 hour PHA) – Results summary

Treatment	Concentration (µg/mL)	Cytotoxicity (%)	Mean MNBN cell frequency (%)	Historical Control Range (%) [#]	Statistical significance
3+21 hour -S-9	Vehicle ^a	-	0.35	0.10 – 0.95	-
	3000	0	0.50		NS
	4000	0	0.25		NS
	5000	2	0.50		NS
	*MMC, 0.80	ND	6.40		p ≤ 0.001
3+21 hour +S-9	Vehicle ^a	-	0.30	0.00 – 1.10	-
	3000	0	0.45		NS
	4000	0	0.25		NS
	5000	0	0.40		NS
	*CPA, 12.5	ND	1.50		p ≤ 0.001
24+24 hour -S-9	Vehicle ^a	-	0.35	0.10 – 1.10**	-
	500.0	10	0.50		NS
	1000	16	0.35		NS
	3000	20	0.40		NS
	4000	18	0.30		NS
	5000	21	0.60		NS
	*VIN, 0.04	ND	9.12		p ≤ 0.001

^a Vehicle control was purified water

* Positive control

[#] 95th percentile of the observed range

NS = Not significant

ND = Not determined

** Historical control range was calculated on 24+0 hour -S-9 treatments. Range included as a guide only.

Appropriate negative (vehicle) control cultures were included in the test system under each treatment condition. The proportion of micronucleated binucleate cells (MNBN) in these cultures fell within current historical vehicle control (normal) ranges. Mitomycin C (MMC) and Vinblastine (VIN) were employed as clastogenic and aneugenic positive control chemicals respectively in the absence of rat liver S-9. Cyclophosphamide (CPA) was employed as a clastogenic positive control chemical in the presence of rat liver S-9. Cells receiving these were sampled in the Micronucleus Experiment at 24 hours (CPA, MMC) or 48 hours (VIN) after the start of treatment; all compounds induced statistically significant increases in the proportion of cells with micronuclei.

The study was therefore considered as valid.

Treatment of cells with Xylanase, PPQ 33502 in the absence and presence of S-9 resulted in frequencies of MNBN cells, which were similar to and not significantly ($p \leq 0.05$) higher from those observed in concurrent vehicle controls for all concentrations analysed. The MNBN cell frequency of all Xylanase, PPQ 33502 treated cultures fell within historical vehicle control (normal) ranges.

It is concluded that Xylanase, PPQ 33502 did not induce micronuclei in cultured human peripheral blood lymphocytes following treatment in the absence and presence of a rat liver metabolic activation system (S-9). Concentrations were tested up to 5000 µg/mL, a recommended regulatory maximum concentration for *in vitro* cytogenetic assays.

INTRODUCTION

Chromosome defects are recognised as the basis of a number of human genetic diseases (Mitelman, 1991). Assays for the detection of chromosome damage in mammalian cells *in vitro* are recommended in regulatory guidelines as a complement to Ames tests in a genotoxicity test battery. There is a large database on the use of chromosomal assays for screening purposes (Preston *et al.*, 1981; Fenech, 1998; Fenech *et al.*, 2003). The use of human peripheral blood lymphocytes is recommended because the cells are only used in short-term culture and maintain a stable karyotype (Evans & O’Riordan, 1975). Experiments with these cells can also be performed in conjunction with a rat liver metabolising system (S-9) since, for short incubation periods, no toxicity is induced by the liver homogenate itself.

An alternative to measuring structural aberrations in mitotic cells is to measure micronuclei. These are produced from whole chromosomes or acentric fragments that are unable to attach to the spindle at mitosis and appear during the next interphase as small darkly staining bodies adjacent to the main daughter nucleus. Cytochalasin B (Cyto-B), if added to cultures, inhibits cytokinesis (cell division) but not karyokinesis (nuclear division) resulting in the formation of binucleate cells (Fenech & Morley, 1985). If micronuclei are counted in binucleate cells, then a measurement of micronucleus induction resulting from cell division can be obtained.

Theoretical considerations, together with published data (Lorge *et al.*, 2006), indicate that most aneugens and clastogens will be detected by a short term treatment period of 3-6 hours in the presence and absence of S-9 followed by removal of the test article and a growth period of 1.5-2.0 cell cycles (Fenech & Morley, 1986).

The most efficient approach is to test lymphocytes 44-48 hours post-mitogen stimulation by PHA, when cycle synchronisation will have dissipated (Fenech, 2007).

The test article was added at 48 hours following culture initiation (stimulation by PHA). Cells were exposed to the test article for 3 hours in the absence and presence of S-9 (from rats induced with Aroclor 1254). These cultures were sampled 24 hours after the beginning of treatment (i.e. 72 hours after culture initiation).

In addition, an extended 24 hour treatment (equivalent to approximately 1.5 to 2 times the average generation time of cultured lymphocytes from the panel of donors used in this laboratory) with 24 hour recovery in the absence of S-9 was included. These

cultures were sampled 48 hours after the beginning of treatment (i.e. 96 hours after culture initiation).

The objective of this study was to evaluate the clastogenic and aneugenic potential of Xylanase, PPQ 33502 by examining its effects on the frequency of micronuclei in cultured human peripheral blood lymphocytes treated in the absence and presence of S-9.

The test methodology is based on OECD guideline 487 (OECD, 2010) and accepted scientific/regulatory principles described in current guidelines for clastogenicity testing *in vitro* (Fenech, 1998; Fenech *et al.*, 2003; Rosefort *et al.*, 2004; Elhajouji *et al.*, 1998; Migliore & Nieri, 1991; Galloway *et al.*, 1994; Aardmea *et al.*, 1998; Miller *et al.*, 1998; ICH-S2A, 1995; ICH-S2B, 1997; Fenech *et al.*, 1999; Thybaud *et al.*, 2007).

This study was performed according to the protocol.

The study was initiated on 17 April 2012. Experimental work started on 23 April 2012 and was completed on 31 May 2012. The study completion date is considered to be the date the Study Director signs the final report.

MATERIALS

Test article

Xylanase, PPQ 33502, batch number PPQ33502, was received as a frozen brown liquid (nominal volume stated as 100 mL). It was received on 13 April 2012. Following receipt, the test article was thawed and sub-divided into three aliquots (1 x 15 mL for use on the Range-Finder Experiment and 2 x 42 mL aliquots for use on the Micronucleus Experiment). These aliquots were then re-frozen and stored at -20°C (nominal) in the dark in order that the test article should be thawed and re-frozen on no more than one occasion.

Purity was stated as 3670 GH8XU/g but for the purposes of this study purity was considered as 100%. The expiry date was given as 28 February 2022. The documentation of test material, provided by the Sponsor, is presented in [Appendix 5](#). The test article information and documentation of test material provided by the Sponsor are considered an adequate description of the characterisation, purity and stability of the test article. Determinations of stability and characteristics of the test article were the responsibility of the Sponsor.

Xylanase, PPQ 33502 is a high molecular weight protein, which was formulated in water for irrigation (purified water) to a concentration of 50 mg/mL (weighed out as received), equivalent to 5000 µg/mL final culture concentration. Sub-aliquots of provided test article were de-frosted overnight under refrigerated (2-8°C) conditions prior to the day of formulation/treatment. Once de-frosted, the test article was stirred gently (under magnetic stirring conditions) both prior to and following weighing.

No preliminary solubility trials were conducted as part of this study.

Test article stock solutions were prepared by formulating Xylanase, PPQ 33502 under subdued light in purified water, with the aid of stirring, the maximum concentrations as specified in [Table 2](#). The stock solutions were membrane filter-sterilised (Pall Acrodisc 32, 0.2 µm pore size) and subsequent dilutions made using purified water. The test article solutions were protected from light and used within approximately 3 hours of initial formulation as shown in [Table 2](#):

Table 2: Xylanase, PPQ 33502 Concentration Ranges Tested

Experiment	Treatment	Concentration range (mg/mL)		Final concentration range (µg/mL)	
Range-Finder	3+21, -S-9	0.1814	to 50.00	18.14	to 5000
	3+21, +S-9	0.1814	to 50.00	18.14	to 5000
	24+24, -S-9	0.1814	to 50.00	18.14	to 5000
Micronucleus Experiment	3+21, -S-9	5.000	to 50.00	500.0	to 5000
	3+21, +S-9	5.000	to 50.00	500.0	to 5000
	24+24, -S-9	5.000	to 50.00	500.0	to 5000

Controls

Sterile purified water was added to cultures designated as negative (vehicle) controls as described in the methods section of this report.

Table 3: Positive Controls

Chemical	Stock concentration (mg/mL)*	Final concentration (µg/mL)	S-9
Mitomycin C (MMC) **	0.060 0.080	0.60 0.80	- -
Cyclophosphamide (CPA) ***	0.625 1.25	6.25 12.50	+ +
Vinblastine (VIN) **	0.002 0.003 0.004	0.02 0.03 0.04	- - -

* In the Micronucleus Experiment, CPA was dissolved in anhydrous analytical grade dimethyl sulphoxide (DMSO), frozen (<-50°C) and thawed immediately prior to use. VIN and MMC were dissolved in purified water immediately prior to use.

** Obtained from Sigma-Aldrich Chemical Co, Poole, UK.

*** Obtained from Acros Organics, Loughborough, Leicestershire, UK.

For the 3+21 hour treatments in the absence of S-9, MMC was used as the positive control. For the 24+24 hour treatments, VIN was used as the positive control.

Metabolic activation system

The mammalian liver post-mitochondrial fraction (S-9) used for metabolic activation was obtained from Molecular Toxicology Incorporated, USA where it is prepared from male Sprague Dawley rats induced with Aroclor 1254. The batches of MolTox™ S-9 were stored frozen in aliquots at <-50°C prior to use. Each batch was checked by the manufacturer for sterility, protein content, ability to convert known promutagens to bacterial mutagens and cytochrome P-450-catalyzed enzyme activities (alkoxyresorufin-O-dealkylase activities). The quality control statements, relating to the batches of S-9 preparation used, are included in [Appendix 4](#) of this report.

The S-9 mix was prepared in the following way:

Glucose-6-phosphate (G6P: 180 mg/mL), β -Nicotinamide adenine dinucleotide phosphate (NADP: 25 mg/mL), Potassium chloride (KCl: 150 mM) and rat liver S-9 were mixed in the ratio 1:1:1:2. For all cultures treated in the presence of S-9, an aliquot of the mix was added to each cell culture to achieve the required final concentration of test article in a total of 10 mL. The final concentration of the liver homogenate in the test system was 2%.

Cultures treated in the absence of S-9 received an equivalent volume of KCl (150 mM).

Blood cultures

Blood from two healthy, non-smoking male volunteers from a panel of donors at Covance was used for each experiment in this study:

Table 4: Blood Cultures

Experiment	Donor Sex	Donor Age (years)	Donor Identity
Range-Finder	Male	34, 32	8844, 6747
Micronucleus Experiment	Male	26, 32	8517, 6747

No volunteer was suspected of any virus infection or exposed to high levels of radiation or hazardous chemicals. All volunteers are non-smokers and are not heavy drinkers of alcohol. Donors were not taking any form of medication. The measured cell cycle time of the donors used at Covance falls within the range 13 \pm 2 hours. For each experiment, an appropriate volume of whole blood was drawn from the peripheral circulation into heparinised tubes within two days of culture initiation. Blood was stored refrigerated and pooled using equal volumes from each donor prior to use.

Whole blood cultures were established in sterile disposable centrifuge tubes by placing 0.4 mL of pooled heparinised blood into 8.1 mL pre-warmed (in an incubator set to 37 \pm 1°C) HEPES-buffered RPMI medium containing 10% (v/v) heat inactivated foetal calf serum and 0.52% penicillin / streptomycin, so that the final volume following addition of S-9 mix/KCl and the test article in its chosen vehicle was 10 mL. The mitogen Phytohaemagglutinin (PHA, reagent grade) was included in the culture medium at a concentration of approximately 2% of culture to stimulate the lymphocytes to divide. Blood cultures were incubated at 37 \pm 1°C for 48 hours and rocked continuously.

METHODS

The test system was suitably labelled (using a colour-coded procedure) to clearly identify the study number, assay type, experiment number, treatment time, sex of the donor, test article concentration (if applicable), positive and negative controls.

Cytotoxicity Range-Finder

S-9 mix or KCl (0.5 mL/culture) was added appropriately. Cultures were treated with the test article, or vehicle control (1.0 mL/culture) as indicated in Table 5. Positive control treatments were not included.

The final culture volume was 10 mL. Cultures were incubated at $37 \pm 1^\circ\text{C}$ for the designated exposure time.

Micronucleus Experiment

Immediately prior to treatment, all positive control cultures had 0.9 mL culture medium added to give a final pre-treatment volume of 9.4 mL.

S-9 mix or KCl (0.5 mL/culture) was added appropriately. Cultures were treated with the test article, vehicle or positive controls (1.0 mL/culture or 0.1 mL for positive controls) as indicated in Table 5. The final culture volume was 10 mL. Cultures were incubated at $37 \pm 1^\circ\text{C}$ for the designated exposure time.

This scheme is illustrated as follows:

Table 5: Treatment Scheme

Treatment	S-9	Number of cultures			
		Cytotoxicity Range-Finder		Micronucleus Experiment	
		3+21*	24+24*	3+21*	24+24*
Vehicle control	-	2	2	4	4
	+	2		4	
Test article	-	1	1	2	2
	+	1		2	
Positive controls	-			2	2
	+			2	

* Hours treatment + hours recovery

For removal of the test article, cells were pelleted (approximately 300 g, 10 minutes), washed twice with sterile saline (pre-warmed in an incubator set to $37 \pm 1^\circ\text{C}$), and resuspended in fresh pre-warmed medium containing foetal calf serum and penicillin / streptomycin. At the appropriate times Cytochalasin-B (formulated in DMSO) was added to post wash-off culture medium to give a final concentration of 6 µg/mL per culture.

Table 6: Summary of treatment conditions

Duration of treatment (hours)	S-9	Hours after culture initiation			
		Addition of test article	Removal of test article	Addition of Cytochalasin B	Harvest time
3	-	48	51	51*	72
24	-	48	72	72*	96
3	+	48	51	51*	72

* Approximate times

Changes in osmolality of more than 50 mOsm/kg and fluctuations in pH of more than one unit may be responsible for an increase in chromosome aberrations (Scott *et al.*, 1991; Brusick, 1986). Osmolality and pH measurements on post-treatment incubation medium were taken in the cytotoxicity Range-Finder Experiment.

Harvesting

At the defined sampling time, cultures were centrifuged at approximately 300 g for 10 minutes, the supernatant removed and discarded and cells resuspended in 4 mL (hypotonic) 0.075 M KCl at $37 \pm 1^\circ\text{C}$ for 4 minutes to allow cell swelling to occur. Cells were then fixed by dropping the KCl suspension into fresh, cold methanol/glacial acetic acid (3:1, v/v). The fixative was changed by centrifugation (approximately 300 g, 10 minutes) and resuspension. This procedure was repeated as necessary (centrifuging at approximately 1250 g, 2-3 minutes) until the cell pellets were clean.

Slide preparation

Lymphocytes were kept in fixative at $2-8^\circ\text{C}$ prior to slide preparation for a minimum of 3 hours to ensure that cells were adequately fixed. Cells were centrifuged (approximately 1250 g, two to three minutes) and resuspended in a minimal amount of fresh fixative (if required) to give a milky suspension. Several drops of cell suspension were gently spread onto multiple clean, dry microscope slides. Slides were

air-dried then stored protected from light at room temperature prior to staining. Slides were stained by immersion in 125 µg/mL Acridine Orange in phosphate buffered saline (PBS), pH 6.8 for approximately 10 seconds, washed with PBS (with agitation) for a few seconds before transfer and immersion in a second container of PBS for approximately 10 minutes. Slides were air-dried and stored protected from light at room temperature prior to analysis.

Selection of concentrations for Micronucleus Experiment

Slides from the cytotoxicity Range-Finder Experiment were examined, uncoded, for proportions of mono-, bi- and multinucleate cells, to a minimum of 200 cells per concentration. From these data the replication index (RI) was determined.

The Replication Index (RI), which indicates the relative number of nuclei compared to controls, was determined using the formulae below:

$$RI = \frac{\text{number binucleate cells} + 2 (\text{number multinucleate cells})}{\text{total number of cells in treated cultures}}$$

Relative RI (expressed in terms of percentage) for each treated culture was calculated as follows:

$$\text{Relative RI (\%)} = \frac{RI \text{ of treated cultures}}{RI \text{ of vehicle controls}} \times 100$$

Cytotoxicity (%) is expressed as (100 – Relative RI).

A selection of random fields was observed from enough treatments to determine whether chemically induced cell cycle delay or cytotoxicity has occurred.

A suitable range of concentrations was selected for the Micronucleus Experiment based on these toxicity data.

Selection of concentrations for micronucleus analysis (Micronucleus Experiment only)

Slides were examined, uncoded, for proportions of mono-, bi- and multinucleate cells to a minimum of 500 cells per culture.

The highest concentration for micronucleus analysis was to be one at which approximately 55% (typically 50-60%) reduction in RI had occurred, or the highest concentration tested.

Slides from the highest selected concentration and at least two lower concentrations were taken for microscopic analysis.

For each treatment regime, two vehicle control cultures were analysed for micronuclei. Positive control concentrations, which gave satisfactory responses in terms of quality and quantity of binucleated cells and numbers of micronuclei, were analysed.

Slide analysis

Slides from the CPA, MMC and VIN positive control treatments were checked to ensure that the system had operated satisfactorily. All slides for analysis were coded, using randomly generated letters, by an individual not connected with the scoring of the slides. Labels with only the study number, assay type, experiment number, the sex of the donor and the code were used to cover treatment details on the slides.

Immediately prior to analysis 1-2 drops of PBS were added to the slides before mounting with glass coverslips. Where possible, one thousand binucleate cells from each culture (2000 per concentration) were analysed for micronuclei. The number of cells containing micronuclei and the number of micronuclei per cell on each slide was noted. Observations were recorded on raw data sheets. The microscope stage co-ordinates of the first six micronucleated cells were recorded.

Binucleate cells were only included in the analysis if all of the following criteria were met:

1. The cytoplasm remained essentially intact, and
2. The daughter nuclei were of approximately equal size.

A micronucleus was only recorded if it met the following criteria:

1. The micronucleus had the same staining characteristics and a similar morphology to the main nuclei, and

2. Any micronucleus present was separate in the cytoplasm or only just touching a main nucleus, and
3. Micronuclei were smooth edged and smaller than approximately one third the diameter of the main nuclei.

Micronucleus analysis was not conducted on slides generated from the Range-Finder treatments.

Slide analysis was performed by competent analysts trained in the applicable Covance Laboratories Harrogate (CLEH) standard operating procedures. The analysts were physically located remote from the CLEH facility, but were subject to CLEH management and GLP control systems (including QA inspection). All slides and raw data generated by the remote analysts were returned to CLEH for archiving on completion of analysis.

Analysis of results

Treatment of data

After completion of scoring and decoding of slides, the numbers of binucleate cells with micronuclei (MNBN cells) in each culture were obtained.

The proportions of MNBN cells in each replicate were used to establish acceptable heterogeneity between replicates by means of a binomial dispersion test (Richardson *et al.*, 1989).

The proportion of MNBN cells for each treatment condition were compared with the proportion in negative controls by using Fisher's exact test (Richardson *et al.*, 1989). Probability values of $p \leq 0.05$ were accepted as significant. Additionally, the number of micronuclei per binucleate cell were obtained and recorded.

Acceptance criteria

The assay was to be considered valid if the following criteria were met:

1. The binomial dispersion test demonstrated acceptable heterogeneity (in terms of MNBN cell frequency) between replicate cultures, particularly where no positive responses were seen.

2. The frequency of MNBN cells in vehicle controls fell within the normal ranges.
3. The positive control chemicals induced statistically significant increases in the proportion of cells with micronuclei. Both replicate cultures at the positive control concentration analysed under each treatment condition demonstrated MNBN cell frequencies that clearly exceeded the current historical vehicle control ranges.
4. A minimum of 50% of cells had gone through at least one cell division (as measured by binucleate + multinucleate cell counts) in negative control cultures at the time of harvest.

Evaluation criteria

For valid data, the test article was considered to induce clastogenic and/or aneugenic events if:

1. A statistically significant increase in the frequency of MNBN cells at one or more concentrations was observed.
2. An incidence of MNBN cells at such a concentration that exceeded the normal range in both replicates was observed.
3. A concentration-related increase in the proportion of MNBN cells was observed.

The test article was considered positive in this assay if all of the above criteria were met.

The test article was considered negative in this assay if none of the above criteria were met.

Results which only partially satisfied the above criteria were dealt with on a case-by-case basis. Evidence of a concentration-related effect was considered useful but not essential in the evaluation of a positive result ([Scott *et al.*, 1990](#)).

Computer systems

The major computer systems used on this study were as follows:

Activity	Computer system
Scheduling	CMS (Covance Management System)
Formulations	Pristima
Slide coding and/or data analysis	Vitroabs
Data generation and collation	Vitronuc/CBPI
Report generation	Microsoft Office/Adobe Acrobat

Version numbers of the systems are held on file at Covance.

RESULTS

Selection of concentrations for micronucleus analysis

The results of the RI determinations from the cytotoxicity Range-Finder Experiment were as follows:

Table 7: Data for 3+21 hour treatments -S-9, Range-Finder- male donors

Dose (µg/mL)	Replicate	Mono	Bi	Multi	Total Number of Cells	RI	Cytotoxicity (%)
Vehicle	A	41	146	13	200	0.86	-
	B	34	152	14	200	0.90	-
18.14	A	NS					-
30.23	A	NS					-
50.39	A	NS					-
83.98	A	NS					-
140.0	A	NS					-
233.3	A	NS					-
388.8	A	NS					-
648.0	A	NS					-
1080	A	38	148	14	200	0.88	0
1800	A	30	157	13	200	0.92	0
3000	A	30	155	15	200	0.93	0
5000	A	36	154	10	200	0.87	1

Table 8: Data for 3+21 hour treatments +S-9, Range-Finder- male donors

Dose (µg/mL)	Replicate	Mono	Bi	Multi	Total Number of Cells	RI	Cytotoxicity (%)
Vehicle	A	22	162	16	200	0.97	-
	B	27	163	10	200	0.92	-
18.14	A	NS					-
30.23	A	NS					-
50.39	A	NS					-
83.98	A	NS					-
140.0	A	NS					-
233.3	A	NS					-
388.8	A	NS					-
648.0	A	NS					-
1080	A	27	143	30	200	1.02	0
1800	A	30	147	23	200	0.97	0
3000	A	30	149	21	200	0.96	0
5000	A	27	154	19	200	0.96	0

NS = Not scored / Mono = Mononucleate

Bi = Binucleate / Multi = Multinucleate

RI = Replication index

Table 9: Data for 24+24 hour treatments -S-9, Range-Finder- male donors

Dose (µg/mL)	Replicate	Mono	Bi	Multi	Total Number of Cells	RI	Cytotoxicity (%)
Vehicle	A	30	156	14	200	0.92	-
	B	9	161	30	200	1.11	-
18.14	A	NS					-
30.23	A	NS					-
50.39	A	NS					-
83.98	A	NS					-
140.0	A	NS					-
233.3	A	NS					-
388.8	A	NS					-
648.0	A	NS					-
1080	A	23	170	7	200	0.92	9
1800	A	35	153	12	200	0.89	13
3000	A	37	153	10	200	0.87	15
5000	A	28	164	8	200	0.90	11

NS = Not scored
Mono = Mononucleate
Bi = Binucleate
Multi = Multinucleate
RI = Replication index

No marked changes in osmolality or pH were observed at the highest concentration tested (5000 µg/mL) as compared to the concurrent vehicle controls (individual data not reported).

The results of the cytotoxicity Range-Finder Experiment were used to select suitable maximum concentrations for the Micronucleus Experiment.

The results of the RI determinations from the Micronucleus Experiment were as follows:

Table 10: Data for 3+21 hour treatments -S-9, Micronucleus Experiment - male donors

Dose (µg/mL)	Replicate	Mono	Bi	Multi	Total Number of Cells	RI	Cytotoxicity (%)
Vehicle	A	123	371	6	500	0.77	-
	B	116	378	6	500	0.78	
	C	104	390	6	500	0.80	
	D	113	382	5	500	0.78	
500.0	A	NS					-
	B	NS					
1000	A	NS					-
	B	NS					
2000	A	74	411	15	500	0.88	0
	B	125	372	3	500	0.76	
3000	A	99	390	11	500	0.82	0 #
	B	108	384	8	500	0.80	
4000	A	110	378	12	500	0.80	0 #
	B	105	383	12	500	0.81	
5000	A	124	366	10	500	0.77	2 #
	B	123	370	7	500	0.77	

NS = Not scored
Mono = Mononucleate
Bi = Binucleate
Multi = Multinucleate
RI = Replication index

Highlighted concentrations selected for analysis

Table 11: Data for 3+21 hour treatments +S-9, Micronucleus Experiment- male donors

Dose (µg/mL)	Replicate	Mono	Bi	Multi	Total Number of Cells	RI	Cytotoxicity (%)
Vehicle	A	127	361	12	500	0.77	-
	B	110	383	7	500	0.79	
	C	86	399	15	500	0.86	
	D	91	395	14	500	0.85	
500.0	A	NS					-
	B	NS					
1000	A	NS					-
	B	NS					
2000	A	100	386	14	500	0.83	0
	B	102	382	16	500	0.83	
3000	A	82	406	12	500	0.86	0 #
	B	120	374	6	500	0.77	
4000	A	95	394	11	500	0.83	0 #
	B	94	390	16	500	0.84	
5000	A	101	391	8	500	0.81	0 #
	B	94	386	20	500	0.85	

NS = Not scored
Mono = Mononucleate
Bi = Binucleate
Multi = Multinucleate
RI = Replication index

Highlighted concentrations selected for analysis

Table 12: Data for 24+24 hour treatments -S-9, Micronucleus Experiment - male donors

Dose (µg/mL)	Replicate	Mono	Bi	Multi	Total Number of Cells	RI	Cytotoxicity (%)
Vehicle	A	63	403	34	500	0.94	-
	B	58	404	38	500	0.96	
	C	66	395	39	500	0.95	
	D	62	376	62	500	1.00	
500.0	A	80	394	26	500	0.89	10 #
	B	106	371	23	500	0.83	
1000	A	138	344	18	500	0.76	16 #
	B	86	402	12	500	0.85	
2000	A	123	367	10	500	0.77	16
	B	84	409	7	500	0.85	
3000	A	127	363	10	500	0.77	20 #
	B	117	375	8	500	0.78	
4000	A	124	368	8	500	0.77	18 #
	B	109	376	15	500	0.81	
5000	A	102	387	11	500	0.82	21 #
	B	148	349	3	500	0.71	

NS = Not scored
Mono = Mononucleate
Bi = Binucleate
Multi = Multinucleate
RI = Replication index

Highlighted concentrations selected for analysis

Micronucleus analysis

Raw data

The raw data for the observations on the test article plus positive and negative controls are retained by Covance Laboratories Limited. A summary of the number of cells containing micronuclei is given in [Appendix 1](#).

Validity of study

The data in [Appendix 1](#), [Appendix 2](#), [Appendix 3](#) and [Table 10](#) to [Table 12](#) indicate that:

- 1) The binomial dispersion test demonstrated acceptable heterogeneity (in terms of MNBN cell frequency) between replicate cultures for the majority of treatments ([Appendix 2](#)). The single exception to this was noted for the 3+21 hour +S-9 treatment where small but statistically significant ($p \leq 0.05$) heterogeneity was observed. However, as all vehicle and test article treated cultures demonstrated MNBN cell values that fell within historical vehicle

control (normal) ranges, this observation had no impact on the interpretation, or validity, of the study data.

- 2) The frequency of MNBN cells in vehicle controls fell within the normal range ([Appendix 3](#)).
- 3) The positive control chemicals induced statistically significant increases in the proportion of cells with micronuclei. Both replicate cultures at the positive control concentration analysed under each treatment condition demonstrated MNBN cell frequencies that clearly exceeded historical vehicle control (normal) ranges ([Appendix 1](#)).
- 4) A minimum of 50% of cells had gone through at least one cell division (as measured by binucleate + multinucleate cell counts) in negative control cultures at the time of harvest ([Table 10](#) to [Table 12](#)).

It should be noted that the historical control range used was based on 24+0 hour -S-9 data and not from 24+24 hour -S-9 treatments. However, this was considered a suitable guide for this treatment regime.

Analysis of data

Treatment of cells with Xylanase, PPQ 33502 in the absence and presence of S-9 resulted in frequencies of MNBN cells, which were similar to and not significantly ($p \leq 0.05$) higher than those observed in concurrent vehicle controls for all concentrations analysed ([Appendix 1](#) and [Appendix 2](#)). The MNBN cell frequency of all Xylanase, PPQ 33502 treated cultures fell within normal ranges ([Appendix 3](#)).

CONCLUSION

It is concluded that Xylanase, PPQ 33502 did not induce micronuclei in cultured human peripheral blood lymphocytes following treatment in the absence and presence of a rat liver metabolic activation system (S-9). Concentrations were tested up to 5000 µg/mL, a recommended regulatory maximum concentration for *in vitro* cytogenetic assays.

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APPENDICES

Appendix 1 Binucleate cells with micronuclei

**Table 13: Xylanase, PPQ 33502, 3+21 hour treatments in the absence of S-9
Micronucleus Experiment - male donors**

Treatment (µg/mL)	Replicate	Total BN Cells Scored	Total MNBN Cells Scored	Frequency of MNBN Cells/ Cells Scored (%)	Significance § (% Toxicity)
Vehicle	A	1000	5	0.50	-
	B	1000	2	0.20	
	Total	2000	7	0.35	
3000	A	1000	8	0.80	NS (0)
	B	1000	2	0.20	
	Total	2000	10	0.50	
4000	A	1000	3	0.30	NS (0)
	B	1000	2	0.20	
	Total	2000	5	0.25	
5000	A	1000	5	0.50	NS (2)
	B	1000	5	0.50	
	Total	2000	10	0.50	
MMC, 0.80	A	1000	58	5.80 #	p ≤ 0.001
	B	1000	70	7.00 #	
	Total	2000	128	6.40	

MNBN = Micronucleated Binucleate

§ Statistical significance (Appendix 2)

NS = Not significant

= Numbers highlighted exceed historical negative control range (Appendix 3)

**Table 14: Xylanase, PPQ 33502, 3+21 hour treatments in the presence of S-9
Micronucleus Experiment - male donors**

Treatment (µg/mL)	Replicate	Total BN Cells Scored	Total MNBN Cells Scored	Frequency of MNBN Cells/ Cells Scored (%)	Significance § (% Toxicity)
Vehicle	A	1000	1	0.10	-
	B	1000	5	0.50	
	Total	2000	6	0.30	
3000	A	1000	8	0.80	NS (0)
	B	1000	1	0.10	
	Total	2000	9	0.45	
4000	A	1000	4	0.40	NS (0)
	B	1000	1	0.10	
	Total	2000	5	0.25	
5000	A	1000	6	0.60	NS (0)
	B	1000	2	0.20	
	Total	2000	8	0.40	
CPA, 12.5	A	1000	12	1.20 #	p ≤ 0.001
	B	1000	18	1.80 #	
	Total	2000	30	1.50	

MNBN = Micronucleated Binucleate

§ Statistical significance ([Appendix 2](#))

NS = Not significant

= Numbers highlighted exceed historical negative control range ([Appendix 3](#))

**Table 15: Xylanase, PPQ 33502, 24+24 hour treatments in the absence of S-9
Micronucleus Experiment - male donors**

Treatment (µg/mL)	Replicate	Total BN Cells Scored	Total MNBN Cells Scored	Frequency of MNBN Cells/ Cells Scored (%)	Significance § (% Toxicity)
Vehicle	A	1000	4	0.40	-
	B	1000	3	0.30	
	Total	2000	7	0.35	
500.0	A	1000	6	0.60	NS (10)
	B	1000	4	0.40	
	Total	2000	10	0.50	
1000	A	1000	3	0.30	NS (16)
	B	1000	4	0.40	
	Total	2000	7	0.35	
3000	A	1000	4	0.40	NS (20)
	B	1000	4	0.40	
	Total	2000	8	0.40	
4000	A	1000	3	0.30	NS (18)
	B	1000	3	0.30	
	Total	2000	6	0.30	
5000	A	1000	5	0.50	NS (21)
	B	1000	7	0.70	
	Total	2000	12	0.60	
VIN, 0.04	A	210	35	16.67 #	p ≤ 0.001
	B	525	32	6.10 #	
	Total	735	67	9.12	

MNBN = Micronucleated Binucleate

§ Statistical significance ([Appendix 2](#))

NS = Not significant

= Numbers highlighted exceed historical negative control range ([Appendix 3](#))

Appendix 2

Statistical analysis of test article data

**Table 16: Xylanase, PPQ 33502, 3+21 hour treatments in the absence of S-9
Micronucleus Experiment - male donors**

Binomial Dispersion Test $\chi^2 = 5.11$ Significance: NS	DF: 4
--	-------

Treatment ($\mu\text{g/mL}$)	Total BN Cells	BN Cells with micronuclei	Proportion	Fisher's exact test	Significance
Vehicle	2000	7	0.004	-	-
3000	2000	10	0.005	0.240	NS
4000	2000	5	0.003	0.710	NS
5000	2000	10	0.005	0.240	NS
MMC, 0.80	2000	128	0.064	0.000	$p \leq 0.001$

**Table 17: Xylanase, PPQ 33502, 3+21 hour treatments in the presence of S-9
Micronucleus Experiment - male donors**

Binomial Dispersion Test $\chi^2 = 11.96$ Significance: $p \leq 0.05$	DF: 4
--	-------

Treatment ($\mu\text{g/mL}$)	Total BN Cells	BN Cells with micronuclei	Proportion	Fisher's exact test	Significance
Vehicle	2000	6	0.003	-	-
3000	2000	9	0.005	0.227	NS
4000	2000	5	0.003	0.613	NS
5000	2000	8	0.004	0.303	NS
CPA, 12.5	2000	30	0.015	0.000	$p \leq 0.001$

NS = Not significant

DF = Degrees of freedom

BN = Binucleate

**Table 18: Xylanase, PPQ 33502, 24+24 hour treatment in the absence of S-9
 Micronucleus Experiment - male donors**

Binomial Dispersion Test $\chi^2 = 1.02$ Significance: NS	DF: 6
--	-------

Treatment ($\mu\text{g/mL}$)	Total BN Cells	BN Cells with micronuclei	Proportion	Fisher's exact test	Significance
Vehicle	2000	7	0.004	-	-
500.0	2000	10	0.005	0.240	NS
1000	2000	7	0.004	0.500	NS
3000	2000	8	0.004	0.402	NS
4000	2000	6	0.003	0.605	NS
5000	2000	12	0.006	0.131	NS
VIN, 0.04	735	67	0.091	0.000	$p \leq 0.001$

NS = Not significant

DF = Degrees of freedom

BN = Binucleate

Appendix 3

Historical vehicle control ranges for the human peripheral blood lymphocyte micronucleus assay

Table 19: Historical vehicle control range

		Frequency of MNBN cells/cells scored (%)
		Male donors
3+21-S9	Number of studies	17
	Number of cultures	80
	Median	0.40
	Mean	0.43
	SD	0.220
	Observed range	0.00 – 1.00
	95% reference range	0.10 – 0.95
3+21+S9	Number of studies	16
	Number of cultures	74
	Median	0.40
	Mean	0.43
	SD	0.267
	Observed range	0.00 – 1.10
	95% reference range	0.00 – 1.10
24+0-S9 **	Number of studies	16
	Number of cultures	83
	Median	0.50
	Mean	0.49
	SD	0.265
	Observed range	0.00 – 1.50
	95% reference range	0.10 – 1.10

Reference ranges are calculated from percentiles of the observed distributions.

Calculated in January 2012 by CLEH Statistics, for studies started between April 2011 and September 2011.

** Historical control range was calculated on 24+0 hour –S-9 treatments. Range included as a guide only.

Appendix 4 Quality control statements for S-9

MOLTOX POST MITOCHONDRIAL SUPERNATANT (S-9) QUALITY CONTROL & PRODUCTION CERTIFICATE

LOT NO.: 2893 SPECIES: Rat PREPARATION DATE: February 14, 2012
PART NO.: 11-101 STRAIN: Sprague Dawley EXPIRATION DATE: February 14, 2014
VOLUME: 5mL SEX: Male BUFFER: 0.154 M KCl
TISSUE: Liver INDUCING AGENT(s): Aroclor 1254
(Monsanto KL615), 500 mg/kg i.p.
REFERENCE: Maron, D & Ames, B, *Mutat Res* 113:173, 1983
STORAGE: At or below -70°C
For Research Purposes Only
BIOCHEMISTRY:

- PROTEIN
41.7 mg/ml Assayed according to the method of Lowry et al., *JBC* 193:265, 1951 using bovine serum albumin as the standard.

- ALKOXYRESORUFIN-0-DEALKYLASE ACTIVITIES

Activity	P450	Fold - Induction	
EROD	1A1, 1A2	193.6	Assays for ethoxyresorufin-0-deethylase (EROD), pentoxy-, benzyl- and methoxyresorufin-0-dealkylases (PROD, BROD, & MROD) were conducted using a modification of the methods of Burke, et al., <i>Biochem Pharm</i> 34:3337, 1985. Fold-inductions were calculated as the ratio of the sample vs. uninduced specific activities (SA's). Control SA's (pmoles/min/mg protein) were 39.5, 27.0, 50.3, & 31.8 for EROD, PROD, BROD and MROD, respectively.
PROD	2B1, 2B2	31.8	
BROD	2B1, 2B2	69.3	
MROD	1A1, 1A2	65.0	

BIOASSAY:

- TEST FOR THE PRESENCE OF ADVENTITIOUS AGENTS

Samples of S-9 were assayed for the presence of contaminating microflora by plating 1.0 ml volumes on Nutrient Agar and Minimal Glucose (Vogel-Bonner E, supplemented with 0.05 mM L-histidine and D-biotin) media. Triplicate plates were read after 40 - 48 h incubation at 35 ± 2°C. The tested samples met acceptance criteria.

- PROMUTAGEN ACTIVATION

No. His ⁺ Revertants	
<u>TA98</u> <u>TA1535</u>	
162.0 758	

The ability of the sample to activate ethidium (EtBr) EtBr/CPA and cyclophosphamide (CPA) to intermediates mutagenic to TA98 and TA1535, respectively, was determined according to Lesca, et al., *Mutation Res* 129:299, 1984. Data were expressed as revertants per µg EtBr or per mg CPA.

Dilutions of the sample S9, ranging from 0.2 - 10% in S9 mix, were tested for their ability to activate benzo(a)pyrene (BP) and 2-aminoanthracene (2-AA) to intermediates mutagenic to TA100. Assays were conducted as described by Maron & Ames, (*Mutat Res* 113:173, 1983).

µl S9 per plate/number his⁺ revertants per plate

Promutagen	0	1	5	10	20	50
BP (5 µg)	80	221	286	373	420	378
2-AA (2.5 µg)	84	469	505	1055	1049	358

MOLECULAR TOXICOLOGY, INC.

157 Industrial Park Dr.

Boone, NC 28607

(828) 264-9099

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Approved:

02/17/12

**MOLTOX POST MITOCHONDRIAL SUPERNATANT (S-9)
QUALITY CONTROL & PRODUCTION CERTIFICATE**

LOT NO.: 2921
PART NO.: 11-101
VOLUME: 5mL

SPECIES: Rat
STRAIN: Sprague Dawley
SEX: Male
TISSUE: Liver

PREPARATION DATE: April 05, 2012
EXPIRATION DATE: April 05, 2014
BUFFER: 0.154 M KCl
INDUCING AGENT(s): Aroclor 1254
(Monsanto KL615), 500 mg/kg i.p.

REFERENCE: Maron, D & Ames, B. *Mutat Res* 113:173, 1983
STORAGE: At or below -70°C
For Research Purposes Only

BIOCHEMISTRY:

- PROTEIN
38.4 mg/ml

Assayed according to the method of Lowry et al., *JBC* 193:265, 1951 using bovine serum albumin as the standard.

- ALKOXYRESORUFIN-0-DEALKYLASE ACTIVITIES

Activity	P450	Fold - Induction
EROD	1A1, 1A2	115.5
PROD	2B1, 2B2	32.4
BROD	2B1, 2B2	54.9
MROD	1A1, 1A2	55.3

Assays for ethoxyresorufin-0-deethylase (EROD), pentoxy-, benzyl- and methoxyresorufin-0-dealkylases (PROD, BROD, & MROD) were conducted using a modification of the methods of Burke, et al., *Biochem Pharm* 34:3337, 1985. Fold-inductions were calculated as the ratio of the sample vs. uninduced specific activities (SA's). Control SA's (pmoles/min/mg protein) were 72.8, 23.7, 95.7, & 44.2 for EROD, PROD, BROD and MROD, respectively.

BIOASSAY:

- TEST FOR THE PRESENCE OF ADVENTITIOUS AGENTS

Samples of S-9 were assayed for the presence of contaminating microflora by plating 1.0 ml volumes on Nutrient Agar and Minimal Glucose (Vogel-Bonner E, supplemented with 0.05 mM L-histidine and D-biotin) media. Triplicate plates were read after 40 - 48 h incubation at 35 ± 2°C. The tested samples met acceptance criteria.

- PROMUTAGEN ACTIVATION

Nº. His⁺ Revertants
TA98 TA1535
168.8 1154

The ability of the sample to activate ethidium (EtBr) EtBr/CPA and cyclophosphamide (CPA) to intermediates mutagenic to TA98 and TA1535, respectively, was determined according to Lesca, et al., *Mutation Res* 129:299, 1984. Data were expressed as revertants per µg EtBr or per mg CPA.

Dilutions of the sample S9, ranging from 0.2 - 10% in S9 mix, were tested for their ability to activate benzo(a)pyrene (BP) and 2-aminoanthracene (2-AA) to intermediates mutagenic to TA100. Assays were conducted as described by Maron & Ames, (*Mutat Res* 113:173, 1983).

µl S9 per plate/number his⁺ revertants per plate

Promutagen	0	1	5	10	20	50
BP (5 µg)	93	160	231	287	370	523
2-AA (2.5 µg)	110	321	1212	1536	1694	1144

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Approved: [REDACTED]

04/09/12 [REDACTED] 04/09/12

Appendix 5 Documentation of Test Material



Toxicology

Date: 28. March 2012
Project no.: DEV00649
Luna: 2012-02509-01
Ref.: KM

Documentation of Test Material

Product:	TOX BATCH
Batch:	PPQ33502
Type of enzyme:	Xylanase
Host organism:	<i>Bacillus licheniformis</i>
Physical form / Colour:	Dark brownish liquid at room temperature
E.C.:	3.2.1.8

Activity:	3670 GH8XU/g
Water (KF):	88.3 % w/w
Dry matter:	11.7 % w/w
Ash (600°C):	2.0 % w/w
Total Organic Solids (TOS):	9.7 % w/w
Specific gravity (g/ml):	1.052 g/ml
pH:	5.7
Total viable counts/g:	<100




Study Director

TEST REPORT

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Study No:	74852
Sponsor Ref No:	20126010
Date:	01 February 2013
Author:	
Number of pages:	385
Sponsor:	Novozymes A/S Krogshøjvej 36 DK-2880 Bagsværd Denmark

Good Laboratory Practice Compliance Statement

The study described in this report "Xylanase, PPQ33502 - A 90-Day Gavage Toxicity Study in Rats" was conducted under my supervision and responsibility and is in compliance with the OECD Principles of Good Laboratory Practice (as revised in 1997), which are in conformity with other international GLP regulations.

The report is a complete and accurate account of the methods employed and the data obtained.


Study Director
CiToxLAB Scantox A/S

01 February 2013
Date

Quality Assurance Statement

Study No: 74852

Study Title: Xylanase, PPQ33502 - A 90-Day Gavage Toxicity Study in Rats

An audit of the study plan has been performed and reported to the Study Director (SD) and Test Facility Management (TFM).

Audit	Date of audit	Date of reporting to SD and TFM
Final study plan	16 April 2012	16 April 2012
Amendment 1	10 June 2012	10 June 2012
Amendment 2	12 July 2012	12 July 2012
Amendment 3	30 July 2012	30 July 2012
Amendment 4	06 September 2012	06 September 2012
Amendment 5	18 December 2012	18 December 2012

This study performed by CiToxLAB Scantox A/S has been inspected by the Quality Assurance Unit at CiToxLAB Scantox A/S in compliance with OECD Principles of Good Laboratory Practice. Inspection reports have been provided to the Study Director and to Test Facility Management according to the table below. Process and facility inspections are performed on a regular basis in accordance with CiToxLAB Scantox A/S procedures. Study-based and the most recent process based inspection dates are stated in the table [below](#).

Inspection type	Inspection item(s)	Inspection date(s)	Date of reporting to SD and TFM
Study-based	Storage and registration of test item	01, 02 May 2012	02 May 2012
	Preparation of test item	01, 02 May 2012	02 May 2012
	Sampling of dose formulation	01, 02 May 2012	02 May 2012
	Housing of animals	01 May 2012	01 May 2012
	Dosing	01 May 2012 14 June 2012	01 May 2012 14 June 2012
	Weekly observation of animals	15 May 2012	15 May 2012
	Clinical observation of animals	14 June 2012	14 June 2012
	Blood sampling	30 July 2012	30 July 2012
	Open-field	20 July 2012	20 July 2012
	Stimuli-induced test	20 July 2012	20 July 2012
	Necropsy	30 July 2012	30 July 2012
	Raw data	01 May 2012 30 July 2012	01 May 2012 30 July 2012
Process-based	Arrival and allocation of animals	12 January 2012	12 January 2012
	Re-allocation, weighing of animal, diet and water	21 February 2012 08 May 2012	22 February 2012 08 May 2012
	Reception or sample dispatch	15 May 2012	16 May 2012
	Clinical chemistry analysis	16 Marts 2012 15 June 2012	19 Marts 2012 15 June 2012
	Haematology analysis	16 Marts 2012 15 June 2012	19 Marts 2012 15 June 2012
	Sampling of urine and urinalysis	04 and 05 July 2012	06 July 2012
	Histology and pathology	21 and 22 May 2012	22 May 2012
	Ophthalmoscopy	27 March 2012 07 June 2012	28 March 2012 07 June 2012

The study report has been audited. The methods, procedures and observations as outlined in the study plan and in CiToxLAB Scantox A/S Standard Operating Procedures have been

accurately described. The results and data presented in the study report accurately reflect the raw data generated during the study.

Date of audit of draft Report	Date(s) of reporting to SD and TFM
03-05, 08-13, 15-18 October 2012	19 October 2012
Date of audit of Final Report	Date of reporting to SD and TFM
09, 29-31 January 2013 and 01 February 2013	01 February 2013

The part analysis of dose formulation of the study performed by Novozymes A/S has been inspected and the results audited by their Quality Assurance Unit and a test site QA statement have been issued.

QA Auditor
CiToxLAB Scantox A/S

01 February 2013
Date

Personnel involved in the study

Study Director:
(until 31 July 2012)

[REDACTED]

Study Director:
(From 01 August 2012 to
17 December 2012)

[REDACTED]

Study Director:
(From 18 December 2012)

[REDACTED]

Analysis of dose formulation

[REDACTED]

Novozymes A/S

Sponsor Monitor:

[REDACTED]

Novozymes A/S

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1 Summary

The objective of this study conducted at CiToxLAB Scantox A/S, was to assess the systemic toxicity of Xylanase, PPQ33502, when administered daily by oral treatment (gavage) to rats for 90/91 days.

The study was conducted in 40 male and 40 female SPF Sprague Dawley rats of the Ntac:SD strain, approximately 5 weeks old. The animals were randomly allocated to four groups: Group 1 (Vehicle (Ion-exchanged water), 0 mg TOS/kg bw and 0 GH8XU/kg), Group 2 (102 mg TOS/kg bw and 3861 GH8XU/kg), Group 3 (336.7 mg TOS/ kg bw and 12741 GH8XU/kg) and Group 4 (1020 mg TOS/kg bw and 38608 GH8XU/kg). Treatment was performed by oral treatment (gavage) once daily for 90/91 days with a dose volume of 10 mL/kg.

Clinical signs were recorded daily and once weekly detailed clinical observations outside the cage were performed. Body weight and food consumption were recorded once weekly, while water consumption was recorded twice weekly. Pre-treatment and before termination, the animals were examined with respect to motor activity (open field test) and reactivity to different types of stimuli. Blood and urine samples were collected from all animals before termination of treatment in Week 13 for evaluation of clinical chemistry (blood and urine) and haematology (blood) parameters. At termination of the study, the animals were euthanised and subjected to a full macroscopic examination and selected organs were weighed, fixed and examined histopathologically.

No treatment related signs were recorded at the clinical examination (clinical observations, open field and stimuli tests and ophthalmoscopy), on body weight gain, on food or water consumption. The test item had no treatment related effects on the clinical chemistry, haematology, and coagulation parameters or on the urinalysis and urine microscopy. At necropsy, no microscopic or macroscopic treatment related findings were observed.

In conclusion, 90/91-days of daily oral (gavage) treatment of rats with Xylanase, PPQ33502, at dose levels of up to 1,020 mg TOS/kg bw/day or 38608 GH8XU/kg bw/day administered in a dose volume of 10 mL/kg bw/day did not cause any test item related changes. The NOAEL (No Observed Adverse Effect Level) for both females and males for Xylanase, PPQ33502, was 1,020 mg TOS/kg bw/day corresponding to 38608 GH8XU/kg bw/day.

2 Introduction

2.1 Background

The test item, Xylanase (batch no PPQ33502), is an enzyme preparation intended for food applications for human consumption. Xylanases, produced under industrial conditions by safe and well described microorganisms, have been used safely in food applications for many years. The present study is conducted to fulfil regulatory requirements in countries where the enzyme is going to be sold.

2.2 Objective

The objective of this study was to assess the systemic toxicity of Xylanase (batch no PPQ33502) when administered daily by oral treatment (gavage) to rats for 90 days.

2.3 Rationale for study design

The rat was selected as the test model because of its well accepted suitability in this type of study and availability of background data. Oral treatment (gavage) was chosen in order to simulate the conditions of potential human exposure. The test enzyme was not anticipated to cause any significant findings, based on the results obtained from studies with similar materials. The highest dose (10 mL/kg/day) is the maximum practical dose and represents administration of the enzyme, as received, at a volume dosage of 10 mL/kg body weight/day. The lower doses were selected using an approximate ratio of 3.3 between doses. The doses were selected by the Sponsor.

2.4 Study conduct

The present study plan was in accordance with the OECD Guideline 408, adopted on 21 September 1998.

This study was conducted at CiToxLAB Scantox A/S, Hestehavevej 36A, Ejby, DK-4623 Lille Skensved, Denmark according to:

Study plan	dated	13 April 2012
Amendment No 1	dated	08 June 2012
Amendment No 2	dated	10 July 2012
Amendment No 3	dated	27 July 2012
Amendment No 4	dated	05 September 2012
Amendment No 5	dated	17 December 2012

The animals arrived on 17 April 2012. Treatment started on 01 May 2012. The in-life phase ended on 31 July 2012.

This report describes the procedures used and the results obtained.

3 Materials and methods

3.1 Test item and vehicle

The test item, Xylanase (batch no PPQ33502, expiry date 28 February 2022), was supplied by the Sponsor.

Test item characterisation (identity, purity, stability) was the responsibility of the Sponsor. The test item was stored in a freezer (-18 °C).

Remaining test item was discarded after completion of the treatment period.

The vehicle for the preparation was ion-exchanged water.

3.2 Animals

The study was performed in 40 male and 40 female SPF Sprague Dawley rats of the Ntac:SD strain from Taconic Europe A/S, Ejby, Denmark. At the start of the acclimatisation period, the rats were approximately 5 weeks old and their body weight was within a range of +/- 20

grams for each sex. Ten (10) extra animals (5 of each sex) were available for replacement purposes.

An acclimatisation period of 14 days was allowed in order to reject animals in poor condition or at the extremes of the weight range.

3.3 Housing

The study took place in animal room No 113 provided with filtered air at a temperature of $21^{\circ}\text{C} \pm 3^{\circ}\text{C}$ and relative humidity of $55\% \pm 15\%$. A deviation to these limits occurred, however it did not have any effect on the outcome of the study. The temperature and relative humidity in the animal room were recorded hourly during the study and the records were retained.

The ventilation system was designed to give 10 air changes per hour. The room was illuminated to give a cycle of 12 hours light and 12 hours darkness. Light was on from 06:00 h to 18:00 h.

The rats were kept in transparent polycarbonate cages (floor area: 1500 cm^2 - Height 21 cm) with 2-3 animals in each cage, males and females separated. The cages were cleaned and the bedding changed at least once per week.

Before arrival of the animals, the animal room was cleaned and disinfected. During the study, the animal room was cleaned regularly and rinsed with water.

3.4 Bedding

The bedding was softwood sawdust "Jeluxyl" from Jelu Werk GmbH, Josef Ehrler GmbH & Co KG, Ludwigsmühle, D-73494 Rosenberg, Germany. Analyses for relevant possible contaminants are performed regularly. Certificates of analysis are retained.

3.5 Environmental enrichment

For environmental enrichment, the animals were offered a supply of Aspen Wood Wool from Tapvei Estonia OÜ, Estonia, at each change of bedding. Analyses for relevant possible contaminants are performed regularly. Certificates of analysis are retained.

Furthermore, an autoclaved brick of wood from Tapvei Estonia OÜ, Estonia, was provided to each cage. Analyses for relevant possible contaminants are performed regularly. Certificates of analysis are retained.

Each cage also contained a red transparent Rat House (Noryl, Tecniplast) from Tecniplast Gazzada S.a.r.l., 21020 Buguggiate -Va, Italy. The house allowed the animals to show a wide range of natural behaviour.

3.6 Diet

A complete pelleted rodent diet "Altromin 1314 Fortified" (for growing animals) was available *ad libitum* until Day 49 of the dosing period. On Day 50 and throughout the study, the animals were offered *ad libitum* "Altromin 1324 Fortified" (for adult animals). Altromin was supplied by Altromin Gesellschaft für Tierernährung mbH, D-32791 Lage, Germany. Analyses for major nutritive components and relevant possible contaminants are performed regularly. Certificates of analysis are retained.

3.7 Drinking water

The animals had free access to bottles with domestic quality drinking water acidified with hydrochloric acid to pH 2.5 in order to prevent microbial growth. Analyses for relevant possible contaminants are performed regularly on the drinking water prior to acidification. Certificates of analysis are retained.

As a deviation on Day 88, all animals in the study did not have access to water during the urine sampling (approximately 17 hours). The lack of water was considered not to have had any impact on the physical condition of the animals, and as blood sampling for clinical chemistry was not performed until three-four days later, this was considered not to have any impact on the outcome of the study.

3.8 Animal randomisation and allocation

On the day of arrival, the animals were allocated randomly to 4 groups and a group of extra animals, using a randomisation scheme.

Prior to commencement of treatment, the animals were re-allocated in order to reduce possible inter-group mean body weight differences. Data available from pre-treatment observations were taken into account when re-allocating animals.

On Day 3 of the study, the extra animals were allocated to CiToxLAB Scantox stock, after which they were no longer part of this study.

3.9 Animal and cage identification

Each animal was identified by punched ear marks.

Each cage was identified by a colour coded card containing study number, group number, sex and animal number.

3.10 Treatment

The groups, dose levels, animal numbers and colour codes were as follows:

Table 1 Treatment schedule

Group	Dose concentration	Dose concentration	Enzyme activity	Animal Nos		Colour code
	% (v/v)*	mg TOS/kg bw/day	GH8XU/kg bw/day	Male	Female	
1	0	0	0	1-10	11-20	White
2	10	102	3861	21-30	31-40	Blue
3	33	336.7	12741	41-50	51-60	Green
4	100	1020	38608	61-70	71-80	Red

TOS = Total organic solids. * % of test item as delivered by the Sponsor.

- The daily dose was given by oral treatment (gavage) according to the most recent body weight data.
- Treatment was performed daily for at least 90 days and until the day before necropsy.
- Dose volume was 10 mL/kg body weight.
- The dose formulations for Groups 2-4 were kept on a magnetic stirrer (gentle stirring) at least 10 minutes before start of treatment and during treatment.
- Treatment was completed within 4 hours after preparation of the dose formulations.
- The tubes for gavage were wiped with a water wetted cloth between each dosing.
- The first day of treatment was designated Day 1.

On two occasions, as a deviation, an animal did not receive the entire amount of test item as the gavage slipped off (animal No 78 on Day 14 and animal No 70, Day 52, both Group 4). This did not have an impact on the outcome of the study, as it only happened once per animal and not on days of important procedures.

Furthermore, in Week 4, due to a calculation error at the preparation of the test item formulation, animals in Group 3 were dosed with a concentration of 37.7%. As this was only for a week and only a minor increase in concentration, it was considered not to have influenced the outcome of the study.

3.11 Dose formulation preparation

The stock bottles with test item were kept frozen at approximately -18°C until use. Each stock bottle was thawed overnight in a refrigerator, and the content was divided into aliquots suitable for daily preparation of dose formulations. Before dividing the contents of the stock bottles, the test item in the stock bottles was stirred gently for at least 10 minutes on a magnetic stirrer. The aliquots were frozen and any remaining test item in the thawed stock bottle was discarded (in order to avoid thawing the stock bottles more than once).

Prior to each dose formulation preparation, a suitable number of aliquots was thawed overnight in a refrigerator. Prior to preparation of the dose formulations, the thawed aliquots were stirred gently for at least 10 minutes on a magnetic stirrer (at room temperature). In addition, the aliquots were also stirred on a magnetic stirrer during preparation of the dose formulations. Dose formulations were prepared as follows:

Group 1: Vehicle (Ion-exchanged water)

Group 2: 1 portion of test item diluted in 9 portions of vehicle (Ion-exchanged water).

Group 3: 1 portion of test item diluted in 2.03 portions of vehicle (Ion-exchanged water).

Group 4: Undiluted test item.

The prepared dose formulations were stored at room temperature and were used within 4 hours after preparation. According to the Sponsor, the prepared dose formulations were stable for up to 24 hours when stored in a refrigerator or at room temperature.

All preparations were prepared using glassware.

Prior to commencement of treatment, a trial formulation was prepared. The preparation of this trial formulation was documented in the raw data of this study, but was not reported.

3.12 Control of dose preparations and usage

Before preparation of dose formulation, the dose calculations were double checked.

Each step of the dose formulation preparation was documented. The weight of dose formulation for each group before and after dosing was documented.

After dosing, the amount of dose formulation used for each group was compared with the predicted daily usage.

3.13 Analysis of dose formulations

During Weeks 1, 6 and 13, two (2) sets of triplicate (3) samples (6 samples in total) each of 10 mL of the 4 dose formulations were collected in a Nunc plastic tube and stored frozen at approximately -18°C . The samples were taken under gentle magnetic stirring from the middle of the bottles with dose formulation. In Week 6, the samples were in error taken from the top, middle and bottom of the bottles and marked accordingly. These were re-labelled by the PI as 1, 2 and 3, respectively.

One (1) set of triplicate samples (Nos 1-3) was sent on dry ice to the PI at Novozymes A/S for analysis. The other set of triplicate samples (Nos 4-6) was stored at CiToxLAB Scantox and discarded when the PI report was finalised. As a deviation, sample Nos 4-6 from Week 1 were sent to the PI. These were re-labelled by the PI as 1, 2 and 3, respectively.

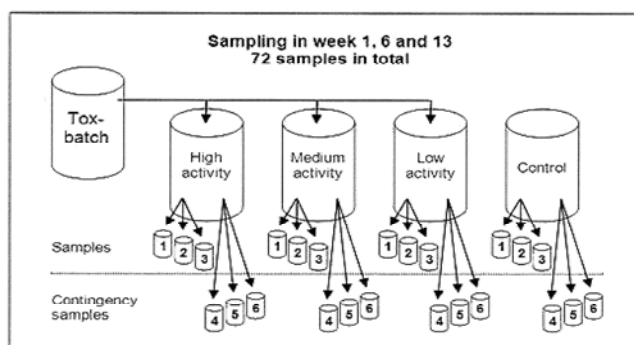
Table 2 Samples of dose formulations

Sampling occasion	Sampling volume	Sample container	Nominal concentration (%)	Number of samples*	Shipping date
Week 1	10 mL	Nunc plastic tube	0	2 sets of 3 (total 6)	Nos 1-3: Week 32
			10	2 sets of 3 (total 6)	
			33	2 sets of 3 (total 6)	
			100	2 sets of 3 (total 6)	
Week 6	10 mL	Nunc plastic tube	0	2 sets of 3 (total 6)	Nos 1-3: Week 32
			10	2 sets of 3 (total 6)	
			33	2 sets of 3 (total 6)	
			100	2 sets of 3 (total 6)	
Week 13	10 mL	Nunc plastic tube	0	2 sets of 3 (total 6)	Nos 1-3: Week 32
			10	2 sets of 3 (total 6)	
			33	2 sets of 3 (total 6)	
			100	2 sets of 3 (total 6)	
Total				3x24 samples	

* For each sampling occasion, the Nunc plastic tubes was labelled 1-6.

Total number of samples from each week: 2 sets of 12, total 24.

Total number of samples from whole study: 3 sets of 24, total 72.



The report for Analysis of dose formulations is included as [Appendix I](#).

3.14 Clinical signs

All visible signs of ill health and any behavioural changes were recorded daily. Any deviation from normal was recorded with respect to time of onset, duration and intensity.

3.14.1 Weekly observations

Beginning prior to start of treatment, detailed clinical observations were performed outside the home cage once per week at similar times. Signs to be recorded included, but were not limited to: changes in skin/fur, eyes, mucous membranes, occurrence of secretions and excretions and autonomic activity (*e.g.*, lacrimation, piloerection, pupil size, and unusual respiratory pattern). Changes in gait, posture and response to handling as well as the presence of clonic or tonic movements, stereotypies (*e.g.* excessive grooming, repetitive circling) or bizarre behaviour (*e.g.* self-mutilation, walking backwards) were also recorded.

3.14.2 Open field observations

Once during the pre-treatment period and once during the last two weeks of the study, all animals were examined with respect to motor activity (open field test).

The rat was placed in the ActiMot arena for open-field-testing for 5 minutes and the parameters given in [Table 3](#) were recorded and described. When the 5 minutes had passed, the rat was removed and placed in its own cage again. The arena was cleaned after each tested animal.

Table 3 Open-field observations

Parameters	Recorded as	Description
Abnormal behaviour	0 = Not observed 1 = Observed	Observation e.g. stereotypes
Level of activity*)	ActiMot	Time moving Total distance Numbers of rearings Time in centre Time in periphery Total corner visits Moves/Counts
Ataxia	0 = None 1 = Slightly increased 2 = Increased	
Number of faecal pellets	Count	Actual number
Urination during test	0 = Not observed 1 = Observed	Observation

*) Level of activity when placed in the ActiMot arena.

3.14.3 Stimuli-induced tests

Once during the pre-treatment period and once during the last two weeks of the study, all animals were examined with respect to reactivity to different types of stimuli (e.g. auditory, visual, tactile) and grip strength, as described in the internal SOP/1.1.1/13, version 2.

3.15 Mortality

Animal No 31 was killed for ethical reasons (formation of tumour larger than 2 cm at the chest region) on Day 45 and the animal was necropsied and subjected to the procedures described in the paragraph [Terminal observations](#). Blood samples for clinical pathology were taken.

3.16 Body weight

Starting on arrival, the animals were weighed once weekly, including Day –1 which was the body weight used for re-allocation. During the dosing period, the animals were weighed on the first day of each study week (Days 1, 8, 15, etc) and this weight was used for calculation of the doses for the following study week. Moreover, the animals were weighed at necropsy.

Body weight gain was calculated.

3.17 Food consumption

From Day 1, the food consumption was recorded weekly for each cage with a 7-day interval.

3.18 Water consumption

From Day 1, the water consumption was recorded twice weekly for each cage.

As a deviation, during urine sampling from Day 87 to 88, registration of the water consumption was in error not performed.

As a deviation, water consumption was in error not recorded on three occasions. These are marked in the tables and excluded from the statistics. Furthermore, on ten occasions a water bottle leaked and therefore a correct water consumption could not be recorded. These are also excluded from statistics.

3.19 Ophthalmoscopy

Before start of treatment, ophthalmoscopy was performed on all animals. Before termination of treatment, all animals in Groups 1 and 4 were re-examined.

After application of tropicamide 1% solution (Mydriacyl, Alcon Universal Ltd., USA), both eyes were examined with an indirect ophthalmoscope and a portable slit-lamp microscope.

3.20 Clinical pathology

In the last week of treatment, blood and urine samples were taken from all animals. Blood samples were drawn using the sublingual venous plexus during CO₂/O₂ anaesthesia.

For haematology, at least 300 µl K3 EDTA stabilised blood was taken. From this sample, a smear was prepared and stained with May-Grünwald and Giemsa for possible later manual differential leucocyte count. The smears were read manually.

For the coagulation tests, 500 µl citrate stabilised blood was taken.

Approximately 750 µl blood was taken for clinical chemistry in plain glass tubes for serum.

Urine samples were collected over night, while the animals were placed individually in metabolism cages. During the sampling period, only water was available. The volume of urine samples was recorded and up to 10 mL was saved for analysis.

At necropsy, a bone marrow smear was taken from the femur of all animals (see the table under the heading [Organs and tissues](#)). The smears were fixed and stained with May-Grünwald and Giemsa stain. These smears were not analysed as no haematological findings were seen and the smears will be discarded upon finalisation of the study.

The parameters, methods and units for the laboratory investigations are stated below:

Table 4 Haematology and coagulation parameters

Parameter	Method/Equipment	Unit
Haemoglobin (Hb)	Direct measurement/ABX Pentra DX120SPS	mmol/L
Red blood cell count (RBC)	Direct measurement/ABX Pentra DX120SPS	$10^{12}/L$
Reticulocyte count (RETIC)	Direct measurement/ABX Pentra DX120SPS	% and $10^{12}/L$
Haematocrit (HT)	Direct measurement/ABX Pentra DX120SPS	mL/100 mL
Mean cell volume (MCV)	Calculated/ABX Pentra DX120SPS	fL
Mean cell haemoglobin (MCH)	Calculated/ABX Pentra DX120SPS	fmol
Mean cell haemoglobin concentration (MCHC)	Calculated/ABX Pentra DX120SPS	mmol/L
White blood cell count (WBC)	Direct measurement/ABX Pentra DX120SPS	$10^9/L$
Differential leucocyte count (NEUTRO, LYMPHO, EOS, BASO, MONO)	Direct measurement/ABX Pentra DX120SPS	% and $10^9/L$
Platelet count (Plt)	Direct measurement/ABX Pentra DX120SPS	$10^9/L$
Activated partial thromboplastin time (APTT)	IL Test™/ACL™ (*)	sec.
Prothrombin time (Pt)	IL Test™/ACL™(*)	sec.
Fibrinogen (Fib)	IL Test™/ACL™(*)	g/L

(* Instrumentation Laboratories, Automated Coagulation Laboratory)

Table 5 Clinical chemistry

Parameter	Method/Equipment	Unit
Alanine aminotransferase (ALAT)	Hitachi 917	μkat/L
Aspartate aminotransferase (ASAT)	Hitachi 917	μkat/L
Alkaline phosphatase (ALKPH)	Hitachi 917	μkat/L
Bilirubin (total) (TBILI)	Hitachi 917	μmol/L
Gamma-glutamyl transferase (GGT)	Hitachi 917	μkat/L
Cholesterol (CHOL)	Hitachi 917	mmol/L
Triglycerides (TRIG)	Hitachi 917	mmol/L
Carbamide (UREA)	Hitachi 917	mmol/L
Creatinine (CREAT)	Hitachi 917	μmol/L
Glucose (GLUC)	Hitachi 917	mmol/L
Sodium (Na)	Ion selective electrode/Hitachi 917	mmol/L
Potassium (K)	Ion selective electrode/Hitachi 917	mmol/L
Calcium (Ca)	Hitachi 917	mmol/L
Magnesium (Mg)	Hitachi 917	mmol/L
Inorganic phosphorus (P)	Hitachi 917	mmol/L
Chloride (Cl)	Ion selective electrode/Hitachi 917	mmol/L
Protein (total) (PROTEIN)	Hitachi 917	g/L
Albumin (ALB)	Hitachi 917	g/L
Globulin	Calculated	g/L
Albumin/Globulin (ALB/G) ratio	Calculated	No unit

Table 6 Urinalysis

Parameter	Method/Equipment	Unit/Range
Volume		mL
Specific gravity (SG)	Ames Multistix 10SG/Clinitek 500	No unit
pH	Ames Multistix 10SG/Clinitek 500	No unit
Colour (COLOUR)	Visual examination	No unit
Protein (PROTEIN)	Ames Multistix 10SG/Clinitek 500	g/L
Leucocytes (LEUC)	Ames Multistix 10SG/Clinitek 500	Cells/ μ l
Nitrite (NITRITE)	Ames Multistix 10SG/Clinitek 500	No unit
Blood (BLOOD)	Ames Multistix 10SG/Clinitek 500	Erythrocytes/ μ l
Glucose (GLUCOSE)	Ames Multistix 10SG/Clinitek 500	mmol/L
Ketones (KETONES)	Ames Multistix 10SG/Clinitek 500	mmol/L
Bilirubin (BILI)	Ames Multistix 10SG/Clinitek 500	No unit
Urobilinogen (UROBIL)	Ames Multistix 10SG/Clinitek 500	μ mol/L

Microscopic examination of spun sediment was performed. A 40 x magnification was used. For the various findings, the incidence was described in the following way:

-	"no trace"	=	no trace in 2-3 visual fields
(+)	"trace"	=	a few in 2-3 visual fields
+	"slight"	=	a few in each visual field
++	"moderate"	=	several in each visual field
+++	"marked"	=	numerous in each visual field

The elements examined were: Erythrocytes, leucocytes, epithelial cells, crystals, urates, hyaline and granular casts and bacteria.

3.21 Terminal observations

On the day of necropsy, the animals were weighed, examined externally and placed in a chamber with atmospheric air upon which a mixture of 70% CO₂ and 30% O₂ was applied at a steadily increasing concentration for euthanasia. The animals were monitored closely while in the chamber. Death was confirmed and the animals were bled before proceeding. The animals were necropsied in the sequence of one or two animals/group.

3.21.1 Necropsy

A macroscopic examination was performed after opening the cranial, thoracic and abdominal cavities and by observing the appearance of the organs and tissues *in situ*. Any macroscopic change was recorded with details of the location, colour, shape and size in the PathData©System V6.2a2 computer system.

3.21.2 Organs and tissues

Either whole organs or selected samples of the indicated organs and tissues was subjected to the procedures itemised in the list given below. Weights were recorded in the PathData©System V6.2a2 computer system.

Paired organs were weighed together. The relative organ weights, i.e. the organ weight as a percentage of the body weight and organ weight as a percentage of the brain weight, were calculated for each animal.

All tissues were initially fixed in phosphate buffered neutral 4% formaldehyde with the exception of the eyes and testes (Modified Davidsons's fixative). The fixative for long term preservation was phosphate buffered neutral 4% formaldehyde for all tissues. The lungs were infused with fixative at necropsy.

Table 7 Organs and tissues

Organs and tissues	W e i g h	F i x	M i c r o	Organs and tissues	W e i g h	F i x	M i c r o
Abnormalities (gross lesions)		x	x	Pituitary	x	x	x
Adrenals	x	x	x	Prostate	x	x	x
Aorta (thoracic)		x	x	Salivary glands (right parotid, sublingual and submandibular)		x	x
Brain	x	x	x	Sciatic nerve		x	x
Bone marrow smear		x		Seminal vesicles		x	x
Bones (right femur)		x	x	Skeletal muscle		x	x
Epididymides	x	x	x	Skin		x	x
Eyes with lens/optic nerve*		x	x	Spinal cord (cervical, thoracic, lumbar)		x	x
Heart	x	x	x	Spleen	x	x	x
Intestine small (duodenum, jejunum, ileum)		x	x	Sternum (for bone marrow)		x	x
Intestine large (caecum, colon, rectum)		x	x	Stomach (glandular, non glandular)		x	x
Joint (knee)		x	x	Testes	x	x	x
Kidneys	x	x	x	Thymus	x	x	x
Larynx		x	x	Thyroids (incl. parathyroid)		x	x
Liver	x	x	x	Tongue		x	x
Lungs		x	x	Trachea		x	x
Lymph nodes (mesenteric and right mandibular)		x	x	Ureters		x	x
Mammary gland		x	x	Urinary bladder		x	x
Oesophagus		x	x	Uterus (horn, cervix and oviducts)	x	x	x
Ovaries	x	x	x	Vagina		x	x
Pancreas		x	x				

* Both eyes were fixed, but only one eye was examined microscopically.

3.21.3 Processing and microscopic examination

After fixation, the organs and tissues sampled for microscopic examination were trimmed and representative specimens were taken for histological processing. The specimens were embedded in paraffin and cut at a nominal thickness of approximately 5 µm, stained with haematoxylin and eosin and examined under a light microscope. Paired organs were processed together.

All pathological findings were entered directly onto the PathData©System V6.2a2 computer system.

Histological alterations were graded on a 5-grade system:

- Grade 1 - Minimal/Very few/Very small
- Grade 2 - Slight/Few/Small
- Grade 3 - Moderate/Moderate number/Moderate size
- Grade 4 - Marked/Many/Large
- Grade 5 - Massive/Extensive number/Extensive size
- Present - Finding present/Severity not scored

The following organs and tissues were examined microscopically:

- All organs and tissues from all control (Group 1) and high dose animals (Group 4).
- All organs and tissues from all animals dead after initiation of treatment.
- All gross lesions from all animals.

Tissues not examined microscopically were stored at CiToxLAB Scantox A/S held in fixative.

3.21.4 Peer review

A peer review by CiToxLAB Scantox A/S peer reviewing pathologist was performed on selected slides. Diagnostic discrepancies were resolved by discussion.

3.22 Data capture

The following computerised data capture systems were used during the conduct of this study.

Instem Provantis (version 7.0.3.3) used for in-life recordings e.g. clinical signs, body weights, food consumption, haematology, blood chemistry and urinalysis.

PathData (version 6.2a2) used for necropsy and pathology data.

Cirkom iFix (version 4.0) used for collection of temperature and humidity data.

SAS (version 8.2) used for statistical processing of data.

SigmaPlot (version 11.0) used for creation of graphs for data presentation.

ActiMot Motility Measuring System (version 6.11) used for collection of motility data.

In the event of a computerised system technical failure, manual recording (in-life data collection) in accordance with the standard operating procedures was used to ensure data capture.

3.23 Statistics

Data were processed to give group mean values and standard deviations where appropriate.

Thereafter each continuous variable was tested for homogeneity of variance with Levene's test. If the variance was homogeneous, analysis of variance was carried out for the variable. If any significant differences were detected, possible inter-group differences were assessed with Dunnett's test (comparing treated groups with a control group). If the variance was heterogeneous, each variable was tested for normality by the Shapiro-Wilk method. In case of normal distribution, possible inter-group differences were identified with Student's t-test. Otherwise the possible inter-group differences were assessed by Kruskal-Wallis's test. If any significant inter-group differences were detected, the subsequent identification of the groups was carried out with Wilcoxon Rank-Sum test.

Ranked type of urinalysis data were analysed with Wilcoxon Rank-Sum test.

For all tests, the level of significance was defined as $p < 0.05$.

The statistical analyses were made with SAS[®] procedures (version 8.2) described in "SAS/STAT[®] User's Guide, SAS OnlineDoc[®], 1999, SAS Institute Inc., Cary, North Carolina 27513, USA".

3.24 Archives

3.24.1 CiToxLAB Scantox A/S

For a period of 10 years, CiToxLAB Scantox A/S will be responsible for the archiving of the following materials relating to the study:

Study plan, study plan amendments and correspondence, test material receipts, sample of test item, animal records, all original paper and electronic data, wet tissues, blocks and slides and final report.

After end of the archiving period, the original report will be transferred to external archiving.

At the end of the archiving period, CiToxLAB Scantox A/S will contact the Sponsor for instructions whether the material should be transferred, retained or destroyed.

3.24.2 Novozymes A/S (Analysis of dose formulation)

For a period of 10 years, the raw data pertaining to formulation analysis, shipping documents, correspondence and the analytical report will be archived at Novozymes A/S. It is the responsibility of the Principal Investigator (PI) to notify the Study Director when the PI Report is archived. At the end of the archiving period, Novozymes A/S in cooperation with the Study Director, will decide whether the material should be transferred, retained or destroyed.

4 Results

4.1 Mortality

Animal No 31 was sacrificed on Day 45 due to the formation of a tumor larger than 2 cm at the chest region.

4.2 Analysis of dose formulations

[Appendix I](#)

The Xylanase activity (GH8XU/g) in the two groups High and Medium was found not to differ significantly for Weeks 1, 6 and 13. In the Group Low, the activity in Week 6 was significantly higher than the activity in Weeks 1 and 13.

The following mean activity (GH8XU/g) per Group for Groups High and Medium and per Group Low were determined.

Week No	High	Medium	Low
1	3580	1210	362
6			377
13			361

There is no significant difference between the Xylanase activity (GH8XU/g) of Group High (100% dose solution) and the tox-batch.

Absence of activity in the control samples was shown.

4.3 Clinical signs

Individual findings: [Table 19](#)

Hairloss was seen in eleven animals in total in Groups 1, 2 and 4 throughout the study. Hairloss is often seen in rats and in this study both seen in control animals and treated animals and is therefore considered not to be related to the test item.

Furthermore, eye discharge and a few incidences of soft faeces were observed during the study. These findings are considered incidental and not related to the test item.

4.3.1 Open field observations

Group mean values: [Table 8](#) [Table 9](#)

Individual values: [Table 20](#)

No test item related effect was observed.

4.3.2 Stimuli-induced tests

Group mean values: [Table 10](#)

Individual values: [Table 21](#)

No test item related effect was observed.

4.4 Body weight

Figure: [Figure 1](#)

Group mean values: [Table 11](#)

Individual values: [Table 22](#)

No test item related changes were observed.

4.5 Food consumption

Group mean values: [Table 12](#)

Individual values: [Table 23](#)

No test item related changes were observed.

4.6 Water consumption

Group mean values: [Table 13](#)

Individual values: [Table 24](#)

No test item related changes were seen in the females.

For males in Group 4, a statistically increased water intake was seen on eight occasions during the study. For females, a statistically significant decrease in water intake was seen on two occasions for Group 3 animals.

Due to the deviations mentioned in section [3.18](#), group mean values of total water intake for statistical analysis was for male animals only available for a single cage in Group 4 and for three cages in Group 1. For females, group mean values of total water intake for statistical analysis was available for three cages in Group 4 and for four cages in Group 1. A statistical analysis was therefore made for the days where water intake was recorded for both Groups 1 and 4, (namely Days 15-18, 25-32, 36-46, 50-53 and 57-91 for males and Days 1-8, 15-25, 29-81 and 85-91 for females). This shows a statistically significant increase in the total water intake for males in Group 4 and a significant decrease for females in Group 4.

4.7 Ophthalmoscopy

Individual values: [Table 25](#)

No test item related changes were observed.

4.8 Clinical pathology

4.8.1 Haematology

Group mean values: [Table 14](#)

Individual values [Table 26](#)

No test item related changes were observed.

4.8.2 Clinical chemistry

Group mean values: [Table 15](#)

Individual values: [Table 27](#)

No test item related changes were observed.

4.8.3 Urinalysis

Group mean values: [Table 16](#)

Individual values: [Table 28](#)

No test item related changes were seen in the females.

For males in Group 4, a larger volume of urine could be collected. The urine for this group of animals was also of a lighter colour and a higher gravity. In females in Group 4 (and similar for females in Group 3), a tendency towards a higher gravity of the urine was also seen.

4.8.4 Urinalysis – microscopy

Group mean values: [Table 17](#)

Individual values: [Table 29](#)

No test item related changes were observed.

4.9 Organ weights

Group mean values: [Table 18](#)

Individual values: [Table 30](#)

No test item related changes were seen on the organ weights.

4.10 Macroscopic findings

[Appendix II](#)

Only few, incidental findings were reported at necropsy.

In animal No 31, sacrificed on Day 45 of the study, a subcutaneous nodule was recorded in the chest region. A renal cyst was found in animal No 6.

4.11 Microscopic findings

Appendix II

The microscopic examination of the subcutaneous nodule from animal No 31 revealed an adenocarcinoma arising in the mammary gland. This was considered to be an incidental finding with no relation to treatment.

The macroscopically recorded renal cyst in animal No 6 was confirmed at the microscopic examination - this was similarly considered to be an incidental finding with no relation to treatment.

Focal infiltration of inflammatory cells and/or haemorrhage and necrosis between/in the myofibres of the tongue were found in 19 animals in Group 1 and in 12 animals in Group 4. These findings are considered consequences of the repeated needle insertion for blood sampling.

All findings reported are considered to be within the background incidence of findings reported in this age and strain of laboratory maintained rats and as such to be of no toxicological significance.

5 Discussion

For males in Group 4, a higher water intake was seen on occasions during the study. Furthermore, a larger volume of urine could be collected from these animals, with the urine having a lighter colour and a higher gravity. A tendency towards higher gravity in females in Groups 3 and 4 was also seen, together with a overall lower water intake. Since the overall water intake was differently affected for the two sexes (decreased in female animals but increased in male animals) and in addition, as no other observations in the study indicated changes in the renal function these findings are considered not to be of toxicological importance.

6 Conclusion

90/91-days of daily oral (gavage) treatment of rats with Xylanase, PPQ33502, at dose levels of up to 1,020 mg TOS/kg bw/day or 38608 GH8XU/kg bw/day administered in a dose volume of 10 mL/kg bw/day did not cause any test item related changes. The NOAEL (No Observed Adverse Effect Level) for both females and males for Xylanase, PPQ33502, was 1,020 mg TOS/kg bw/day corresponding to 38608 GH8XU/kg bw/day.

Figure 1 Body weight

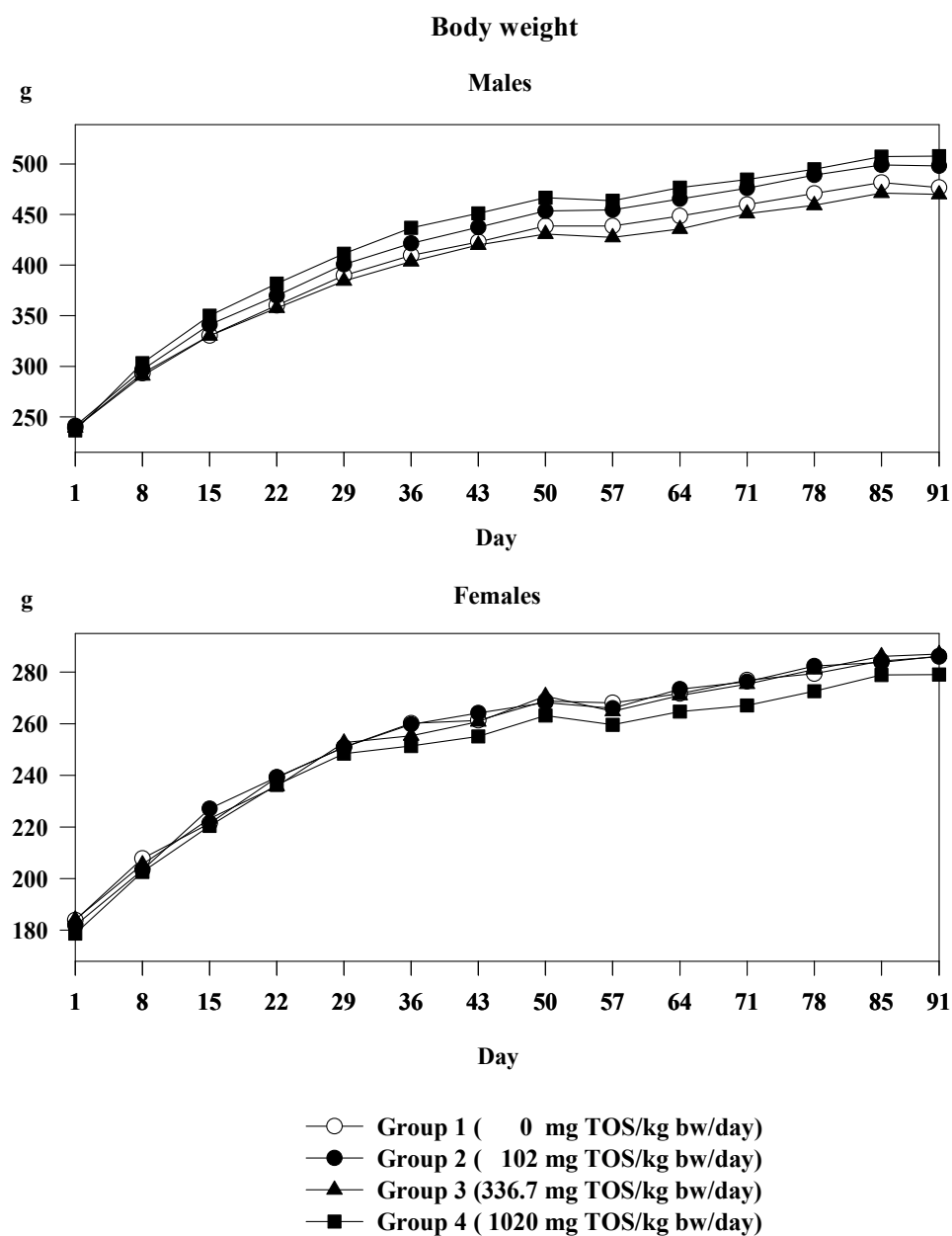


Table 8 Open field observation – Group mean values

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Group mean values - Before start of treatment

Males

GROUP (Dose mg TOS /kg bw/day)	TIME MOVING			p	TOTAL DISTANCE (m)			p	NO. OF REARINGS			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	218.6	27.8	10		87.2	16.1	10		28.5	8.2	10	
2 (102)	230.4	13.4	10		95.1	8.9	10		28.5	11.1	10	
3 (336.7)	229.6	21.0	10		97.3	10.1	10		35.1	9.8	10	
4 (1020)	234.0	12.9	10		99.0	7.1	10		32.5	10.4	10	

GROUP (Dose mg TOS /kg bw/day)	TIME CENTRE			p	TIME PERIPHERY			p	TOTAL CORNER VISITS			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	17.5	8.8	10		282.5	8.8	10		71.8	16.4	10	
2 (102)	17.9	9.4	10		282.2	9.5	10		82.2	9.7	10	
3 (336.7)	17.5	11.5	10		282.5	11.5	10		76.8	17.1	10	
4 (1020)	19.0	10.3	10		281.0	10.3	10		80.2	11.6	10	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Group mean values - Before start of treatment

Males

GROUP (Dose mg TOS /kg bw/day)	MOVES/COUNTS			p
	Mean	S.D.	N	
1 (0)	6287.1	888.2	10	
2 (102)	6702.1	457.3	10	
3 (336.7)	6760.6	613.4	10	
4 (1020)	6870.2	366.3	10	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Group mean values - Before start of treatment

Females

GROUP (Dose mg TOS /kg bw/day)	TIME MOVING			p	TOTAL DISTANCE (m)			p	NO. OF REARINGS			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	231.3	21.8	10		96.0	7.3	10		37.8	6.4	10	
2 (102)	241.3	14.8	10		100.2	14.6	10		37.6	10.1	10	
3 (336.7)	244.2	15.6	10		101.9	16.0	10		41.4	9.8	10	
4 (1020)	236.9	11.7	10		97.4	7.0	10		41.9	7.5	10	

GROUP (Dose mg TOS /kg bw/day)	TIME CENTRE			p	TIME PERIPHERY			p	TOTAL CORNER VISITS			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	25.0	6.4	10		275.0	6.4	10		72.3	15.3	10	
2 (102)	23.9	12.6	10		276.1	12.6	10		77.8	16.5	10	
3 (336.7)	22.5	15.7	10		277.5	15.7	10		80.8	19.1	10	
4 (1020)	18.9	14.9	10		281.1	14.9	10		68.0	7.9	10	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Group mean values - Before start of treatment

Females

GROUP (Dose mg TOS /kg bw/day)	MOVES/COUNTS			p
	Mean	S.D.	N	
1 (0)	6595.4	609.4	10	
2 (102)	6931.5	570.7	10	
3 (336.7)	7078.7	686.1	10	
4 (1020)	6749.9	396.3	10	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Group mean values - At termination of treatment

Males

GROUP (Dose mg TOS/kg bw/day)	TIME MOVING				TOTAL DISTANCE (m)				NO. OF REARINGS			
	Mean	S.D.	N	p	Mean	S.D.	N	p	Mean	S.D.	N	p
1 (0)	138.4	54.6	10		41.4	18.8	10		16.8	10.4	10	
2 (102)	177.9	62.4	10		59.6	25.4	10		22.5	10.4	10	
3 (336.7)	147.1	62.2	10		47.0	26.9	10		20.4	15.1	10	
4 (1020)	162.3	53.6	10		50.6	19.9	10		23.8	8.7	10	

GROUP (Dose mg TOS/kg bw/day)	TIME CENTRE				TIME PERIPHERY				TOTAL CORNER VISITS			
	Mean	S.D.	N	p	Mean	S.D.	N	p	Mean	S.D.	N	p
1 (0)	34.1	38.3	10		266.0	38.3	10		27.7	18.2	10	
2 (102)	30.5	15.5	10		269.5	15.5	10		49.5	20.8	10	
3 (336.7)	19.2	8.7	10		280.9	8.7	10		40.0	32.2	10	
4 (1020)	19.4	14.6	10		280.6	14.6	10		44.4	26.8	10	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Group mean values - At termination of treatment

Males

GROUP (Dose mg TOS/kg bw/day)	MOVES/COUNTS			
	Mean	S.D.	N	p
1 (0)	3699.0	1613.2	10	
2 (102)	4862.8	1772.3	10	
3 (336.7)	3931.0	1803.6	10	
4 (1020)	4354.1	1487.2	10	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Group mean values - At termination of treatment

Females

GROUP (Dose mg TOS/kg bw/day)	TIME MOVING				TOTAL DISTANCE (m)				NO. OF REARINGS			
	Mean	S.D.	N	p	Mean	S.D.	N	p	Mean	S.D.	N	p
1 (0)	221.5	22.9	10		93.2	15.2	10		35.9	12.6	10	
2 (102)	230.8	16.7	9		97.6	12.9	9		30.2	11.3	9	
3 (336.7)	225.0	17.7	10		92.2	19.1	10		36.3	9.2	10	
4 (1020)	228.9	10.6	10		96.5	11.4	10		36.0	6.6	10	

GROUP (Dose mg TOS/kg bw/day)	TIME CENTRE				TIME PERIPHERY				TOTAL CORNER VISITS			
	Mean	S.D.	N	p	Mean	S.D.	N	p	Mean	S.D.	N	p
1 (0)	15.5	8.2	10		284.5	8.2	10		72.3	18.8	10	
2 (102)	13.5	6.6	9		286.5	6.7	9		77.8	17.0	9	
3 (336.7)	13.9	4.8	10		286.1	4.8	10		70.6	18.3	10	
4 (1020)	12.5	8.1	10		287.6	8.1	10		76.2	10.2	10	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Group mean values - At termination of treatment

Females

GROUP (Dose mg TOS/kg bw/day)	MOVES/COUNTS			
	Mean	S.D.	N	p
1 (0)	6131.2	680.0	10	
2 (102)	6481.6	519.3	9	
3 (336.7)	6252.3	545.4	10	
4 (1020)	6327.3	414.6	10	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Table 9 Open field observation – Incidence of findings

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Incidence of findings - Before start of treatment

Males

GROUP (Dose mg TOS /kg bw/day)	ABNORMAL BEHAV- IOUR	Total	p
	0		
1 (0)	10	10	
2 (102)	10	10	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	40	40	

Codes are described in [Table 3](#)

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Incidence of findings - Before start of treatment

Males

GROUP (Dose mg TOS /kg bw/day)	ATAXIA	Total	p
	0		
1 (0)	10	10	
2 (102)	10	10	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	40	40	

Codes are described in [Table 3](#)

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Incidence of findings - Before start of treatment

Males

GROUP (Dose mg TOS /kg bw/day)	NUMBER OF FAECAL PELLETS										Total	p
	0	1	2	3	4	5	6	7	8	9		
1 (0)	1	0	1	2	2	1	1	1	1	0	10	
2 (102)	1	1	2	1	3	1	1	0	0	0	10	
3 (336.7)	1	3	2	0	1	0	0	2	1	0	10	
4 (1020)	4	0	1	0	1	2	1	0	0	1	10	
Total	7	4	6	3	7	4	3	3	2	1	40	

Codes are described in [Table 3](#)

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Incidence of findings - Before start of treatment

Males

GROUP (Dose mg TOS /kg bw/day)	URINATION DURING TEST		Total	p
	0	1		
1 (0)	2	8	10	
2 (102)	0	10	10	
3 (336.7)	5	5	10	
4 (1020)	4	6	10	
Total	11	29	40	

Codes are described in [Table 3](#)

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Incidence of findings - Before start of treatment

Females

GROUP (Dose mg TOS /kg bw/day)	ABNORMAL BEHAV- IOUR	Total	p
	0		
1 (0)	10	10	
2 (102)	10	10	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	40	40	

Codes are described in [Table 3](#)

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Incidence of findings - Before start of treatment

Females

GROUP (Dose mg TOS /kg bw/day)	ATAXIA	Total	p
	0		
1 (0)	10	10	
2 (102)	10	10	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	40	40	

Codes are described in [Table 3](#)

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Incidence of findings - Before start of treatment

Females

GROUP (Dose mg TOS /kg bw/day)	NUMBER OF FAECAL PELLETS						Total	p
	0	1	3	4	5	6		
1 (0)	8	1	1	0	0	0	10	
2 (102)	9	0	0	0	0	1	10	
3 (336.7)	8	1	0	1	0	0	10	
4 (1020)	7	1	1	0	1	0	10	
Total	32	3	2	1	1	1	40	

Codes are described in [Table 3](#)

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Incidence of findings - Before start of treatment

Females

GROUP (Dose mg TOS /kg bw/day)	URINATION DURING TEST		Total	p
	0	1		
1 (0)	4	6	10	
2 (102)	4	6	10	
3 (336.7)	5	5	10	
4 (1020)	4	6	10	
Total	17	23	40	

Codes are described in [Table 3](#)

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Incidence of findings - At termination of treatment

Males

GROUP (Dose mg TOS/kg bw/day)	ABNORMAL BEHAV- IOUR		Total	p
	0	1		
1 (0)	8	2	10	
2 (102)	8	2	10	
3 (336.7)	8	2	10	
4 (1020)	9	1	10	
Total	33	7	40	

Codes are described in [Table 3](#)

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Incidence of findings - At termination of treatment

Males

GROUP (Dose mg TOS/kg bw/day)	ATAXIA	Total	p
	0		
1 (0)	10	10	
2 (102)	10	10	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	40	40	

Codes are described in [Table 3](#)

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Incidence of findings - At termination of treatment

Males

GROUP (Dose mg TOS/kg bw/day)	NUMBER OF FAECAL PELLETS						
	0	1	2	3	4	5	6
1 (0)	0	0	3	2	0	1	0
2 (102)	4	0	3	2	0	1	0
3 (336.7)	0	1	2	2	1	2	1
4 (1020)	2	0	0	3	2	1	1
Total	6	1	8	9	3	5	2

GROUP (Dose mg TOS/kg bw/day)	NUMBER OF FAECAL PELLETS	Total	p
	7		
1 (0)	4	10	
2 (102)	0	10	*
3 (336.7)	1	10	
4 (1020)	1	10	
Total	6	40	

Codes are described in [Table 3](#)

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Incidence of findings - At termination of treatment

Males

GROUP (Dose mg TOS/kg bw/day)	URINATION DURING TEST		Total	p
	0	1		
1 (0)	1	9	10	
2 (102)	3	7	10	
3 (336.7)	3	7	10	
4 (1020)	3	7	10	
Total	10	30	40	

Codes are described in [Table 3](#)

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Incidence of findings - At termination of treatment

Females

GROUP (Dose mg TOS/kg bw/day)	ABNORMAL BEHAV- IOUR	Total	p
	0		
1 (0)	10	10	
2 (102)	9	9	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	39	39	

Codes are described in [Table 3](#)

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Incidence of findings - At termination of treatment

Females

GROUP (Dose mg TOS/kg bw/day)	ATAXIA	Total	p
	0		
1 (0)	10	10	
2 (102)	9	9	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	39	39	

Codes are described in [Table 3](#)

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Incidence of findings - At termination of treatment

Females

GROUP (Dose mg TOS/kg bw/day)	NUMBER OF FAECAL PELLETS			Total	p
	0	2	4		
1 (0)	9	1	0	10	
2 (102)	8	0	1	9	
3 (336.7)	10	0	0	10	
4 (1020)	10	0	0	10	
Total	37	1	1	39	

Codes are described in [Table 3](#)

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Incidence of findings - At termination of treatment

Females

GROUP (Dose mg TOS/kg bw/day)	URINATION DURING TEST		Total	p
	0	1		
1 (0)	3	7	10	
2 (102)	6	3	9	
3 (336.7)	4	6	10	
4 (1020)	8	2	10	
Total	21	18	39	

Codes are described in [Table 3](#)

* means $p < 0.05$, versus control group
** means $p < 0.01$, versus control group

Table 10 Stimuli-induced clinical observations - Incidence of findings

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Incidence of findings - Before start of treatment

Males

GROUP (Dose mg TOS/kg bw/day)	PUPIL REFLEX	Total	p
	Proper reaction		
1 (0)	10	10	
2 (102)	10	10	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	40	40	

GROUP (Dose mg TOS/kg bw/day)	TOE PINCH REACTION	Total	p
	Proper reaction		
1 (0)	10	10	
2 (102)	10	10	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	40	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Incidence of findings - Before start of treatment

Males

GROUP (Dose mg TOS/kg bw/day)	GRASP RESPONSE	Total	p
	Proper reaction		
1 (0)	10	10	
2 (102)	10	10	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	40	40	

GROUP (Dose mg TOS/kg bw/day)	GRIP STRENGTH	Total	p
	Proper reaction		
1 (0)	10	10	
2 (102)	10	10	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	40	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Incidence of findings - Before start of treatment

Males

GROUP (Dose mg TOS/kg bw/day)	EYELID REFLEX	Total	p
	Proper reaction		
1 (0)	10	10	
2 (102)	10	10	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	40	40	

GROUP (Dose mg TOS/kg bw/day)	STARTLE RESPONSE	Total	p
	Proper reaction		
1 (0)	10	10	
2 (102)	10	10	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	40	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Incidence of findings - Before start of treatment

Males

GROUP (Dose mg TOS/kg bw/day)	HEAD SHAKE RESPONSE	Total	p
	Proper reaction		
1 (0)	10	10	
2 (102)	10	10	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	40	40	

GROUP (Dose mg TOS/kg bw/day)	RIGHTING REFLEX, TABLE	Total	p
	Proper reaction		
1 (0)	10	10	
2 (102)	10	10	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	40	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Incidence of findings - Before start of treatment

Males

GROUP (Dose mg TOS/kg bw/day)	RIGHTING REFLEX, HAND	Total	p
	Proper reaction		
1 (0)	10	10	
2 (102)	10	10	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	40	40	

GROUP (Dose mg TOS/kg bw/day)	PLACING REFLEX	Total	p
	Proper reaction		
1 (0)	10	10	
2 (102)	10	10	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	40	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Incidence of findings - Before start of treatment

Males

GROUP (Dose mg TOS/kg bw/day)	NEGATIVE GEOTAXIS	Total	p
	Proper reaction		
1 (0)	10	10	
2 (102)	10	10	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	40	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Incidence of findings - Before start of treatment

Females

GROUP (Dose mg TOS/kg bw/day)	PUPIL REFLEX	Total	p
	Proper reaction		
1 (0)	10	10	
2 (102)	10	10	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	40	40	

GROUP (Dose mg TOS/kg bw/day)	TOE PINCH REACTION	Total	p
	Proper reaction		
1 (0)	10	10	
2 (102)	10	10	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	40	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Incidence of findings - Before start of treatment

Females

GROUP (Dose mg TOS/kg bw/day)	GRASP RESPONSE		Total	p
	Proper reaction	Failed reaction		
1 (0)	10	0	10	
2 (102)	10	0	10	
3 (336.7)	10	0	10	
4 (1020)	9	1	10	
Total	39	1	40	

GROUP (Dose mg TOS/kg bw/day)	GRIP STRENGTH		Total	p
	Proper reaction	Failed reaction		
1 (0)	10	0	10	
2 (102)	10	0	10	
3 (336.7)	9	1	10	
4 (1020)	10	0	10	
Total	39	1	40	

* means $p < 0.05$, versus control group
** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Incidence of findings - Before start of treatment

Females

GROUP (Dose mg TOS/kg bw/day)	EYELID REFLEX	Total	p
	Proper reaction		
1 (0)	10	10	
2 (102)	10	10	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	40	40	

GROUP (Dose mg TOS/kg bw/day)	STARTLE RESPONSE	Total	p
	Proper reaction		
1 (0)	10	10	
2 (102)	10	10	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	40	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Incidence of findings - Before start of treatment

Females

GROUP (Dose mg TOS/kg bw/day)	HEAD SHAKE RESPONSE	Total	p
	Proper reaction		
1 (0)	10	10	
2 (102)	10	10	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	40	40	

GROUP (Dose mg TOS/kg bw/day)	RIGHTING REFLEX, TABLE	Total	p
	Proper reaction		
1 (0)	10	10	
2 (102)	10	10	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	40	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Incidence of findings - Before start of treatment

Females

GROUP (Dose mg TOS/kg bw/day)	RIGHTING REFLEX, HAND	Total	p
	Proper reaction		
1 (0)	10	10	
2 (102)	10	10	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	40	40	

GROUP (Dose mg TOS/kg bw/day)	PLACING REFLEX	Total	p
	Proper reaction		
1 (0)	10	10	
2 (102)	10	10	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	40	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Incidence of findings - Before start of treatment

Females

GROUP (Dose mg TOS/kg bw/day)	NEGATIVE GEOTAXIS	Total	p
	Proper reaction		
1 (0)	10	10	
2 (102)	10	10	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	40	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Incidence of findings - At termination of treatment

Males

GROUP (Dose mg TOS/kg bw/day)	PUPIL REFLEX	Total	p
	Proper reaction		
1 (0)	10	10	
2 (102)	10	10	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	40	40	

GROUP (Dose mg TOS/kg bw/day)	TOE PINCH REACTION		Total	p
	Proper reaction	Failed reaction		
1 (0)	10	0	10	
2 (102)	10	0	10	
3 (336.7)	9	1	10	
4 (1020)	10	0	10	
Total	39	1	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Incidence of findings - At termination of treatment

Males

GROUP (Dose mg TOS/kg bw/day)	GRASP RESPONSE		Total	p
	Proper reaction	Failed reaction		
1 (0)	6	4	10	
2 (102)	8	2	10	
3 (336.7)	6	4	10	
4 (1020)	8	2	10	
Total	28	12	40	

GROUP (Dose mg TOS/kg bw/day)	GRIP STRENGTH		Total	p
	Proper reaction	Failed reaction		
1 (0)	5	5	10	
2 (102)	10	0	10	*
3 (336.7)	6	4	10	
4 (1020)	9	1	10	
Total	30	10	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Incidence of findings - At termination of treatment

Males

GROUP (Dose mg TOS/kg bw/day)	EYELID REFLEX	Total	p
	Proper reaction		
1 (0)	10	10	
2 (102)	10	10	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	40	40	

GROUP (Dose mg TOS/kg bw/day)	STARTLE RESPONSE		Total	p
	Proper reaction	Failed reaction		
1 (0)	9	1	10	
2 (102)	9	1	10	
3 (336.7)	10	0	10	
4 (1020)	10	0	10	
Total	38	2	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Incidence of findings - At termination of treatment

Males

GROUP (Dose mg TOS/kg bw/day)	HEAD SHAKE RESPONSE	Total	p
	Proper reaction		
1 (0)	10	10	
2 (102)	10	10	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	40	40	

GROUP (Dose mg TOS/kg bw/day)	RIGHTING REFLEX, TABLE	Total	p
	Proper reaction		
1 (0)	10	10	
2 (102)	10	10	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	40	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Incidence of findings - At termination of treatment

Males

GROUP (Dose mg TOS/kg bw/day)	RIGHTING REFLEX, HAND		Total	p
	Proper reaction	Failed reaction		
1 (0)	10	0	10	
2 (102)	9	1	10	
3 (336.7)	9	1	10	
4 (1020)	9	1	10	
Total	37	3	40	

GROUP (Dose mg TOS/kg bw/day)	PLACING REFLEX		Total	p
	Proper reaction	Failed reaction		
1 (0)	10	0	10	
2 (102)	9	1	10	
3 (336.7)	10	0	10	
4 (1020)	10	0	10	
Total	39	1	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Incidence of findings - At termination of treatment

Males

GROUP (Dose mg TOS/kg bw/day)	NEGATIVE GEOTAXIS		Total	p
	Proper reaction	Failed reaction		
1 (0)	9	1	10	
2 (102)	8	2	10	
3 (336.7)	9	1	10	
4 (1020)	9	1	10	
Total	35	5	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Incidence of findings - At termination of treatment

Females

GROUP (Dose mg TOS/kg bw/day)	PUPIL REFLEX	Total	p
	Proper reaction		
1 (0)	10	10	
2 (102)	9	9	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	39	39	

GROUP (Dose mg TOS/kg bw/day)	TOE PINCH REACTION		Total	p
	Proper reaction	Failed reaction		
1 (0)	9	1	10	
2 (102)	8	1	9	
3 (336.7)	9	1	10	
4 (1020)	10	0	10	
Total	36	3	39	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Incidence of findings - At termination of treatment

Females

GROUP (Dose mg TOS/kg bw/day)	GRASP RESPONSE		Total	p
	Proper reaction	Failed reaction		
1 (0)	9	1	10	
2 (102)	9	0	9	
3 (336.7)	9	1	10	
4 (1020)	9	1	10	
Total	36	3	39	

GROUP (Dose mg TOS/kg bw/day)	GRIP STRENGTH		Total	p
	Proper reaction	Failed reaction		
1 (0)	4	6	10	
2 (102)	8	1	9	
3 (336.7)	8	2	10	
4 (1020)	9	1	10	
Total	29	10	39	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Incidence of findings - At termination of treatment

Females

GROUP (Dose mg TOS/kg bw/day)	EYELID REFLEX	Total	p
	Proper reaction		
1 (0)	10	10	
2 (102)	9	9	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	39	39	

GROUP (Dose mg TOS/kg bw/day)	STARTLE RESPONSE		Total	p
	Proper reaction	Failed reaction		
1 (0)	10	0	10	
2 (102)	8	1	9	
3 (336.7)	10	0	10	
4 (1020)	10	0	10	
Total	38	1	39	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Incidence of findings - At termination of treatment

Females

GROUP (Dose mg TOS/kg bw/day)	HEAD SHAKE RESPONSE	Total	p
	Proper reaction		
1 (0)	10	10	
2 (102)	9	9	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	39	39	

GROUP (Dose mg TOS/kg bw/day)	RIGHTING REFLEX, TABLE	Total	p
	Proper reaction		
1 (0)	10	10	
2 (102)	9	9	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	39	39	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

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A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Incidence of findings - At termination of treatment

Females

GROUP (Dose mg TOS/kg bw/day)	RIGHTING REFLEX, HAND		Total	p
	Proper reaction	Failed reaction		
1 (0)	10	0	10	
2 (102)	9	0	9	
3 (336.7)	9	1	10	
4 (1020)	10	0	10	
Total	38	1	39	

GROUP (Dose mg TOS/kg bw/day)	PLACING REFLEX		Total	p
	Proper reaction	Failed reaction		
1 (0)	9	1	10	
2 (102)	8	1	9	
3 (336.7)	10	0	10	
4 (1020)	10	0	10	
Total	37	2	39	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

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A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Incidence of findings - At termination of treatment

Females

GROUP (Dose mg TOS/kg bw/day)	NEGATIVE GEOTAXIS		Total	p
	Proper reaction	Failed reaction		
1 (0)	9	1	10	
2 (102)	8	1	9	
3 (336.7)	9	1	10	
4 (1020)	10	0	10	
Total	36	3	39	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Table 11 Body weight – Group mean values

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Body weight and body weight gain (g)

Group mean values - From arrival to Day 91

Males

GROUP (Dose mg TOS /kg bw/day)	DAY OF ARRIVAL			p	DAY -7			p	DAY -1			p
	Mean	S.D	N		Mean	S.D	N		Mean	S.D	N	
1 (0)	115.8	6.0	10		177.5	6.5	10		231.2	9.5	10	
2 (102)	116.8	3.9	10		178.4	5.8	10		231.8	7.8	10	
3 (336.7)	118.4	5.6	10		178.6	7.8	10		230.6	10.1	10	
4 (1020)	119.9	5.2	10		183.5	5.1	10		231.4	18.9	10	

GROUP (Dose mg TOS /kg bw/day)	DAY 1			p	DAY 8			p	DAY 15			p
	Mean	S.D	N		Mean	S.D	N		Mean	S.D	N	
1 (0)	239.2	10.6	10		293.1	14.1	10		330.3	19.5	10	
2 (102)	241.1	9.0	10		296.6	14.7	10		341.1	20.5	10	
3 (336.7)	239.1	9.6	10		290.6	10.4	10		330.1	8.7	10	
4 (1020)	236.6	26.4	10		303.1	9.7	10		350.1	13.9	10	*

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Body weight and body weight gain (g)

Group mean values - From arrival to Day 91

Males

GROUP (Dose mg TOS /kg bw/day)	DAY 22			p	DAY 29			p	DAY 36			p
	Mean	S.D	N		Mean	S.D	N		Mean	S.D	N	
1 (0)	360.2	24.5	10		389.7	30.0	10		409.6	32.2	10	
2 (102)	369.6	24.4	10		400.7	27.5	10		421.5	32.3	10	
3 (336.7)	357.5	10.8	10		384.3	13.2	10		403.5	14.0	10	
4 (1020)	381.8	16.5	10		411.2	20.6	10		436.8	21.0	10	

GROUP (Dose mg TOS /kg bw/day)	DAY 43			p	DAY 50			p	DAY 57			p
	Mean	S.D	N		Mean	S.D	N		Mean	S.D	N	
1 (0)	422.9	32.2	10		438.7	35.4	10		438.6	35.6	10	
2 (102)	437.5	32.3	10		453.5	35.1	10		454.7	37.6	10	
3 (336.7)	420.0	15.8	10		430.8	16.2	10		427.4	16.9	10	
4 (1020)	451.2	22.4	10		466.7	27.5	10		463.7	30.0	10	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Body weight and body weight gain (g)

Group mean values - From arrival to Day 91

Males

GROUP (Dose mg TOS /kg bw/day)	DAY 64			p	DAY 71			p	DAY 78			p
	Mean	S.D	N		Mean	S.D	N		Mean	S.D	N	
1 (0)	448.5	33.8	10		459.7	34.0	10		470.9	38.8	10	
2 (102)	465.4	31.0	10		476.1	34.6	10		488.9	34.9	10	
3 (336.7)	435.7	19.7	10		451.0	21.7	10		459.1	21.7	10	
4 (1020)	476.6	30.4	10		484.6	31.3	10		494.8	32.8	10	

GROUP (Dose mg TOS /kg bw/day)	DAY 85			p	DAY 91			p	BODY WT GAIN 1 TO 91			p
	Mean	S.D	N		Mean	S.D	N		Mean	S.D	N	
1 (0)	481.6	41.3	10		476.7	41.4	10		237.5	35.5	10	
2 (102)	499.0	37.5	10		498.1	38.7	10		257.0	33.0	10	
3 (336.7)	471.2	23.1	10		470.0	25.1	10		230.9	25.4	10	
4 (1020)	507.3	37.1	10		507.8	33.3	10		271.2	36.6	10	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Body weight and body weight gain (g)

Group mean values - From arrival to Day 91

Females

GROUP (Dose mg TOS /kg bw/day)	DAY OF ARRIVAL			p	DAY -7			p	DAY -1			p
	Mean	S.D	N		Mean	S.D	N		Mean	S.D	N	
1 (0)	117.3	6.0	10		154.0	4.1	10		179.7	4.8	10	
2 (102)	116.3	6.1	10		154.9	8.3	10		179.5	9.6	10	
3 (336.7)	114.1	6.5	10		153.0	6.9	10		179.6	10.0	10	
4 (1020)	119.8	3.9	10		154.7	5.6	10		179.6	6.5	10	

GROUP (Dose mg TOS /kg bw/day)	DAY 1			p	DAY 8			p	DAY 15			p
	Mean	S.D	N		Mean	S.D	N		Mean	S.D	N	
1 (0)	183.9	5.5	10		207.8	10.4	10		221.4	10.6	10	
2 (102)	181.9	10.4	10		203.3	11.9	10		227.1	13.9	10	
3 (336.7)	184.1	9.1	10		205.5	14.5	10		223.2	16.8	10	
4 (1020)	178.7	5.8	10		202.6	7.2	10		220.4	9.8	10	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Body weight and body weight gain (g)

Group mean values - From arrival to Day 91

Females

GROUP (Dose mg TOS /kg bw/day)	DAY 22			p	DAY 29			p	DAY 36			p
	Mean	S.D	N		Mean	S.D	N		Mean	S.D	N	
1 (0)	239.2	8.1	10		250.9	9.7	10		260.2	12.3	10	
2 (102)	239.3	14.0	10		250.9	14.6	10		259.8	15.5	10	
3 (336.7)	235.8	14.6	10		252.7	15.0	10		255.3	16.1	10	
4 (1020)	236.3	8.2	10		248.4	8.9	10		251.4	11.9	10	

GROUP (Dose mg TOS /kg bw/day)	DAY 43			p	DAY 50			p	DAY 57			p
	Mean	S.D	N		Mean	S.D	N		Mean	S.D	N	
1 (0)	261.3	14.1	10		268.8	12.0	10		268.1	13.3	10	
2 (102)	264.2	15.7	10		268.2	14.5	9		266.0	15.3	9	
3 (336.7)	260.8	17.1	10		270.7	18.3	10		264.8	17.2	10	
4 (1020)	255.1	11.7	10		263.2	9.4	10		259.6	11.5	10	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Body weight and body weight gain (g)

Group mean values - From arrival to Day 91

Females

GROUP (Dose mg TOS /kg bw/day)	DAY 64			p	DAY 71			p	DAY 78			p
	Mean	S.D	N		Mean	S.D	N		Mean	S.D	N	
1 (0)	271.7	10.9	10		276.9	12.5	10		279.4	11.2	10	
2 (102)	273.4	18.2	9		276.3	15.7	9		282.3	17.9	9	
3 (336.7)	271.0	18.9	10		275.4	18.0	10		281.0	20.0	10	
4 (1020)	264.7	12.3	10		267.1	13.1	10		272.6	13.1	10	

GROUP (Dose mg TOS /kg bw/day)	DAY 85			p	DAY 91			p	BODY WT GAIN 1 TO 91			p
	Mean	S.D	N		Mean	S.D	N		Mean	S.D	N	
1 (0)	284.3	12.4	10		286.0	12.1	10		102.1	11.4	10	
2 (102)	283.8	19.2	9		286.2	16.5	9		104.3	16.9	9	
3 (336.7)	286.1	17.4	10		287.0	20.9	10		102.9	19.7	10	
4 (1020)	278.9	17.1	10		279.1	12.8	10		100.4	15.2	10	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Table 12 Food consumption – Group mean values

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A 90-Day Gavage Toxicity Study in Rats

Food consumption (g)

Group mean values (g) - Week 1 to Week 13

Males

GROUP (Dose mg TOS/kg bw/day)	WEEK 1			p	WEEK 2			p	WEEK 3			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	174.1	8.8	5		175.4	8.8	5		176.0	6.9	5	
2 (102)	176.4	5.7	5		178.3	9.6	5		175.0	10.3	5	
3 (336.7)	173.4	3.8	5		172.7	5.8	5		176.6	7.7	5	
4 (1020)	183.8	4.3	5		184.8	7.7	5		186.5	9.4	5	

GROUP (Dose mg TOS/kg bw/day)	WEEK 4			p	WEEK 5			p	WEEK 6			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	175.9	6.7	5		174.6	8.5	5		171.5	5.7	5	
2 (102)	173.7	7.6	5		178.0	9.4	5		174.6	9.4	5	
3 (336.7)	170.6	2.8	5		171.8	4.9	5		170.6	1.9	5	
4 (1020)	181.6	9.4	5		182.6	7.6	5		180.5	7.7	5	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of cages

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Food consumption (g)

Group mean values (g) - Week 1 to Week 13

Males

GROUP (Dose mg TOS/kg bw/day)	WEEK 7			p	WEEK 8			p	WEEK 9			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	166.8	8.5	5		174.7	8.0	5		185.7	8.2	5	
2 (102)	168.6	9.5	5		176.0	9.3	5		188.3	5.1	5	
3 (336.7)	161.4	6.0	5		162.6	5.2	5		176.8	6.9	5	
4 (1020)	175.7	9.9	5		173.5	11.3	5		189.8	7.9	5	

GROUP (Dose mg TOS/kg bw/day)	WEEK 10			p	WEEK 11			p	WEEK 12			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	184.9	8.2	5		185.6	12.3	5		184.6	11.3	5	
2 (102)	185.3	5.8	5		186.8	9.0	5		186.9	11.0	5	
3 (336.7)	182.2	5.3	5		179.0	6.3	5		180.6	7.5	5	
4 (1020)	184.0	9.4	5		190.3	9.9	5		190.7	11.3	5	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of cages

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Food consumption (g)

Group mean values (g) - Week 1 to Week 13

Males

GROUP (Dose mg TOS/kg bw/day)	WEEK 13			p	TOTAL, WEEK 1 TO WEEK 13			p
	Mean	S.D.	N		Mean	S.D.	N	
1 (0)	138.5	6.2	5		2268.3	100.6	5	
2 (102)	138.7	7.7	5		2286.6	94.2	5	
3 (336.7)	132.2	5.0	5		2210.5	50.1	5	
4 (1020)	141.5	9.3	5		2345.3	88.3	5	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of cages

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A 90-Day Gavage Toxicity Study in Rats

Food consumption (g)

Group mean values (g) - Week 1 to Week 13

Females

GROUP (Dose mg TOS/kg bw/day)	WEEK 1			p	WEEK 2			p	WEEK 3			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	121.1	5.5	5		117.1	5.7	5		121.8	5.8	5	
2 (102)	120.0	4.6	5		123.8	6.2	5		122.5	11.4	5	
3 (336.7)	117.1	8.5	5		130.3	31.2	5		118.8	7.3	5	
4 (1020)	115.3	6.8	5		120.5	9.7	5		121.6	5.2	5	

GROUP (Dose mg TOS/kg bw/day)	WEEK 4			p	WEEK 5			p	WEEK 6			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	119.9	5.8	5		121.9	6.5	5		115.8	6.9	5	
2 (102)	123.0	12.5	5		119.0	5.4	5		116.2	4.5	5	
3 (336.7)	122.5	13.4	5		117.1	3.6	5		116.4	4.8	5	
4 (1020)	116.0	5.7	5		115.6	5.4	5		116.8	5.5	5	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of cages

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Food consumption (g)

Group mean values (g) - Week 1 to Week 13

Females

GROUP (Dose mg TOS/kg bw/day)	WEEK 7			p	WEEK 8			p	WEEK 9			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	114.5	8.8	5		122.5	11.3	5		129.6	8.6	5	
2 (102)	109.4	4.3	4		119.4	11.2	5		127.8	13.1	5	
3 (336.7)	115.3	7.0	5		109.9	6.7	5		126.1	10.7	5	
4 (1020)	110.9	5.5	5		110.9	4.0	5		123.4	5.8	5	

GROUP (Dose mg TOS/kg bw/day)	WEEK 10			p	WEEK 11			p	WEEK 12			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	123.2	5.6	5		126.8	9.1	5		114.7	20.4	5	
2 (102)	126.0	10.0	5		130.5	12.2	5		122.9	13.1	5	
3 (336.7)	125.0	5.0	5		131.1	8.9	5		124.0	8.8	5	
4 (1020)	119.8	5.3	5		122.9	4.7	5		123.0	8.8	5	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of cages

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Food consumption (g)

Group mean values (g) - Week 1 to Week 13

Females

GROUP (Dose mg TOS/kg bw/day)	WEEK 13			p	TOTAL, WEEK 1 TO WEEK 13			p
	Mean	S.D.	N		Mean	S.D.	N	
1 (0)	96.6	7.9	5		1545.5	46.1	5	
2 (102)	93.5	7.0	5		1525.3	76.3	4	
3 (336.7)	92.9	6.8	5		1546.5	71.2	5	
4 (1020)	89.9	5.8	5		1506.6	57.0	5	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of cages

Table 13 Water consumption – Group mean values

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A 90-Day Gavage Toxicity Study in Rats

Water consumption (g)

Group mean values (g) - Day 1 to Day 91

Males

GROUP (Dose mg TOS/kg bw/day)	DAY 1-4			p	DAY 4-8			p	DAY 8-11			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	89.2	7.4	5		134.0	10.6	4		94.8	6.2	5	
2 (102)	90.9	5.1	5		133.0	6.4	5		101.8	11.1	5	
3 (336.7)	93.3	5.4	5		135.2	2.8	5		101.6	3.8	4	
4 (1020)	96.1	5.9	4		126.8	28.8	5		102.2	2.2	4	

GROUP (Dose mg TOS/kg bw/day)	DAY 11-15			p	DAY 15-18			p	DAY 18-22			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	136.3	7.0	5		97.6	9.9	5		129.1	6.9	5	
2 (102)	135.1	8.0	5		96.7	5.4	5		133.0	7.6	5	
3 (336.7)	138.5	4.8	5		98.1	4.3	5		133.0	3.8	5	
4 (1020)	140.6	5.3	4		103.5	2.6	5		154.6	12.5	4	**

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of cages

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Water consumption (g)

Group mean values (g) - Day 1 to Day 91

Males

GROUP (Dose mg TOS/kg bw/day)	DAY 22-25			p	DAY 25-29			p	DAY 29-32			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	94.0	5.1	5		136.1	9.7	5		104.0	7.6	5	
2 (102)	97.9	6.4	5		144.4	7.8	5		108.5	9.1	5	
3 (336.7)	94.3	3.7	5		137.8	3.5	5		106.4	6.6	5	
4 (1020)	107.6	4.3	4	**	156.0	15.6	5	*	116.6	10.9	5	

GROUP (Dose mg TOS/kg bw/day)	DAY 32-36			p	DAY 36-39			p	DAY 39-43			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	133.6	10.4	5		93.9	7.1	5		125.9	7.5	5	
2 (102)	137.8	10.2	5		100.6	8.7	5		139.1	11.1	5	
3 (336.7)	131.6	7.5	5		97.3	4.0	5		130.9	4.8	5	
4 (1020)	153.0	5.9	4	*	117.4	27.0	5		147.2	9.5	5	**

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of cages

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Water consumption (g)

Group mean values (g) - Day 1 to Day 91

Males

GROUP (Dose mg TOS/kg bw/day)	DAY 43-46			p	DAY 46-50			p	DAY 50-53			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	78.8	6.5	5		116.4	4.7	4		105.9	7.0	5	
2 (102)	81.7	8.9	5		136.0	12.9	5	*	114.2	14.0	5	
3 (336.7)	78.8	5.0	5		124.6	5.2	5		104.7	6.5	5	
4 (1020)	92.9	8.5	5	*	141.1	14.4	5	**	115.9	9.8	5	

GROUP (Dose mg TOS/kg bw/day)	DAY 53-57			p	DAY 57-60			p	DAY 60-64			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	112.3	2.7	4		103.6	17.4	5		134.1	13.2	5	
2 (102)	122.5	11.0	5		113.8	13.4	5		147.0	6.9	5	
3 (336.7)	106.5	11.5	5		106.6	6.7	5		139.0	5.4	5	
4 (1020)	116.9	11.3	5		117.2	10.3	5		146.6	6.7	5	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of cages

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Water consumption (g)

Group mean values (g) - Day 1 to Day 91

Males

GROUP (Dose mg TOS/kg bw/day)	DAY 64-67			p	DAY 67-71			p	DAY 71-74			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	111.1	14.5	5		143.2	17.5	5		102.6	13.0	5	
2 (102)	123.8	10.0	5		182.2	63.0	5		116.8	9.5	5	
3 (336.7)	115.3	8.3	5		151.7	15.5	5		120.9	12.3	5	*
4 (1020)	117.4	15.8	5		158.9	5.6	5		126.3	8.2	5	**

GROUP (Dose mg TOS/kg bw/day)	DAY 74-78			p	DAY 78-81			p	DAY 81-85			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	130.1	19.8	5		112.9	19.3	5		142.3	14.9	5	
2 (102)	135.0	14.4	5		129.7	13.5	5		151.4	17.3	5	
3 (336.7)	138.4	13.8	5		126.6	18.7	5		147.4	12.4	5	
4 (1020)	140.4	12.9	5		133.6	15.5	5		151.0	16.4	5	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of cages

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Water consumption (g)

Group mean values (g) - Day 1 to Day 91

Males

GROUP (Dose mg TOS/kg bw/day)	DAY 85-88			p	DAY 88-91			p	TOTAL, DAY 1 TO DAY 91			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	82.6	9.4	5		120.7	14.6	5		2897.0	278.1	3	
2 (102)	86.1	12.3	5		126.7	11.8	5		3185.7	218.4	5	
3 (336.7)	83.1	4.9	5		119.4	7.6	5		3079.6	97.5	4	
4 (1020)	95.8	6.2	5		123.4	8.2	5		3385.5		1	

GROUP (Dose mg TOS/kg bw/day)	TOTAL DAY 1 TO DAY 91#			
	Mean	S.D.	N	p
1 (0)	1804.7	169.1	5	
4 (1020)	2036.7	119.8	5	*

#Only includes water consumption on Days 15-18, 25-32, 36-46, 50-53, 57-91

Statistical group test not valid for groups with N<3

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of cages

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Water consumption (g)

Group mean values (g) - Day 1 to Day 91

Females

GROUP (Dose mg TOS/kg bw/day)	DAY 1-4			p	DAY 4-8			p	DAY 8-11			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	76.8	7.5	5		107.6	8.8	5		98.3	51.8	4	
2 (102)	70.1	2.6	5		99.9	5.4	5		73.5	6.9	5	
3 (336.7)	66.2	5.1	5	*	97.5	10.4	5		70.5	9.7	5	
4 (1020)	72.1	2.9	5		94.6	4.0	5		69.0	5.8	5	

GROUP (Dose mg TOS/kg bw/day)	DAY 11-15			p	DAY 15-18			p	DAY 18-22			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	102.6	9.1	5		76.8	6.0	5		104.7	8.9	5	
2 (102)	103.9	4.3	5		84.9	26.6	5		99.1	10.6	5	
3 (336.7)	95.2	10.9	5		68.1	5.5	5		94.9	2.2	5	
4 (1020)	96.8	7.2	4		71.7	3.5	5		103.2	18.7	5	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of cages

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Water consumption (g)

Group mean values (g) - Day 1 to Day 91

Females

GROUP (Dose mg TOS/kg bw/day)	DAY 22-25			p	DAY 25-29			p	DAY 29-32			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	74.3	10.2	5		115.3	8.0	5		90.3	9.8	5	
2 (102)	72.4	6.4	5		108.8	10.0	5		80.2	6.2	5	
3 (336.7)	71.7	9.3	5		102.1	7.1	5		88.1	18.4	5	
4 (1020)	69.5	3.1	5		106.6	6.6	4		73.8	2.4	5	

GROUP (Dose mg TOS/kg bw/day)	DAY 32-36			p	DAY 36-39			p	DAY 39-43			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	116.1	14.8	5		78.5	10.5	5		107.4	10.4	5	
2 (102)	106.6	10.2	5		72.7	9.4	5		103.3	10.2	5	
3 (336.7)	96.2	6.8	5	*	70.4	5.7	5		95.1	7.6	5	
4 (1020)	101.9	6.4	5		71.4	2.7	5		98.8	5.7	5	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of cages

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Water consumption (g)

Group mean values (g) - Day 1 to Day 91

Females

GROUP (Dose mg TOS/kg bw/day)	DAY 43-46			p	DAY 46-50			p	DAY 50-53			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	61.7	3.7	5		102.5	10.3	5		87.9	9.8	5	
2 (102)	67.0	24.7	5		100.4	13.3	4		91.1	15.4	5	
3 (336.7)	56.9	6.8	5		96.5	14.2	5		73.4	8.4	5	
4 (1020)	59.0	5.3	5		84.9	3.2	5		70.5	4.1	4	

GROUP (Dose mg TOS/kg bw/day)	DAY 53-57			p	DAY 57-60			p	DAY 60-64			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	85.7	8.4	5		88.2	6.7	5		106.2	11.2	5	
2 (102)	97.6	16.7	5		83.0	12.5	5		105.4	12.1	5	
3 (336.7)	77.7	5.5	5		79.1	6.9	5		101.1	6.3	5	
4 (1020)	73.2	4.3	5		75.8	7.7	5		102.2	24.0	5	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of cages

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Water consumption (g)

Group mean values (g) - Day 1 to Day 91

Females

GROUP (Dose mg TOS/kg bw/day)	DAY 64-67			p	DAY 67-71			p	DAY 71-74			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	80.7	7.5	5		113.6	9.9	5		89.5	7.7	5	
2 (102)	85.9	5.7	5		114.0	15.0	5		89.6	7.3	5	
3 (336.7)	87.5	13.8	5		109.5	13.7	5		68.5	35.1	5	
4 (1020)	78.1	4.7	5		102.1	7.2	5		81.8	6.1	5	

GROUP (Dose mg TOS/kg bw/day)	DAY 74-78			p	DAY 78-81			p	DAY 81-85			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	107.4	9.8	5		97.3	11.2	5		116.4	15.3	5	
2 (102)	108.9	19.1	5		91.4	15.6	5		114.2	9.4	5	
3 (336.7)	108.0	17.6	5		88.6	11.5	5		108.5	14.7	5	
4 (1020)	97.8	5.7	5		82.9	6.0	5		105.3	9.9	4	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of cages

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Water consumption (g)

Group mean values (g) - Day 1 to Day 91

Females

GROUP (Dose mg TOS/kg bw/day)	DAY 85-88			p	DAY 88-91			p	TOTAL, DAY 1 TO DAY 91			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	74.1	7.2	5		100.2	11.7	5		2464.6	237.6	4	
2 (102)	68.3	8.8	5		95.3	13.6	5		2373.8	215.7	4	
3 (336.7)	65.0	7.9	5		87.4	11.0	5		2223.7	166.4	5	
4 (1020)	63.0	4.2	5		87.1	3.4	5		2201.7	34.6	3	

GROUP (Dose mg TOS/kg bw/day)	TOTAL DAY 1 TO DAY 91#			
	Mean	S.D.	N	p
1 (0)	2056.0	154.1	5	
4 (1020)	1844.8	34.8	5	*

#Only includes water consumption on days 1-8, 15-25, 29-49, 54-81, 85-91

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of cages

Table 14 Haematology – Group mean values

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Haematology

Group mean values

Males

GROUP (Dose mg TOS/kg bw/day)	Hb			p	RBC			p	% RETIC			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	9.51	0.21	10		8.46	0.24	10		2.10	0.24	10	
2 (102)	9.87	0.40	10		8.88	0.32	10	**	2.12	0.27	10	
3 (336.7)	9.55	0.21	9		8.50	0.29	9		2.05	0.18	9	
4 (1020)	9.44	0.45	10		8.60	0.19	10		2.28	0.44	10	

GROUP (Dose mg TOS/kg bw/day)	RETIC			p	HT			p	MCV			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	0.177	0.018	10		42.5	1.2	10		50.1	1.0	10	
2 (102)	0.188	0.019	10		44.1	1.9	10		49.7	2.5	10	
3 (336.7)	0.174	0.018	9		42.9	1.2	9		50.3	0.9	9	
4 (1020)	0.195	0.036	10		42.3	1.8	10		49.3	1.8	10	

Abbreviations and units are explained in [Table 4](#)

* means p<0.05, versus control group

** means p<0.01, versus control group

S.D. = standard deviation N = number of animals

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Haematology

Group mean values

Males

GROUP (Dose mg TOS/kg bw/day)	MCH			p	MCHC			p	WBC			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	1.12	0.04	10		22.5	0.4	10		11.70	3.45	10	
2 (102)	1.11	0.06	10		22.4	0.2	10		11.69	1.76	10	
3 (336.7)	1.13	0.05	9		22.2	0.3	9		11.76	1.85	9	
4 (1020)	1.10	0.05	10		22.3	0.3	10		11.34	2.83	10	

GROUP (Dose mg TOS/kg bw/day)	% NEUTRO			p	NEUTRO			p	% LYMPHO			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	10.0	1.6	10		1.17	0.37	10		87.1	2.1	10	
2 (102)	11.3	2.5	10		1.33	0.37	10		85.3	2.6	10	
3 (336.7)	10.4	1.6	9		1.20	0.32	9		86.3	1.7	9	
4 (1020)	10.1	3.2	10		1.15	0.50	10		86.9	3.3	10	

Abbreviations and units are explained in [Table 4](#)

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Haematology

Group mean values

Males

GROUP (Dose mg TOS/kg bw/day)	LYMPHO			p	% EOS			p	EOS			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	10.17	2.99	10		0.9	0.3	10		0.12	0.06	10	
2 (102)	9.96	1.48	10		0.8	0.4	10		0.11	0.03	10	
3 (336.7)	10.12	1.59	9		1.1	0.3	9		0.11	0.03	9	
4 (1020)	9.88	2.55	10		1.1	0.3	10		0.12	0.04	10	

GROUP (Dose mg TOS/kg bw/day)	% BASO			p	BASO			p	% MONO			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	0.1	0.3	10		0.03	0.05	10		2.0	1.3	10	
2 (102)	0.0	0.0	10		0.00	0.00	10		2.6	0.5	10	
3 (336.7)	0.0	0.0	9		0.00	0.00	9		2.1	0.9	9	
4 (1020)	0.0	0.0	10		0.01	0.03	10		1.7	0.9	10	

Abbreviations and units are explained in [Table 4](#)

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Haematology

Group mean values

Males

GROUP (Dose mg TOS/kg bw/day)	MONO			p	Plt			p	APTT			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	0.25	0.17	10		731	85	10		15.2	2.0	10	
2 (102)	0.30	0.08	10		724	62	10		14.7	1.3	10	
3 (336.7)	0.27	0.13	9		719	22	9		13.9	1.5	10	
4 (1020)	0.19	0.12	10		741	61	10		14.3	1.0	10	

GROUP (Dose mg TOS/kg bw/day)	Pt			p	Fib			p
	Mean	S.D.	N		Mean	S.D.	N	
1 (0)	15.5	0.6	10		2.91	0.43	10	
2 (102)	15.8	0.6	10		2.97	0.52	10	
3 (336.7)	16.1	0.7	10		2.84	0.26	10	
4 (1020)	15.9	0.6	10		3.01	0.40	10	

Abbreviations and units are explained in [Table 4](#)

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Haematology

Group mean values

Females

GROUP (Dose mg TOS/kg bw/day)	Hb			p	RBC			p	% RETIC			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	8.87	0.97	9		7.88	0.33	9		2.49	0.58	9	
2 (102)	9.13	0.56	7		7.93	0.52	7		2.28	0.31	7	
3 (336.7)	9.07	0.30	9		7.70	0.41	9		2.43	0.24	9	
4 (1020)	9.09	0.29	9		7.83	0.29	9		2.47	0.36	9	

GROUP (Dose mg TOS/kg bw/day)	RETIC			p	HT			p	MCV			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	0.197	0.048	9		41.6	1.7	9		52.8	1.5	9	
2 (102)	0.180	0.021	7		41.1	2.3	7		51.7	1.1	7	
3 (336.7)	0.187	0.013	9		40.3	1.5	9		52.4	0.9	9	
4 (1020)	0.194	0.033	9		40.9	1.4	9		52.1	0.9	9	

Abbreviations and units are explained in [Table 4](#)

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Haematology

Group mean values

Females

GROUP (Dose mg TOS/kg bw/day)	MCH			p	MCHC			p	WBC			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	1.14	0.13	9		21.4	2.4	9		11.09	4.07	9	
2 (102)	1.16	0.05	7		22.3	0.2	7		9.57	2.01	7	
3 (336.7)	1.19	0.06	9		22.6	0.5	9		11.21	3.28	9	
4 (1020)	1.19	0.03	9		22.3	0.2	9		9.84	1.90	9	

GROUP (Dose mg TOS/kg bw/day)	% NEUTRO			p	NEUTRO			p	% LYMPHO			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	10.1	3.0	9		1.22	0.79	9		86.1	4.4	9	
2 (102)	8.4	1.6	7		0.80	0.21	7		88.7	2.0	7	
3 (336.7)	10.3	1.9	9		1.13	0.31	9		86.3	2.9	9	
4 (1020)	9.6	1.9	9		0.96	0.31	9		87.3	2.7	9	

Abbreviations and units are explained in [Table 4](#)

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Haematology

Group mean values

Females

GROUP (Dose mg TOS/kg bw/day)	LYMPHO			p	% EOS			p	EOS			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	9.44	2.95	9		1.7	0.9	9		0.21	0.20	9	
2 (102)	8.49	1.74	7		1.1	0.4	7		0.13	0.05	7	
3 (336.7)	9.69	3.01	9		1.2	0.4	9		0.11	0.03	9	
4 (1020)	8.56	1.65	9		1.1	0.3	9		0.10	0.05	9	

GROUP (Dose mg TOS/kg bw/day)	% BASO			p	BASO			p	% MONO			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	0.2	0.4	9		0.03	0.05	9		1.8	1.1	9	
2 (102)	0.1	0.4	7		0.01	0.04	7		1.4	0.8	7	
3 (336.7)	0.4	0.5	9		0.06	0.05	9		2.0	1.1	9	
4 (1020)	0.1	0.3	9		0.01	0.03	9		2.0	0.7	9	

Abbreviations and units are explained in [Table 4](#)

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Haematology

Group mean values

Females

GROUP (Dose mg TOS/kg bw/day)	MONO			p	Plt			p	APTT			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	0.21	0.15	9		744	104	9		11.7	1.7	9	
2 (102)	0.16	0.08	7		719	96	7		10.8	0.6	9	
3 (336.7)	0.24	0.09	9		720	52	9		11.2	0.9	10	
4 (1020)	0.18	0.10	9		704	80	9		10.6	0.2	10	

GROUP (Dose mg TOS/kg bw/day)	Pt			p	Fib			p
	Mean	S.D.	N		Mean	S.D.	N	
1 (0)	14.5	0.4	10		2.24	0.48	10	
2 (102)	14.3	0.5	9		2.27	0.28	9	
3 (336.7)	14.4	0.6	10		2.37	0.48	10	
4 (1020)	14.7	0.5	10		2.21	0.18	10	

Abbreviations and units are explained in [Table 4](#)

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Table 15 Clinical chemistry – Group mean values

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Clinical chemistry

Group mean values

Males

GROUP (Dose mg TOS /kg bw/day)	ALAT			p	ASAT			p	ALKPH			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	1.30	0.37	10		1.57	0.28	10		2.47	0.20	10	
2 (102)	1.51	0.54	10		1.64	0.50	10		2.39	0.42	10	
3 (336.7)	1.38	0.33	10		1.49	0.32	10		2.37	0.54	10	
4 (1020)	1.29	0.29	10		1.52	0.25	10		2.23	0.26	10	*

GROUP (Dose mg TOS /kg bw/day)	TBILI			p	GGT			p	CHOL			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	1.36	0.26	10		<0.03	>0.00	10		2.46	0.48	10	
2 (102)	1.24	0.46	10		<0.03	>0.01	10		2.41	0.31	10	
3 (336.7)	1.49	0.64	10		<0.03	>0.00	10		2.32	0.34	10	
4 (1020)	1.42	0.64	10		<0.04	>0.03	10		2.59	0.41	10	

Abbreviations and units are explained in [Table 5](#)

Limit of detection for GGT is 0.03 - this value is used in the calculation

* means p<0.05, versus control group

** means p<0.01, versus control group

S.D. = standard deviation N = number of animals

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Clinical chemistry

Group mean values

Males

GROUP (Dose mg TOS /kg bw/day)	TRIG			p	UREA			p	CREAT			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	1.76	0.49	10		8.72	1.13	10		24.7	1.4	10	
2 (102)	1.62	0.44	10		8.07	0.86	10		25.1	1.9	10	
3 (336.7)	1.53	0.27	10		7.89	1.10	10		23.9	1.7	10	
4 (1020)	1.65	0.44	10		8.44	1.33	10		24.6	2.0	10	

GROUP (Dose mg TOS /kg bw/day)	GLUC			p	Na			p	K			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	6.23	0.72	10		145.5	1.2	10		8.19	0.87	10	
2 (102)	6.50	0.53	10		145.5	1.4	10		8.20	0.78	10	
3 (336.7)	6.49	0.42	10		145.3	1.2	10		7.84	0.95	10	
4 (1020)	6.32	0.73	10		145.7	1.6	10		7.76	0.89	10	

Abbreviations and units are explained in [Table 5](#)

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Clinical chemistry

Group mean values

Males

GROUP (Dose mg TOS /kg bw/day)	Ca			p	Mg			p	P			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	2.81	0.13	10		1.04	0.11	10		2.56	0.23	10	
2 (102)	2.86	0.06	10		1.06	0.06	10		2.64	0.24	10	
3 (336.7)	2.86	0.07	10		1.03	0.11	10		2.50	0.24	10	
4 (1020)	2.88	0.08	10		0.98	0.09	10		2.43	0.29	10	

GROUP (Dose mg TOS /kg bw/day)	Cl			p	PROTEIN			p	ALB			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	97.0	1.2	10		66.0	2.4	10		42.6	2.3	10	
2 (102)	95.9	0.9	10		66.2	1.6	10		42.1	1.3	10	
3 (336.7)	96.2	1.0	10		65.4	2.8	10		42.4	2.3	10	
4 (1020)	96.2	1.5	10		65.7	2.5	10		41.4	1.8	10	

Abbreviations and units are explained in [Table 5](#)

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** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Clinical chemistry

Group mean values

Males

GROUP (Dose mg TOS /kg bw/day)	GLOBULIN			p	ALB/G Ratio			p
	Mean	S.D.	N		Mean	S.D.	N	
1 (0)	23.4	2.1	10		1.83	0.22	10	
2 (102)	24.1	1.2	10		1.75	0.11	10	
3 (336.7)	23.0	1.1	10		1.84	0.11	10	
4 (1020)	24.3	1.6	10		1.71	0.13	10	

Abbreviations and units are explained in [Table 5](#)

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Clinical chemistry

Group mean values

Females

GROUP (Dose mg TOS /kg bw/day)	ALAT			p	ASAT			p	ALKPH			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	1.16	0.25	10		1.64	0.22	10		1.54	0.28	10	
2 (102)	1.05	0.18	9		1.44	0.24	9		1.75	0.43	9	
3 (336.7)	1.20	0.37	10		2.02	1.03	10		1.74	0.42	10	
4 (1020)	1.02	0.29	10		1.63	0.38	10		1.65	0.31	10	

GROUP (Dose mg TOS /kg bw/day)	TBILI			p	GGT			p	CHOL			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	1.07	0.19	10		<0.04	>0.02	10		2.51	0.38	10	
2 (102)	0.91	0.30	9		<0.03	>0.00	9		2.43	0.28	9	
3 (336.7)	1.20	0.39	10		<0.03	>0.00	10		2.81	0.37	10	
4 (1020)	0.96	0.20	10		<0.03	>0.00	10		2.61	0.55	10	

Abbreviations and units are explained in [Table 5](#)

Limit of detection for GGT is 0.03 - this value is used in the calculation

* means p<0.05, versus control group

** means p<0.01, versus control group

S.D. = standard deviation N = number of animals

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Clinical chemistry

Group mean values

Females

GROUP (Dose mg TOS /kg bw/day)	TRIG			p	UREA			p	CREAT			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	1.17	0.20	10		8.07	0.94	10		26.9	1.6	10	
2 (102)	1.16	0.29	9		8.58	1.05	9		27.6	2.5	9	
3 (336.7)	1.42	0.52	10		8.69	1.55	10		28.7	2.1	10	
4 (1020)	1.21	0.31	10		8.03	0.89	10		26.0	2.1	10	

GROUP (Dose mg TOS /kg bw/day)	GLUC			p	Na			p	K			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	6.32	0.60	10		143.0	1.3	10		7.16	0.85	10	
2 (102)	7.01	1.16	9		142.5	1.3	9		6.81	0.81	9	
3 (336.7)	6.76	0.75	10		143.1	1.5	10		6.60	0.66	10	
4 (1020)	6.70	0.61	10		143.6	1.9	10		6.76	0.51	10	

Abbreviations and units are explained in [Table 5](#)

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Clinical chemistry

Group mean values

Females

GROUP (Dose mg TOS /kg bw/day)	Ca			p	Mg			p	P			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	2.95	0.06	10		1.10	0.06	10		2.28	0.20	10	
2 (102)	2.93	0.10	9		1.12	0.10	9		2.25	0.27	9	
3 (336.7)	2.95	0.07	10		1.09	0.06	10		2.26	0.33	10	
4 (1020)	2.93	0.06	10		1.02	0.07	10		2.28	0.30	10	

GROUP (Dose mg TOS /kg bw/day)	Cl			p	PROTEIN			p	ALB			p
	Mean	S.D.	N		Mean	S.D.	N		Mean	S.D.	N	
1 (0)	98.3	1.3	10		67.5	2.0	10		45.7	1.4	10	
2 (102)	99.4	1.9	9		66.6	3.6	9		45.2	2.8	9	
3 (336.7)	98.3	1.3	10		67.2	4.1	10		45.9	3.2	10	
4 (1020)	98.1	1.1	10		66.9	2.3	10		45.9	1.7	10	

Abbreviations and units are explained in [Table 5](#)

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Clinical chemistry

Group mean values

Females

GROUP (Dose mg TOS /kg bw/day)	GLOBULIN			p	ALB/G Ratio			p
	Mean	S.D.	N		Mean	S.D.	N	
1 (0)	21.8	2.1	10		2.11	0.21	10	
2 (102)	21.4	1.6	9		2.12	0.18	9	
3 (336.7)	21.3	1.5	10		2.16	0.16	10	
4 (1020)	21.0	1.1	10		2.19	0.12	10	

Abbreviations and units are explained in [Table 5](#)

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Table 16 Urinalysis – Group mean values

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis

Group mean values

GROUP (Dose mg TOS/kg bw/day)		VOLUME			p
		MEAN	S.D.	N	
Males	1 (0)	9.4	1.3	10	
	2 (102)	9.4	1.6	10	
	3 (336.7)	10.4	2.8	10	
	4 (1020)	13.4	2.1	10	**
Females	1 (0)	6.6	2.5	10	
	2 (102)	6.7	2.4	9	
	3 (336.7)	4.8	1.4	10	
	4 (1020)	5.8	1.1	10	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis

Incidence of findings

Males

GROUP (Dose mg TOS/kg bw/day)	SPECIFIC GRAVITY					p
	1.010	1.015	1.020	1.025	Total	
1 (0)	1	5	3	1	10	
2 (102)	0	1	9	0	10	
3 (336.7)	0	4	5	1	10	
4 (1020)	0	1	2	7	10	**
Total	1	11	19	9	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis

Incidence of findings

Males

GROUP (Dose mg TOS/kg bw/day)	pH					p
	7.0	7.5	8.0	8.5	Total	
1 (0)	1	1	6	2	10	
2 (102)	1	6	2	1	10	
3 (336.7)	5	2	2	1	10	
4 (1020)	5	3	0	2	10	
Total	12	12	10	6	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis

Incidence of findings

Males

GROUP (Dose mg TOS/kg bw/day)	COLOUR				p
	Light yellow	Yellow	Dark yellow	Total	
1 (0)	0	8	2	10	
2 (102)	0	4	6	10	
3 (336.7)	2	7	1	10	
4 (1020)	5	5	0	10	*
Total	7	24	9	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis

Incidence of findings

Males

GROUP (Dose mg TOS/kg bw/day)	PROTEIN					p
	Trace	0.3 g/l	1.0 g/l	>3.0 g/l	Total	
1 (0)	0	4	4	2	10	
2 (102)	0	4	4	2	10	
3 (336.7)	2	4	4	0	10	
4 (1020)	2	3	5	0	10	
Total	4	15	17	4	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis

Incidence of findings

Males

GROUP (Dose mg TOS/kg bw/day)	LEUCOCYTES						p
	No trace	15 cells/ μ l	70 cells/ μ l	125 cells/ μ l	500 cells/ μ l	Total	
1 (0)	0	1	6	2	1	10	
2 (102)	0	3	3	2	2	10	
3 (336.7)	0	3	6	1	0	10	
4 (1020)	1	0	5	4	0	10	
Total	1	7	20	9	3	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis

Incidence of findings

Males

GROUP (Dose mg TOS/kg bw/day)	NITRITE			p
	No trace	Positive	Total	
1 (0)	10	0	10	
2 (102)	9	1	10	
3 (336.7)	9	1	10	
4 (1020)	6	4	10	
Total	34	6	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis

Incidence of findings

Males

GROUP (Dose mg TOS/kg bw/day)	BLOOD			p
	No trace	Trace- Intact	Total	
1 (0)	10	0	10	
2 (102)	10	0	10	
3 (336.7)	10	0	10	
4 (1020)	9	1	10	
Total	39	1	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis

Incidence of findings

Males

GROUP (Dose mg TOS/kg bw/day)	GLUCOSE		p
	No trace	Total	
1 (0)	10	10	
2 (102)	10	10	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	40	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis

Incidence of findings

Males

GROUP (Dose mg TOS/kg bw/day)	KETONES					p
	No trace	Trace	1.5 mmol/l	3.9 mmol/l	Total	
1 (0)	0	1	9	0	10	
2 (102)	0	1	8	1	10	
3 (336.7)	1	1	8	0	10	
4 (1020)	0	6	4	0	10	
Total	1	9	29	1	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis

Incidence of findings

Males

GROUP (Dose mg TOS/kg bw/day)	BILIRUBIN			p
	No trace	Small amounts	Total	
1 (0)	10	0	10	
2 (102)	7	3	10	
3 (336.7)	10	0	10	
4 (1020)	10	0	10	
Total	37	3	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis

Incidence of findings

Males

GROUP (Dose mg TOS/kg bw/day)	UROBILINOGEN			p
	3.2 μmol/l	16 μmol/l	Total	
1 (0)	10	0	10	
2 (102)	9	1	10	
3 (336.7)	10	0	10	
4 (1020)	10	0	10	
Total	39	1	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis

Incidence of findings

Females

GROUP (Dose mg TOS/kg bw/day)	SPECIFIC GRAVITY						p
	1.010	1.015	1.020	1.025	≥ 1.030	Total	
1 (0)	1	2	1	4	2	10	
2 (102)	0	1	4	2	2	9	
3 (336.7)	0	0	1	6	3	10	
4 (1020)	0	0	1	6	3	10	
Total	1	3	7	18	10	39	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis

Incidence of findings

Females

GROUP (Dose mg TOS/kg bw/day)	pH							p
	6.0	6.5	7.0	7.5	8.0	8.5	Total	
1 (0)	0	4	3	2	0	1	10	
2 (102)	0	3	4	1	1	0	9	
3 (336.7)	0	6	4	0	0	0	10	
4 (1020)	4	4	2	0	0	0	10	*
Total	4	17	13	3	1	1	39	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis

Incidence of findings

Females

GROUP (Dose mg TOS/kg bw/day)	COLOUR			p
	Light yellow	Yellow	Total	
1 (0)	1	9	10	
2 (102)	1	8	9	
3 (336.7)	0	10	10	
4 (1020)	1	9	10	
Total	3	36	39	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis

Incidence of findings

Females

GROUP (Dose mg TOS/kg bw/day)	PROTEIN						p
	No trace	Trace	0.3 g/l	1.0 g/l	>3.0 g/l	Total	
1 (0)	0	3	6	1	0	10	
2 (102)	3	1	3	1	1	9	
3 (336.7)	0	2	7	1	0	10	
4 (1020)	2	4	4	0	0	10	
Total	5	10	20	3	1	39	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis

Incidence of findings

Females

GROUP (Dose mg TOS/kg bw/day)	LEUCOCYTES					p
	No trace	15 cells/ μ l	70 cells/ μ l	125 cells/ μ l	Total	
1 (0)	6	4	0	0	10	
2 (102)	6	2	0	1	9	
3 (336.7)	5	3	2	0	10	
4 (1020)	8	2	0	0	10	
Total	25	11	2	1	39	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis

Incidence of findings

Females

GROUP (Dose mg TOS/kg bw/day)	NITRITE			p
	No trace	Positive	Total	
1 (0)	9	1	10	
2 (102)	8	1	9	
3 (336.7)	10	0	10	
4 (1020)	10	0	10	
Total	37	2	39	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis

Incidence of findings

Females

GROUP (Dose mg TOS/kg bw/day)	BLOOD		p
	No trace	Total	
1 (0)	10	10	
2 (102)	9	9	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	39	39	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis

Incidence of findings

Females

GROUP (Dose mg TOS/kg bw/day)	GLUCOSE		p
	No trace	Total	
1 (0)	10	10	
2 (102)	9	9	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	39	39	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis

Incidence of findings

Females

GROUP (Dose mg TOS/kg bw/day)	KETONES			p
	No trace	Trace	Total	
1 (0)	9	1	10	
2 (102)	5	4	9	
3 (336.7)	6	4	10	
4 (1020)	7	3	10	
Total	27	12	39	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis

Incidence of findings

Females

GROUP (Dose mg TOS/kg bw/day)	BILIRUBIN		p
	No trace	Total	
1 (0)	10	10	
2 (102)	9	9	
3 (336.7)	10	10	
4 (1020)	10	10	
Total	39	39	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis

Incidence of findings

Females

GROUP (Dose mg TOS/kg bw/day)	UROBILINOGEN			p
	3.2 μmol/l	16 μmol/l	Total	
1 (0)	8	2	10	
2 (102)	8	1	9	
3 (336.7)	9	1	10	
4 (1020)	10	0	10	
Total	35	4	39	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Table 17 Urinalysis – Microscopy – Incidence of findings

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis - Microscopy

Incidence of findings

Males

GROUP (Dose mg TOS /kg bw/day)	ERYTHROCYTES						p
	No trace	Traces	Slight	Moderate	Marked	Total	
1 (0)	1	8	1	0	0	10	
2 (102)	0	4	6	0	0	10	
3 (336.7)	0	6	4	0	0	10	
4 (1020)	2	6	2	0	0	10	
Total	3	24	13	0	0	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis - Microscopy

Incidence of findings

Males

GROUP (Dose mg TOS /kg bw/day)	LEUCOCYTES						p
	No trace	Traces	Slight	Moderate	Marked	Total	
1 (0)	3	6	1	0	0	10	
2 (102)	9	1	0	0	0	10	*
3 (336.7)	10	0	0	0	0	10	**
4 (1020)	9	1	0	0	0	10	*
Total	31	8	1	0	0	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis - Microscopy

Incidence of findings

Males

GROUP (Dose mg TOS /kg bw/day)	EPITHELIAL CELLS						p
	No trace	Traces	Slight	Moderate	Marked	Total	
1 (0)	4	6	0	0	0	10	
2 (102)	3	7	0	0	0	10	
3 (336.7)	6	4	0	0	0	10	
4 (1020)	6	4	0	0	0	10	
Total	19	21	0	0	0	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis - Microscopy

Incidence of findings

Males

GROUP (Dose mg TOS /kg bw/day)	CRYSTALS						p
	No trace	Traces	Slight	Moderate	Marked	Total	
1 (0)	0	0	0	3	7	10	
2 (102)	0	0	0	1	9	10	
3 (336.7)	0	0	1	5	4	10	
4 (1020)	0	0	1	5	4	10	
Total	0	0	2	14	24	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis - Microscopy

Incidence of findings

Males

GROUP (Dose mg TOS /kg bw/day)	URATES						p
	No trace	Traces	Slight	Moderate	Marked	Total	
1 (0)	1	0	8	1	0	10	
2 (102)	3	0	6	1	0	10	
3 (336.7)	2	0	8	0	0	10	
4 (1020)	2	1	4	3	0	10	
Total	8	1	26	5	0	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis - Microscopy

Incidence of findings

Males

GROUP (Dose mg TOS /kg bw/day)	HYALINE CASTS						p
	No trace	Traces	Slight	Moderate	Marked	Total	
1 (0)	10	0	0	0	0	10	
2 (102)	10	0	0	0	0	10	
3 (336.7)	10	0	0	0	0	10	
4 (1020)	10	0	0	0	0	10	
Total	40	0	0	0	0	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis - Microscopy

Incidence of findings

Males

GROUP (Dose mg TOS /kg bw/day)	GRANULAR CASTS						p
	No trace	Traces	Slight	Moderate	Marked	Total	
1 (0)	10	0	0	0	0	10	
2 (102)	10	0	0	0	0	10	
3 (336.7)	10	0	0	0	0	10	
4 (1020)	10	0	0	0	0	10	
Total	40	0	0	0	0	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis - Microscopy

Incidence of findings

Males

GROUP (Dose mg TOS /kg bw/day)	BACTERIA						p
	No trace	Traces	Slight	Moderate	Marked	Total	
1 (0)	0	0	0	6	4	10	
2 (102)	0	0	0	5	5	10	
3 (336.7)	0	0	0	4	6	10	
4 (1020)	0	0	0	3	7	10	
Total	0	0	0	18	22	40	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis - Microscopy

Incidence of findings

Females

GROUP (Dose mg TOS /kg bw/day)	ERYTHROCYTES						p
	No trace	Traces	Slight	Moderate	Marked	Total	
1 (0)	3	7	0	0	0	10	
2 (102)	1	8	0	0	0	9	
3 (336.7)	6	3	1	0	0	10	
4 (1020)	5	5	0	0	0	10	
Total	15	23	1	0	0	39	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis - Microscopy

Incidence of findings

Females

GROUP (Dose mg TOS /kg bw/day)	LEUCOCYTES						p
	No trace	Traces	Slight	Moderate	Marked	Total	
1 (0)	10	0	0	0	0	10	
2 (102)	6	2	1	0	0	9	
3 (336.7)	7	3	0	0	0	10	
4 (1020)	8	2	0	0	0	10	
Total	31	7	1	0	0	39	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis - Microscopy

Incidence of findings

Females

GROUP (Dose mg TOS /kg bw/day)	EPITHELIAL CELLS						p
	No trace	Traces	Slight	Moderate	Marked	Total	
1 (0)	4	6	0	0	0	10	
2 (102)	4	5	0	0	0	9	
3 (336.7)	4	6	0	0	0	10	
4 (1020)	5	4	1	0	0	10	
Total	17	21	1	0	0	39	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis - Microscopy

Incidence of findings

Females

GROUP (Dose mg TOS /kg bw/day)	CRYSTALS						p
	No trace	Traces	Slight	Moderate	Marked	Total	
1 (0)	0	0	0	9	1	10	
2 (102)	0	0	3	6	0	9	
3 (336.7)	0	0	1	5	4	10	
4 (1020)	0	1	2	7	0	10	
Total	0	1	6	27	5	39	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis - Microscopy

Incidence of findings

Females

GROUP (Dose mg TOS /kg bw/day)	URATES						p
	No trace	Traces	Slight	Moderate	Marked	Total	
1 (0)	5	2	3	0	0	10	
2 (102)	5	2	1	0	1	9	
3 (336.7)	6	3	1	0	0	10	
4 (1020)	3	1	3	1	2	10	
Total	19	8	8	1	3	39	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis - Microscopy

Incidence of findings

Females

GROUP (Dose mg TOS /kg bw/day)	HYALINE CASTS						p
	No trace	Traces	Slight	Moderate	Marked	Total	
1 (0)	10	0	0	0	0	10	
2 (102)	9	0	0	0	0	9	
3 (336.7)	10	0	0	0	0	10	
4 (1020)	10	0	0	0	0	10	
Total	39	0	0	0	0	39	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis - Microscopy

Incidence of findings

Females

GROUP (Dose mg TOS /kg bw/day)	GRANULAR CASTS						p
	No trace	Traces	Slight	Moderate	Marked	Total	
1 (0)	10	0	0	0	0	10	
2 (102)	9	0	0	0	0	9	
3 (336.7)	10	0	0	0	0	10	
4 (1020)	10	0	0	0	0	10	
Total	39	0	0	0	0	39	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis - Microscopy

Incidence of findings

Females

GROUP (Dose mg TOS /kg bw/day)	BACTERIA						p
	No trace	Traces	Slight	Moderate	Marked	Total	
1 (0)	0	0	0	5	5	10	
2 (102)	0	0	0	6	3	9	
3 (336.7)	0	0	1	4	5	10	
4 (1020)	0	0	0	5	5	10	
Total	0	0	1	20	18	39	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

Table 18 Organ weight – Group mean values

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Absolute (mg) and relative (% of body wt and brain wt) organ weight

Group mean values - Day 91/92

Males

GROUP (Dose mg TOS/kg bw/day)	BODY WT, g			p	ADRENALS			p	ADRENALS			p
					ABSOLUTE				% of BODY WT			
	MEAN	S.D.	N		MEAN	S.D.	N		MEAN	S.D.	N	
1 (0)	476.7	41.4	10		50.9	8.2	10		0.0107	0.0019	10	
2 (102)	498.1	38.7	10		52.9	9.5	10		0.0107	0.0022	10	
3 (336.7)	470.0	25.1	10		52.9	4.4	10		0.0113	0.0006	10	
4 (1020)	507.8	33.3	10		57.5	6.7	10		0.0113	0.0014	10	

GROUP (Dose mg TOS/kg bw/day)	ADRENALS			p	BRAIN			p	BRAIN			p
	% OF BRAIN WT				ABSOLUTE				% of BODY WT			
	MEAN	S.D.	N		MEAN	S.D.	N		MEAN	S.D.	N	
1 (0)	2.27	0.38	10		2243	102	10		0.473	0.028	10	
2 (102)	2.32	0.41	10		2276	86	10		0.458	0.026	10	
3 (336.7)	2.36	0.21	10		2243	74	10		0.478	0.027	10	
4 (1020)	2.51	0.28	10		2295	38	10		0.454	0.029	10	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Absolute (mg) and relative (% of body wt and brain wt) organ weight

Group mean values - Day 91/92

Males

GROUP (Dose mg TOS/kg bw/day)	EPIDIDYIMIDES			p	EPIDIDYIMIDES			p	EPIDIDYIMIDES			p
	ABSOLUTE				% of BODY WT				% OF BRAIN WT			
	MEAN	S.D.	N		MEAN	S.D.	N		MEAN	S.D.	N	
1 (0)	1390	134	10		0.292	0.022	10		61.9	4.6	10	
2 (102)	1476	123	10		0.297	0.027	10		64.9	5.6	10	
3 (336.7)	1388	124	10		0.295	0.022	10		62.0	6.0	10	
4 (1020)	1482	44	10		0.293	0.018	10		64.6	2.3	10	

GROUP (Dose mg TOS/kg bw/day)	HEART			p	HEART			p	HEART			p
	ABSOLUTE				% of BODY WT				% OF BRAIN WT			
	MEAN	S.D.	N		MEAN	S.D.	N		MEAN	S.D.	N	
1 (0)	1602	179	10		0.336	0.024	10		71.3	5.3	10	
2 (102)	1583	164	10		0.318	0.026	10		69.5	5.9	10	
3 (336.7)	1533	57	10		0.327	0.023	10		68.4	2.6	10	
4 (1020)	1662	86	10		0.328	0.016	10		72.4	3.6	10	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Absolute (mg) and relative (% of body wt and brain wt) organ weight

Group mean values - Day 91/92

Males

GROUP (Dose mg TOS/kg bw/day)	KIDNEYS			p	KIDNEYS			p	KIDNEYS			p
	ABSOLUTE				% of BODY WT				% OF BRAIN WT			
	MEAN	S.D.	N		MEAN	S.D.	N		MEAN	S.D.	N	
1 (0)	3143	263	10		0.660	0.042	10		140.1	10.0	10	
2 (102)	3265	270	10		0.657	0.046	10		143.4	9.2	10	
3 (336.7)	2982	102	10		0.636	0.037	10		133.1	6.2	10	
4 (1020)	3329	233	10		0.657	0.045	10		145.1	9.9	10	

GROUP (Dose mg TOS/kg bw/day)	LIVER			p	LIVER			p	LIVER			p
	ABSOLUTE				% of BODY WT				% OF BRAIN WT			
	MEAN	S.D.	N		MEAN	S.D.	N		MEAN	S.D.	N	
1 (0)	17689	2065	10		3.71	0.18	10		787.4	69.1	10	
2 (102)	18376	1685	10		3.69	0.19	10		806.4	51.7	10	
3 (336.7)	16689	1246	10		3.55	0.14	10		744.4	53.8	10	
4 (1020)	19272	1801	10		3.79	0.22	10		839.5	73.6	10	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Absolute (mg) and relative (% of body wt and brain wt) organ weight

Group mean values - Day 91/92

Males

GROUP (Dose mg TOS/kg bw/day)	PITUITARY			p	PITUITARY			p	PITUITARY			p
	ABSOLUTE				% of BODY WT				% OF BRAIN WT			
	MEAN	S.D.	N		MEAN	S.D.	N		MEAN	S.D.	N	
1 (0)	13.4	1.7	10		0.00281	0.00026	10		0.597	0.062	10	
2 (102)	13.6	2.3	10		0.00273	0.00039	10		0.596	0.083	10	
3 (336.7)	12.0	2.6	10		0.00256	0.00057	10		0.533	0.111	10	
4 (1020)	13.4	1.5	10		0.00264	0.00030	10		0.583	0.059	10	

GROUP (Dose mg TOS/kg bw/day)	PROSTATE			p	PROSTATE			p	PROSTATE			p
	ABSOLUTE				% of BODY WT				% OF BRAIN WT			
	MEAN	S.D.	N		MEAN	S.D.	N		MEAN	S.D.	N	
1 (0)	820	170	10		0.171	0.025	10		36.5	6.9	10	
2 (102)	793	156	10		0.160	0.031	10		34.8	6.3	10	
3 (336.7)	760	184	10		0.162	0.040	10		33.8	7.6	10	
4 (1020)	785	166	10		0.156	0.037	10		34.2	7.0	10	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Absolute (mg) and relative (% of body wt and brain wt) organ weight

Group mean values - Day 91/92

Males

GROUP (Dose mg TOS/kg bw/day)	SPLEEN			p	SPLEEN			p	SPLEEN			p
	ABSOLUTE				% of BODY WT				% OF BRAIN WT			
	MEAN	S.D.	N		MEAN	S.D.	N		MEAN	S.D.	N	
1 (0)	957	142	10		0.201	0.030	10		42.7	6.5	10	
2 (102)	1029	136	10		0.206	0.020	10		45.1	4.6	10	
3 (336.7)	942	120	10		0.200	0.023	10		42.1	5.8	10	
4 (1020)	1111	274	10		0.219	0.054	10		48.4	11.8	10	

GROUP (Dose mg TOS/kg bw/day)	TESTES			p	TESTES			p	TESTES			p
	ABSOLUTE				% of BODY WT				% OF BRAIN WT			
	MEAN	S.D.	N		MEAN	S.D.	N		MEAN	S.D.	N	
1 (0)	3718	250	10		0.782	0.049	10		165.7	7.0	10	
2 (102)	3880	343	10		0.782	0.079	10		170.6	14.9	10	
3 (336.7)	3791	397	10		0.808	0.087	10		169.3	20.2	10	
4 (1020)	3901	175	10		0.771	0.052	10		170.0	6.9	10	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Absolute (mg) and relative (% of body wt and brain wt) organ weight

Group mean values - Day 91/92

Males

GROUP (Dose mg TOS/kg bw/day)	THYMUS			p	THYMUS			p	THYMUS			p
	ABSOLUTE				% of BODY WT				% OF BRAIN WT			
	MEAN	S.D.	N		MEAN	S.D.	N		MEAN	S.D.	N	
1 (0)	431	96	10		0.0910	0.0215	10		19.2	4.0	10	
2 (102)	379	68	10		0.0757	0.0100	10		16.6	2.9	10	
3 (336.7)	424	73	10		0.0898	0.0121	10		18.9	3.2	10	
4 (1020)	380	102	10		0.0745	0.0175	10		16.6	4.4	10	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Absolute (mg) and relative (% of body wt and brain wt) organ weight

Group mean values - Day 91/92

Females

GROUP (Dose mg TOS/kg bw/day)	BODY WT, g			p	ADRENALS			p	ADRENALS			p
					ABSOLUTE				% of BODY WT			
	Mean	S.D	N		Mean	S.D	N		Mean	S.D	N	
1 (0)	288.2	13.4	10		73.4	8.4	10		0.0255	0.0029	10	
2 (102)	287.8	19.8	9		83.1	29.9	9		0.0287	0.0090	9	
3 (336.7)	287.3	18.4	10		79.2	11.0	10		0.0275	0.0032	10	
4 (1020)	279.8	13.4	10		77.2	8.4	10		0.0277	0.0032	10	

GROUP (Dose mg TOS/kg bw/day)	ADRENALS			p	BRAIN			p	BRAIN			p
	% OF BRAIN WT				ABSOLUTE				% of BODY WT			
	Mean	S.D	N		Mean	S.D	N		Mean	S.D	N	
1 (0)	3.50	0.40	10		2098	57	10		0.729	0.036	10	
2 (102)	3.99	1.43	9		2083	71	9		0.726	0.039	9	
3 (336.7)	3.78	0.48	10		2091	45	10		0.731	0.051	10	
4 (1020)	3.68	0.40	10		2101	59	10		0.753	0.045	10	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

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A 90-Day Gavage Toxicity Study in Rats

Absolute (mg) and relative (% of body wt and brain wt) organ weight

Group mean values - Day 91/92

Females

GROUP (Dose mg TOS/kg bw/day)	HEART			p	HEART			p	HEART			p
	ABSOLUTE				% of BODY WT				% OF BRAIN WT			
	Mean	S.D	N		Mean	S.D	N		Mean	S.D	N	
1 (0)	1036	88	10		0.360	0.022	10		49.4	3.9	10	
2 (102)	999	81	9		0.347	0.019	9		48.0	3.8	9	
3 (336.7)	1036	67	10		0.361	0.018	10		49.6	3.4	10	
4 (1020)	1017	69	10		0.364	0.024	10		48.4	2.9	10	

GROUP (Dose mg TOS/kg bw/day)	KIDNEYS			p	KIDNEYS			p	KIDNEYS			p
	ABSOLUTE				% of BODY WT				% OF BRAIN WT			
	Mean	S.D	N		Mean	S.D	N		Mean	S.D	N	
1 (0)	1952	135	10		0.677	0.040	10		93.2	7.6	10	
2 (102)	1930	161	9		0.672	0.049	9		92.7	6.9	9	
3 (336.7)	1895	113	10		0.660	0.025	10		90.6	5.7	10	
4 (1020)	1932	84	10		0.691	0.022	10		92.0	5.6	10	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Absolute (mg) and relative (% of body wt and brain wt) organ weight

Group mean values - Day 91/92

Females

GROUP (Dose mg TOS/kg bw/day)	LIVER			p	LIVER			p	LIVER			p
	ABSOLUTE				% of BODY WT				% OF BRAIN WT			
	Mean	S.D	N		Mean	S.D	N		Mean	S.D	N	
1 (0)	10508	962	10		3.65	0.31	10		500.8	41.7	10	
2 (102)	10137	1291	9		3.51	0.29	9		485.9	51.4	9	
3 (336.7)	10209	654	10		3.56	0.22	10		488.6	35.7	10	
4 (1020)	9970	700	10		3.56	0.15	10		475.0	38.3	10	

GROUP (Dose mg TOS/kg bw/day)	OVARIES			p	OVARIES			p	OVARIES			p
	ABSOLUTE				% of BODY WT				% OF BRAIN WT			
	Mean	S.D	N		Mean	S.D	N		Mean	S.D	N	
1 (0)	107.4	23.9	10		0.0372	0.0079	10		5.11	1.07	10	
2 (102)	100.1	16.9	9		0.0349	0.0061	9		4.82	0.85	9	
3 (336.7)	97.2	17.5	10		0.0338	0.0055	10		4.65	0.85	10	
4 (1020)	96.6	16.0	10		0.0345	0.0051	10		4.60	0.75	10	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

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A 90-Day Gavage Toxicity Study in Rats

Absolute (mg) and relative (% of body wt and brain wt) organ weight

Group mean values - Day 91/92

Females

GROUP (Dose mg TOS/kg bw/day)	PITUITARY			p	PITUITARY			p	PITUITARY			p
	ABSOLUTE				% of BODY WT				% OF BRAIN WT			
	Mean	S.D	N		Mean	S.D	N		Mean	S.D	N	
1 (0)	15.9	2.3	10		0.00551	0.00070	10		0.757	0.100	10	
2 (102)	15.2	3.2	9		0.00526	0.00087	9		0.729	0.141	9	
3 (336.7)	16.2	2.1	10		0.00564	0.00062	10		0.775	0.101	10	
4 (1020)	16.1	1.9	10		0.00577	0.00071	10		0.767	0.099	10	

GROUP (Dose mg TOS/kg bw/day)	SPLEEN			p	SPLEEN			p	SPLEEN			p
	ABSOLUTE				% of BODY WT				% OF BRAIN WT			
	Mean	S.D	N		Mean	S.D	N		Mean	S.D	N	
1 (0)	722	106	10		0.250	0.032	10		34.4	5.0	10	
2 (102)	711	103	9		0.247	0.030	9		34.1	4.9	9	
3 (336.7)	806	133	10		0.280	0.040	10		38.6	6.5	10	
4 (1020)	688	51	10		0.246	0.015	10		32.8	2.7	10	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Absolute (mg) and relative (% of body wt and brain wt) organ weight

Group mean values - Day 91/92

Females

GROUP (Dose mg TOS/kg bw/day)	THYMUS			p	THYMUS			p	THYMUS			p
	ABSOLUTE				% of BODY WT				% OF BRAIN WT			
	Mean	S.D	N		Mean	S.D	N		Mean	S.D	N	
1 (0)	315	52	10		0.1092	0.0161	10		15.0	2.4	10	
2 (102)	311	63	9		0.1079	0.0196	9		14.9	2.8	9	
3 (336.7)	348	63	10		0.1223	0.0273	10		16.7	3.0	10	
4 (1020)	293	78	10		0.1049	0.0274	10		13.9	3.4	10	

GROUP (Dose mg TOS/kg bw/day)	UTERUS			p	UTERUS			p	UTERUS			p
	ABSOLUTE				% of BODY WT				% OF BRAIN WT			
	Mean	S.D	N		Mean	S.D	N		Mean	S.D	N	
1 (0)	672	160	10		0.233	0.054	10		32.0	7.5	10	
2 (102)	828	196	9		0.292	0.089	9		39.9	10.0	9	
3 (336.7)	850	404	10		0.296	0.142	10		40.4	18.5	10	
4 (1020)	779	297	10		0.281	0.118	10		37.1	14.3	10	

* means $p < 0.05$, versus control group

** means $p < 0.01$, versus control group

S.D. = standard deviation N = number of animals

Table 19 Clinical signs – Individual findings

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A 90-Day Gavage Toxicity Study in Rats							
Clinical signs							
Individual findings							
Group	Animal	Sex	Day No	Symptom	Site	Severity	Comment
1	6	m	66-68	GI - Faeces - consistency	Soft	Slight-moderate	
	8	m	68	GI - Faeces - consistency	Soft	Slight	
			82-84	Eye - discharge	Left Eye	Slight	
	15	f	43-47	Fur - Hair loss	Foreleg	Slight-moderate	
	18	f	91-92	Fur - Hair loss	Back	Slight	
2	25	m	31-91	Fur - Hair loss	Foreleg	Slight-marked	
	26	m	52-61, 83-91	Fur - Hair loss	Head	Slight-moderate	
	28	m	65-68	GI - Faeces - consistency	Soft	Slight-moderate	
	30	m	74	GI - Faeces - consistency	Soft	Moderate	
	31	f	32-42	Skin - Swelling, hard	Shoulder	1-2 cm	
			43-45	Skin - Swelling, hard	Shoulder	> 2cm	
			45	Sacrificed			
	37	f	11-92	Fur - Hair loss	Foreleg	Slight-marked	
	38	f	50-92	Fur - Hair loss at both ears	Head	Slight-marked	
3	41	m	44	GI - Faeces - consistency	Soft	Slight	
			53-55	Wound, dry, missing toe nail	Left hind paw	0-0.5cm	
			82-84	Eye - discharge	Right Eye	Slight	

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A 90-Day Gavage Toxicity Study in Rats							
Clinical signs							
Individual findings							
Group	Animal	Sex	Day No	Symptom	Site	Severity	Comment
3	45	m	66-68	GI - Faeces - consistency	Soft	Slight	
	46	m	66-70, 74-88	Eye - discharge	Both eyes	Slight	
	50	m	82	Eye - discharge	Right Eye	Slight	
	56	f	30-45	Eye - discharge	Left Eye	Slight-moderate, sometimes reddish	
4	65	m	69	GI - Faeces - consistency	Soft	Slight	
	66	m	57-90	Fur - Hair loss	Foreleg	Slight-moderate	
	68	m	52	Respiration - Rattling	Left lung field	Moderate	
	70	m	27-42	Fur - Hair loss	Head	Slight-moderate	
	72	f	59	GI - Pinched abdomen		Slight	Lost 10g
			59	Nutrition	Dehydration	Slight	Housed separately and offered water in a bowl and softened feed.
			60	Nutrition	Dehydration	Insignificant	Has gained 5 g.
	74	f	28-42	Fur - Hair loss	Foreleg	Slight-moderate	
	75	f	21-92	Fur - Hair loss	Foreleg	Slight-marked	
	76	f	12-92	Fur - Hair loss	Foreleg	Slight-marked	
			22-92	Fur - Hair loss	Head	Slight-marked	

Table 20 Open field observation – Individual values

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Individual values - Before start of treatment

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	ABNORMAL BEHAVIOUR	TIME MOVING	TOTAL DISTANCE (m)	NO. OF REARINGS	TIME CENTRE	TIME PERIPHERY
1 (0)	1	0	207.1	76.7	43	5.7	294.3
	2	0	233.0	86.1	30	27.6	272.4
	3	0	225.1	98.8	32	30.7	269.3
	4	0	244.9	93.5	17	24.2	275.8
	5	0	235.7	103.8	32	17.1	282.9
	6	0	223.1	88.0	31	16.6	283.4
	7	0	154.5	52.8	16	9.2	290.8
	8	0	245.9	100.2	21	16.6	283.4
	9	0	224.5	100.2	33	22.0	278.0
	10	0	192.4	71.5	30	5.2	294.8
2 (102)	21	0	235.8	97.1	45	12.8	287.2
	22	0	210.7	84.4	27	12.3	287.8
	23	0	234.8	94.1	36	27.4	272.6
	24	0	236.5	99.5	34	27.2	272.8
	25	0	229.9	92.7	21	7.3	292.8
	26	0	225.0	85.0	11	17.0	283.0
	27	0	241.6	114.1	40	30.1	269.9
	28	0	242.3	96.4	15	27.1	272.9
	29	0	204.4	86.9	22	3.5	296.5
	30	0	243.4	101.0	34	14.0	286.0

Codes are described in [Table 3](#)

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Individual values - Before start of treatment

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	ABNORMAL BEHAVIOUR	TIME MOVING	TOTAL DISTANCE (m)	NO. OF REARINGS	TIME CENTRE	TIME PERIPHERY
3 (336.7)	41	0	189.1	79.0	33	15.7	284.3
	42	0	225.9	89.3	47	39.9	260.1
	43	0	240.6	99.5	38	13.7	286.4
	44	0	246.6	102.9	36	27.1	272.9
	45	0	207.5	93.4	27	9.0	291.0
	46	0	220.4	96.4	13	14.0	286.0
	47	0	261.1	112.1	44	5.8	294.2
	48	0	230.0	108.7	44	30.8	269.2
	49	0	227.5	88.2	36	4.3	295.7
	50	0	247.6	103.8	33	14.5	285.5
4 (1020)	61	0	222.2	105.1	34	37.9	262.1
	62	0	256.2	110.8	15	35.8	264.2
	63	0	215.4	100.1	35	12.0	288.1
	64	0	244.6	101.8	33	8.1	291.9
	65	0	228.7	91.2	36	19.2	280.8
	66	0	231.0	91.8	23	8.6	291.5
	67	0	237.2	96.4	45	17.0	283.0
	68	0	219.7	92.2	21	20.9	279.1
	69	0	243.6	93.0	34	14.2	285.8
	70	0	241.3	107.4	49	16.1	283.9

Codes are described in [Table 3](#)

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Individual values - Before start of treatment

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	TOTAL CORNER VISITS	MOVES/ COUNTS	ATAXIA	NUMBER OF FAECAL PELLETS	URINATION DURING TEST
1 (0)	1	69	5787	0	4	0
	2	69	6498	0	6	1
	3	75	6695	0	5	1
	4	97	7111	0	3	1
	5	72	6964	0	8	1
	6	86	6402	0	4	1
	7	37	4311	0	0	1
	8	86	7072	0	3	1
	9	63	6656	0	7	1
	10	64	5375	0	2	0
2 (102)	21	71	6846	0	6	1
	22	69	6003	0	2	1
	23	75	6886	0	1	1
	24	92	6952	0	2	1
	25	76	6638	0	4	1
	26	79	6261	0	4	1
	27	95	7381	0	5	1
	28	89	6959	0	0	1
	29	82	6046	0	4	1
	30	94	7049	0	3	1

Codes are described in [Table 3](#)

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A 90-Day Gavage Toxicity Study in Rats

Open field observation

Individual values - Before start of treatment

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	TOTAL CORNER VISITS	MOVES/ COUNTS	ATAXIA	NUMBER OF FAECAL PELLETS	URINATION DURING TEST
3 (336.7)	41	51	5743	0	1	1
	42	61	6550	0	1	0
	43	75	6968	0	2	0
	44	70	7116	0	4	0
	45	72	6162	0	7	1
	46	88	6558	0	0	0
	47	113	7707	0	7	1
	48	80	7053	0	1	1
	49	69	6270	0	8	1
	50	89	7479	0	2	0
4 (1020)	61	77	6700	0	0	0
	62	72	7555	0	0	0
	63	98	6619	0	0	1
	64	90	7101	0	6	1
	65	57	6356	0	5	1
	66	75	6766	0	0	0
	67	84	6988	0	5	1
	68	76	6452	0	4	1
	69	82	6943	0	9	1
	70	91	7222	0	2	0

Codes are described in [Table 3](#)

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A 90-Day Gavage Toxicity Study in Rats

Open field observation

Individual values - Before start of treatment

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	ABNORMAL BEHAVIOUR	TIME MOVING	TOTAL DISTANCE (m)	NO. OF REARINGS	TIME CENTRE	TIME PERIPHERY
1 (0)	11	0	241.3	95.2	31	30.1	269.9
	12	0	219.4	94.5	27	13.2	286.8
	13	0	242.8	100.8	43	21.4	278.6
	14	0	189.3	82.2	37	22.2	277.8
	15	0	211.2	90.1	36	26.1	273.9
	16	0	243.3	102.8	31	32.3	267.7
	17	0	224.0	100.1	42	32.4	267.6
	18	0	254.5	95.5	44	28.4	271.6
	19	0	225.0	90.8	46	17.1	282.9
	20	0	262.4	107.9	41	26.7	273.3
2 (102)	31	0	246.1	99.3	39	22.7	277.3
	32	0	222.0	90.1	27	23.0	277.1
	33	0	246.3	105.7	55	25.3	274.7
	34	0	226.9	70.6	18	26.7	273.3
	35	0	256.9	111.2	40	32.7	267.3
	36	0	250.3	103.1	33	11.0	289.0
	37	0	217.4	92.8	36	10.6	289.4
	38	0	261.9	122.2	42	52.4	247.6
	39	0	245.6	114.2	42	24.6	275.4
	40	0	239.7	92.6	44	10.3	289.7

Codes are described in [Table 3](#)

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A 90-Day Gavage Toxicity Study in Rats

Open field observation

Individual values - Before start of treatment

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	ABNORMAL BEHAVIOUR	TIME MOVING	TOTAL DISTANCE (m)	NO. OF REARINGS	TIME CENTRE	TIME PERIPHERY
3 (336.7)	51	0	256.8	96.2	27	30.3	269.7
	52	0	250.3	97.9	55	25.5	274.5
	53	0	229.2	86.7	43	6.3	293.7
	54	0	234.9	101.7	48	25.5	274.5
	55	0	250.9	103.8	55	23.5	276.5
	56	0	241.9	104.4	32	44.2	255.8
	57	0	236.4	87.1	41	5.3	294.7
	58	0	226.4	96.0	46	14.5	285.5
	59	0	236.7	101.1	36	2.3	297.7
	60	0	278.9	143.8	31	47.5	252.5
4 (1020)	71	0	231.8	101.3	38	12.9	287.1
	72	0	227.3	96.9	43	11.9	288.1
	73	0	223.2	96.5	42	12.4	287.6
	74	0	248.7	100.6	39	37.2	262.8
	75	0	251.8	108.7	44	19.8	280.2
	76	0	250.6	99.1	29	51.3	248.7
	77	0	218.6	91.0	53	23.2	276.8
	78	0	239.6	92.7	34	3.0	297.1
	79	0	242.7	103.1	53	11.3	288.7
	80	0	234.6	83.8	44	6.1	293.9

Codes are described in [Table 3](#)

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Individual values - Before start of treatment

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	TOTAL CORNER VISITS	MOVES/ COUNTS	ATAXIA	NUMBER OF FAECAL PELLETS	URINATION DURING TEST
1 (0)	11	48	6771	0	1	0
	12	69	6227	0	0	1
	13	71	7043	0	0	1
	14	63	5390	0	0	1
	15	59	5955	0	3	1
	16	72	7024	0	0	1
	17	82	6556	0	0	0
	18	90	7027	0	0	0
	19	68	6509	0	0	1
	20	101	7452	0	0	0
2 (102)	31	78	6814	0	0	1
	32	84	6388	0	0	1
	33	52	7179	0	0	0
	34	54	5949	0	0	0
	35	84	7398	0	0	0
	36	80	7189	0	0	0
	37	75	6425	0	0	1
	38	111	7868	0	0	1
	39	83	7325	0	0	1
	40	77	6780	0	6	1

Codes are described in [Table 3](#)

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Individual values - Before start of treatment

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	TOTAL CORNER VISITS	MOVES/ COUNTS	ATAXIA	NUMBER OF FAECAL PELLETS	URINATION DURING TEST
3 (336.7)	51	56	7228	0	0	1
	52	79	7358	0	0	0
	53	77	6350	0	0	1
	54	81	6749	0	0	0
	55	96	7139	0	0	0
	56	68	7152	0	0	0
	57	66	6367	0	0	1
	58	79	6679	0	0	1
	59	80	7008	0	4	1
	60	126	8757	0	1	0
4 (1020)	71	70	6700	0	0	1
	72	78	6510	0	5	1
	73	67	6628	0	0	0
	74	61	7190	0	0	0
	75	84	7494	0	0	0
	76	59	7095	0	0	1
	77	65	6224	0	1	1
	78	68	6521	0	3	1
	79	68	6765	0	0	1
	80	60	6372	0	0	0

Codes are described in [Table 3](#)

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Individual values - At termination of treatment

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	ABNORMAL BEHAVIOUR	TIME MOVING	TOTAL DISTANCE (m)	NO. OF REARINGS	TIME CENTRE	TIME PERIPHERY
1 (0)	1	0	189.9	55.9	25	3.1	296.9
	2	0	87.3	21.6	10	4.3	295.7
	3	0	181.7	57.4	19	20.8	279.3
	4	0	121.5	29.9	5	8.7	291.3
	5	1	77.0	22.3	2	56.8	243.2
	6	0	186.3	65.4	30	27.3	272.7
	7	0	175.8	51.7	16	131.6	168.4
	8	0	201.4	62.0	34	23.7	276.3
	9	0	109.4	31.1	11	45.7	254.3
	10	1	53.7	16.7	16	18.5	281.5
2 (102)	21	0	152.8	50.2	20	17.6	282.4
	22	0	212.9	72.8	35	40.7	259.3
	23	0	191.7	54.3	26	13.7	286.3
	24	1	64.6	17.5	11	21.2	278.8
	25	0	211.1	80.6	28	26.7	273.3
	26	0	233.7	77.2	18	50.5	249.5
	27	0	175.1	62.9	31	21.2	278.8
	28	0	251.3	97.3	24	55.8	244.2
	29	1	79.2	20.3	1	42.5	257.5
	30	0	206.9	62.6	31	15.5	284.5

Codes are described in [Table 3](#)

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Individual values - At termination of treatment

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	ABNORMAL BEHAVIOUR	TIME MOVING	TOTAL DISTANCE (m)	NO. OF REARINGS	TIME CENTRE	TIME PERIPHERY
3 (336.7)	41	0	85.9	25.0	8	9.8	290.2
	42	0	168.4	55.8	46	9.6	290.4
	43	1	104.0	26.5	5	33.4	266.6
	44	1	49.6	12.6	6	13.9	286.1
	45	0	196.2	61.1	23	34.5	265.5
	46	0	224.0	76.7	30	16.4	283.6
	47	0	131.3	38.4	13	16.1	283.9
	48	0	239.3	99.0	40	22.1	277.9
	49	0	105.5	25.5	6	16.8	283.2
	50	0	167.2	49.8	27	18.9	281.1
4 (1020)	61	0	172.4	52.3	24	21.5	278.5
	62	0	225.2	77.4	30	37.7	262.3
	63	0	149.9	52.0	14	11.0	289.0
	64	0	211.4	59.1	33	7.7	292.3
	65	0	95.5	25.5	11	11.8	288.2
	66	0	205.7	67.1	28	10.7	289.4
	67	1	75.6	18.7	10	44.5	255.5
	68	0	187.1	64.8	28	10.4	289.6
	69	0	197.1	61.4	29	35.9	264.1
	70	0	102.9	27.4	31	3.1	296.9

Codes are described in [Table 3](#)

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Individual values - At termination of treatment

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	TOTAL CORNER VISITS	MOVES/ COUNTS	ATAXIA	NUMBER OF FAECAL PELLETS	URINATION DURING TEST
1 (0)	1	54	4674	0	3	1
	2	17	2024	0	7	1
	3	37	4889	0	7	1
	4	11	3306	0	7	1
	5	12	1819	0	2	1
	6	41	5146	0	2	1
	7	33	5489	0	3	1
	8	52	5452	0	2	0
	9	18	2819	0	5	1
	10	2	1372	0	7	1
2 (102)	21	34	4295	0	5	1
	22	56	5639	0	3	1
	23	57	4979	0	0	0
	24	15	1694	0	0	1
	25	79	5999	0	3	1
	26	65	6442	0	2	1
	27	54	4801	0	2	1
	28	65	6957	0	0	0
	29	18	2000	0	2	0
	30	52	5822	0	0	1

Codes are described in [Table 3](#)

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Individual values - At termination of treatment

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	TOTAL CORNER VISITS	MOVES/ COUNTS	ATAXIA	NUMBER OF FAECAL PELLETS	URINATION DURING TEST
3 (336.7)	41	10	2234	0	6	1
	42	45	4721	0	7	1
	43	18	2419	0	5	1
	44	6	1523	0	5	1
	45	53	5160	0	1	1
	46	86	6037	0	2	0
	47	48	3185	0	3	0
	48	98	6756	0	2	1
	49	12	2406	0	4	1
	50	24	4869	0	3	0
4 (1020)	61	56	4950	0	3	0
	62	68	5923	0	4	1
	63	45	4589	0	7	1
	64	61	5334	0	6	1
	65	11	2447	0	4	1
	66	68	5726	0	0	1
	67	1	1721	0	3	1
	68	78	5051	0	3	1
	69	40	5067	0	5	0
	70	16	2733	0	0	0

Codes are described in [Table 3](#)

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Individual values - At termination of treatment

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	ABNORMAL BEHAVIOUR	TIME MOVING	TOTAL DISTANCE (m)	NO. OF REARINGS	TIME CENTRE	TIME PERIPHERY
1 (0)	11	0	223.9	75.7	19	18.7	281.4
	12	0	178.2	63.9	14	7.8	292.3
	13	0	241.4	114.7	53	17.9	282.1
	14	0	211.0	101.0	31	32.1	267.9
	15	0	230.5	101.9	33	19.1	280.9
	16	0	218.0	95.9	38	18.4	281.6
	17	0	190.0	80.8	43	7.8	292.2
	18	0	235.0	93.7	36	4.7	295.3
	19	0	235.7	100.8	52	19.8	280.3
	20	0	250.9	103.3	40	8.9	291.2
2 (102)	31	d					
	32	0	221.4	87.2	15	18.7	281.3
	33	0	230.9	106.5	32	17.4	282.6
	34	0	233.5	81.8	24	10.9	289.1
	35	0	256.0	111.3	34	24.9	275.1
	36	0	215.0	89.8	38	13.1	286.9
	37	0	226.0	104.9	44	10.9	289.1
	38	0	259.5	118.3	44	14.3	285.7
	39	0	221.8	93.5	28	10.8	289.2
	40	0	212.7	85.4	13	0.9	299.2

d = unscheduled death
Codes are described in [Table 3](#)

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Individual values - At termination of treatment

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	ABNORMAL BEHAVIOUR	TIME MOVING	TOTAL DISTANCE (m)	NO. OF REARINGS	TIME CENTRE	TIME PERIPHERY
3 (336.7)	51	0	181.9	55.9	16	15.4	284.6
	52	0	227.3	77.7	31	9.6	290.4
	53	0	233.0	99.0	37	6.0	294.0
	54	0	243.1	119.7	47	12.5	287.5
	55	0	235.3	93.0	30	15.2	284.8
	56	0	229.7	92.3	42	17.1	282.9
	57	0	217.3	81.2	40	11.3	288.7
	58	0	213.5	86.3	47	15.5	284.5
	59	0	240.1	96.5	35	12.9	287.1
	60	0	228.7	120.3	38	23.8	276.2
4 (1020)	71	0	213.3	91.3	32	8.4	291.6
	72	0	236.8	101.1	41	6.9	293.2
	73	0	229.9	99.9	23	24.2	275.8
	74	0	234.9	107.4	29	29.0	271.0
	75	0	241.6	102.1	41	11.4	288.6
	76	0	217.3	79.6	39	6.9	293.1
	77	0	225.5	88.6	37	3.0	297.0
	78	0	230.8	106.9	33	10.5	289.5
	79	0	243.0	109.7	44	12.3	287.7
	80	0	216.1	78.4	41	11.9	288.1

Codes are described in [Table 3](#)

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Individual values - At termination of treatment

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	TOTAL CORNER VISITS	MOVES/ COUNTS	ATAXIA	NUMBER OF FAECAL PELLETS	URINATION DURING TEST
1 (0)	11	58	5911	0	0	1
	12	34	4724	0	2	1
	13	96	6925	0	0	1
	14	73	5999	0	0	1
	15	78	6464	0	0	1
	16	96	6046	0	0	0
	17	67	5397	0	0	0
	18	60	6359	0	0	0
	19	85	6629	0	0	1
	20	76	6858	0	0	1
2 (102)	31	d				
	32	64	5976	0	0	1
	33	75	6818	0	0	0
	34	55	6205	0	0	0
	35	100	6889	0	0	1
	36	67	5868	0	0	0
	37	90	6487	0	0	0
	38	105	7441	0	0	0
	39	76	6641	0	0	0
	40	68	6009	0	4	1

d = unscheduled death
Codes are described in [Table 3](#)

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Open field observation

Individual values - At termination of treatment

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	TOTAL CORNER VISITS	MOVES/ COUNTS	ATAXIA	NUMBER OF FAECAL PELLETS	URINATION DURING TEST
3 (336.7)	51	38	5121	0	0	0
	52	71	6403	0	0	1
	53	82	6397	0	0	1
	54	98	6937	0	0	0
	55	45	6383	0	0	1
	56	76	6254	0	0	1
	57	65	5843	0	0	0
	58	66	5742	0	0	1
	59	78	6721	0	0	1
	60	87	6722	0	0	0
4 (1020)	71	54	6020	0	0	0
	72	84	6526	0	0	0
	73	85	6585	0	0	0
	74	75	6827	0	0	0
	75	80	6610	0	0	1
	76	66	5672	0	0	0
	77	74	6037	0	0	0
	78	89	6432	0	0	1
	79	79	6776	0	0	0
	80	76	5788	0	0	0

Codes are described in [Table 3](#)

Table 21 Stimuli-induced clinical observations – Individual values

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Individual values - Before start of treatment

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	TOE					
		PUPIL REFLEX	PINCH REACT.	GRASP RESPONSE	GRIP STRENGTH	EYELID REFLEX	STARTLE RESPONSE
1 (0)	1	1	1	1	1	1	1
	2	1	1	1	1	1	1
	3	1	1	1	1	1	1
	4	1	1	1	1	1	1
	5	1	1	1	1	1	1
	6	1	1	1	1	1	1
	7	1	1	1	1	1	1
	8	1	1	1	1	1	1
	9	1	1	1	1	1	1
	10	1	1	1	1	1	1
2 (102)	21	1	1	1	1	1	1
	22	1	1	1	1	1	1
	23	1	1	1	1	1	1
	24	1	1	1	1	1	1
	25	1	1	1	1	1	1
	26	1	1	1	1	1	1
	27	1	1	1	1	1	1
	28	1	1	1	1	1	1
	29	1	1	1	1	1	1
	30	1	1	1	1	1	1

0 = No reaction 1 = Reaction

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Individual values - Before start of treatment

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	TOE					
		PUPIL REFLEX	PINCH REACT.	GRASP RESPONSE	GRIP STRENGTH	EYELID REFLEX	STARTLE RESPONSE
3 (336.7)	41	1	1	1	1	1	1
	42	1	1	1	1	1	1
	43	1	1	1	1	1	1
	44	1	1	1	1	1	1
	45	1	1	1	1	1	1
	46	1	1	1	1	1	1
	47	1	1	1	1	1	1
	48	1	1	1	1	1	1
	49	1	1	1	1	1	1
	50	1	1	1	1	1	1
4 (1020)	61	1	1	1	1	1	1
	62	1	1	1	1	1	1
	63	1	1	1	1	1	1
	64	1	1	1	1	1	1
	65	1	1	1	1	1	1
	66	1	1	1	1	1	1
	67	1	1	1	1	1	1
	68	1	1	1	1	1	1
	69	1	1	1	1	1	1
	70	1	1	1	1	1	1

0 = No reaction 1 = Reaction

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Individual values - Before start of treatment

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	HEAD SHAKE RESPONSE	RIGHTING REFLEX TABLE	RIGHTING REFLEX HAND	PLACING REFLEX	NEGA- TIVE GEOTAXIS
1 (0)	1	1	1	1	1	1
	2	1	1	1	1	1
	3	1	1	1	1	1
	4	1	1	1	1	1
	5	1	1	1	1	1
	6	1	1	1	1	1
	7	1	1	1	1	1
	8	1	1	1	1	1
	9	1	1	1	1	1
	10	1	1	1	1	1
2 (102)	21	1	1	1	1	1
	22	1	1	1	1	1
	23	1	1	1	1	1
	24	1	1	1	1	1
	25	1	1	1	1	1
	26	1	1	1	1	1
	27	1	1	1	1	1
	28	1	1	1	1	1
	29	1	1	1	1	1
	30	1	1	1	1	1

0 = No reaction 1 = Reaction

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Individual values - Before start of treatment

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	HEAD SHAKE RESPONSE	RIGHTING REFLEX TABLE	RIGHTING REFLEX HAND	PLACING REFLEX	NEGA- TIVE GEOTAXIS
3 (336.7)	41	1	1	1	1	1
	42	1	1	1	1	1
	43	1	1	1	1	1
	44	1	1	1	1	1
	45	1	1	1	1	1
	46	1	1	1	1	1
	47	1	1	1	1	1
	48	1	1	1	1	1
	49	1	1	1	1	1
	50	1	1	1	1	1
4 (1020)	61	1	1	1	1	1
	62	1	1	1	1	1
	63	1	1	1	1	1
	64	1	1	1	1	1
	65	1	1	1	1	1
	66	1	1	1	1	1
	67	1	1	1	1	1
	68	1	1	1	1	1
	69	1	1	1	1	1
	70	1	1	1	1	1

0 = No reaction 1 = Reaction

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Individual values - Before start of treatment

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	TOE					
		PUPIL REFLEX	PINCH REACT.	GRASP RESPONSE	GRIP STRENGTH	EYELID REFLEX	STARTLE RESPONSE
1 (0)	11	1	1	1	1	1	1
	12	1	1	1	1	1	1
	13	1	1	1	1	1	1
	14	1	1	1	1	1	1
	15	1	1	1	1	1	1
	16	1	1	1	1	1	1
	17	1	1	1	1	1	1
	18	1	1	1	1	1	1
	19	1	1	1	1	1	1
	20	1	1	1	1	1	1
2 (102)	31	1	1	1	1	1	1
	32	1	1	1	1	1	1
	33	1	1	1	1	1	1
	34	1	1	1	1	1	1
	35	1	1	1	1	1	1
	36	1	1	1	1	1	1
	37	1	1	1	1	1	1
	38	1	1	1	1	1	1
	39	1	1	1	1	1	1
	40	1	1	1	1	1	1

0 = No reaction 1 = Reaction

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Individual values - Before start of treatment

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	TOE					
		PUPIL REFLEX	PINCH REACT.	GRASP RESPONSE	GRIP STRENGTH	EYELID REFLEX	STARTLE RESPONSE
3 (336.7)	51	1	1	1	1	1	1
	52	1	1	1	1	1	1
	53	1	1	1	1	1	1
	54	1	1	1	1	1	1
	55	1	1	1	1	1	1
	56	1	1	1	1	1	1
	57	1	1	1	0	1	1
	58	1	1	1	1	1	1
	59	1	1	1	1	1	1
	60	1	1	1	1	1	1
4 (1020)	71	1	1	1	1	1	1
	72	1	1	1	1	1	1
	73	1	1	1	1	1	1
	74	1	1	1	1	1	1
	75	1	1	1	1	1	1
	76	1	1	1	1	1	1
	77	1	1	1	1	1	1
	78	1	1	0	1	1	1
	79	1	1	1	1	1	1
	80	1	1	1	1	1	1

1 = correct reaction

0 = no reaction or not correct reaction

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Individual values - Before start of treatment

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	HEAD SHAKE RESPONSE	RIGHTING REFLEX TABLE	RIGHTING REFLEX HAND	PLACING REFLEX	NEGA- TIVE GEOTAXIS
1 (0)	11	1	1	1	1	1
	12	1	1	1	1	1
	13	1	1	1	1	1
	14	1	1	1	1	1
	15	1	1	1	1	1
	16	1	1	1	1	1
	17	1	1	1	1	1
	18	1	1	1	1	1
	19	1	1	1	1	1
	20	1	1	1	1	1
2 (102)	31	1	1	1	1	1
	32	1	1	1	1	1
	33	1	1	1	1	1
	34	1	1	1	1	1
	35	1	1	1	1	1
	36	1	1	1	1	1
	37	1	1	1	1	1
	38	1	1	1	1	1
	39	1	1	1	1	1
	40	1	1	1	1	1

0 = No reaction 1 = Reaction

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Individual values - Before start of treatment

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	HEAD SHAKE RESPONSE	RIGHTING REFLEX TABLE	RIGHTING REFLEX HAND	PLACING REFLEX	NEGA- TIVE GEOTAXIS
3 (336.7)	51	1	1	1	1	1
	52	1	1	1	1	1
	53	1	1	1	1	1
	54	1	1	1	1	1
	55	1	1	1	1	1
	56	1	1	1	1	1
	57	1	1	1	1	1
	58	1	1	1	1	1
	59	1	1	1	1	1
	60	1	1	1	1	1
4 (1020)	71	1	1	1	1	1
	72	1	1	1	1	1
	73	1	1	1	1	1
	74	1	1	1	1	1
	75	1	1	1	1	1
	76	1	1	1	1	1
	77	1	1	1	1	1
	78	1	1	1	1	1
	79	1	1	1	1	1
	80	1	1	1	1	1

1 = correct reaction

0 = no reaction or not correct reaction

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Individual values - At termination of treatment

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	TOE					
		PUPIL REFLEX	PINCH REACT.	GRASP RESPONSE	GRIP STRENGTH	EYELID REFLEX	STARTLE RESPONSE
1 (0)	1	1	1	0	1	1	0
	2	1	1	1	1	1	1
	3	1	1	0	0	1	1
	4	1	1	1	1	1	1
	5	1	1	0	0	1	1
	6	1	1	1	1	1	1
	7	1	1	1	1	1	1
	8	1	1	1	0	1	1
	9	1	1	0	0	1	1
	10	1	1	1	0	1	1
2 (102)	21	1	1	0	1	1	1
	22	1	1	1	1	1	1
	23	1	1	1	1	1	1
	24	1	1	1	1	1	1
	25	1	1	1	1	1	1
	26	1	1	0	1	1	0
	27	1	1	1	1	1	1
	28	1	1	1	1	1	1
	29	1	1	1	1	1	1
	30	1	1	1	1	1	1

0 = No reaction 1 = Reaction

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Individual values - At termination of treatment

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	TOE					
		PUPIL REFLEX	PINCH REACT.	GRASP RESPONSE	GRIP STRENGTH	EYELID REFLEX	STARTLE RESPONSE
3 (336.7)	41	1	1	0	0	1	1
	42	1	1	1	0	1	1
	43	1	1	1	1	1	1
	44	1	1	1	1	1	1
	45	1	1	1	1	1	1
	46	1	1	1	1	1	1
	47	1	1	1	1	1	1
	48	1	1	0	1	1	1
	49	1	1	0	0	1	1
	50	1	0	0	0	1	1
4 (1020)	61	1	1	1	1	1	1
	62	1	1	1	1	1	1
	63	1	1	0	0	1	1
	64	1	1	1	1	1	1
	65	1	1	1	1	1	1
	66	1	1	1	1	1	1
	67	1	1	1	1	1	1
	68	1	1	1	1	1	1
	69	1	1	0	1	1	1
	70	1	1	1	1	1	1

0 = No reaction 1 = Reaction

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Individual values - At termination of treatment

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	HEAD SHAKE RESPONSE	RIGHTING REFLEX TABLE	RIGHTING REFLEX HAND	PLACING REFLEX	NEGA- TIVE GEOTAXIS
1 (0)	1	1	1	1	1	1
	2	1	1	1	1	1
	3	1	1	1	1	0
	4	1	1	1	1	1
	5	1	1	1	1	1
	6	1	1	1	1	1
	7	1	1	1	1	1
	8	1	1	1	1	1
	9	1	1	1	1	1
	10	1	1	1	1	1
2 (102)	21	1	1	1	1	0
	22	1	1	1	1	1
	23	1	1	0	1	1
	24	1	1	1	1	0
	25	1	1	1	1	1
	26	1	1	1	1	1
	27	1	1	1	1	1
	28	1	1	1	1	1
	29	1	1	1	1	1
	30	1	1	1	0	1

0 = No reaction 1 = Reaction

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Individual values - At termination of treatment

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	HEAD SHAKE RESPONSE	RIGHTING REFLEX TABLE	RIGHTING REFLEX HAND	PLACING REFLEX	NEGA- TIVE GEOTAXIS
3 (336.7)	41	1	1	1	1	0
	42	1	1	1	1	1
	43	1	1	1	1	1
	44	1	1	0	1	1
	45	1	1	1	1	1
	46	1	1	1	1	1
	47	1	1	1	1	1
	48	1	1	1	1	1
	49	1	1	1	1	1
	50	1	1	1	1	1
4 (1020)	61	1	1	1	1	0
	62	1	1	1	1	1
	63	1	1	1	1	1
	64	1	1	1	1	1
	65	1	1	1	1	1
	66	1	1	1	1	1
	67	1	1	1	1	1
	68	1	1	1	1	1
	69	1	1	0	1	1
	70	1	1	1	1	1

0 = No reaction 1 = Reaction

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Individual values - At termination of treatment

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	TOE					
		PUPIL REFLEX	PINCH REACT.	GRASP RESPONSE	GRIP STRENGTH	EYELID REFLEX	STARTLE RESPONSE
1 (0)	11	1	1	1	0	1	1
	12	1	1	1	1	1	1
	13	1	1	1	0	1	1
	14	1	1	1	0	1	1
	15	1	1	0	0	1	1
	16	1	1	1	0	1	1
	17	1	1	1	1	1	1
	18	1	0	1	1	1	1
	19	1	1	1	1	1	1
	20	1	1	1	0	1	1
2 (102)	31	d					
	32	1	1	1	1	1	1
	33	1	1	1	0	1	1
	34	1	1	1	1	1	1
	35	1	1	1	1	1	1
	36	1	1	1	1	1	1
	37	1	1	1	1	1	1
	38	1	1	1	1	1	1
	39	1	1	1	1	1	0
	40	1	0	1	1	1	1

0 = No reaction 1 = Reaction

d = unscheduled death

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Individual values - At termination of treatment

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	TOE					
		PUPIL REFLEX	PINCH REACT.	GRASP RESPONSE	GRIP STRENGTH	EYELID REFLEX	STARTLE RESPONSE
3 (336.7)	51	1	1	1	0	1	1
	52	1	1	1	1	1	1
	53	1	1	1	1	1	1
	54	1	1	0	1	1	1
	55	1	1	1	1	1	1
	56	1	1	1	1	1	1
	57	1	1	1	0	1	1
	58	1	1	1	1	1	1
	59	1	1	1	1	1	1
	60	1	0	1	1	1	1
4 (1020)	71	1	1	1	1	1	1
	72	1	1	1	1	1	1
	73	1	1	0	0	1	1
	74	1	1	1	1	1	1
	75	1	1	1	1	1	1
	76	1	1	1	1	1	1
	77	1	1	1	1	1	1
	78	1	1	1	1	1	1
	79	1	1	1	1	1	1
	80	1	1	1	1	1	1

0 = No reaction 1 = Reaction

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Individual values - At termination of treatment

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	HEAD SHAKE RESPONSE	RIGHTING REFLEX TABLE	RIGHTING REFLEX HAND	PLACING REFLEX	NEGA- TIVE GEOTAXIS
1 (0)	11	1	1	1	1	1
	12	1	1	1	1	1
	13	1	1	1	1	1
	14	1	1	1	1	1
	15	1	1	1	0	0
	16	1	1	1	1	1
	17	1	1	1	1	1
	18	1	1	1	1	1
	19	1	1	1	1	1
	20	1	1	1	1	1
2 (102)	31	d				
	32		1	1	1	1
	33		1	1	1	1
	34		1	1	1	0
	35		1	1	1	1
	36		1	1	1	1
	37		1	1	0	1
	38		1	1	1	1
	39		1	1	1	1
	40		1	1	1	1

0 = No reaction 1 = Reaction

d = unscheduled death

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Stimuli-induced clinical observations

Individual values - At termination of treatment

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	HEAD SHAKE RESPONSE	RIGHTING REFLEX TABLE	RIGHTING REFLEX HAND	PLACING REFLEX	NEGA- TIVE GEOTAXIS
3 (336.7)	51	1	1	1	1	1
	52	1	1	1	1	1
	53	1	1	0	1	1
	54	1	1	1	1	1
	55	1	1	1	1	1
	56	1	1	1	1	1
	57	1	1	1	1	0
	58	1	1	1	1	1
	59	1	1	1	1	1
	60	1	1	1	1	1
4 (1020)	71	1	1	1	1	1
	72	1	1	1	1	1
	73	1	1	1	1	1
	74	1	1	1	1	1
	75	1	1	1	1	1
	76	1	1	1	1	1
	77	1	1	1	1	1
	78	1	1	1	1	1
	79	1	1	1	1	1
	80	1	1	1	1	1

0 = No reaction 1 = Reaction

Table 22 Body weight – Individual

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Body weight and body weight gain (g)

Individual values - From arrival to Day 91

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	DAY OF ARRIVAL	DAY -7	DAY -1	DAY 1	DAY 8	DAY 15	DAY 22	DAY 29	DAY 36
1 (0)	1	117	174	222	226	267	290	311	330	345
	2	114	175	230	239	294	341	379	422	440
	3	110	180	236	246	306	344	393	430	456
	4	127	187	246	254	311	353	377	404	419
	5	117	169	219	223	274	304	330	358	378
	6	111	171	221	234	293	334	362	388	407
	7	115	177	230	239	292	333	363	393	412
	8	112	183	245	253	309	345	374	407	434
	9	125	187	236	246	294	334	365	394	415
	10	110	172	227	232	291	325	348	371	390
2 (102)	21	122	184	239	250	306	351	380	415	434
	22	124	183	237	247	296	337	357	387	412
	23	112	179	226	235	285	327	366	398	417
	24	116	172	220	227	279	321	347	379	396
	25	115	177	233	244	302	354	387	418	437
	26	114	176	230	239	283	312	332	351	365
	27	118	190	247	258	330	386	422	456	492
	28	119	176	233	241	302	346	376	410	423
	29	114	171	226	233	291	336	362	398	425
	30	114	176	227	237	292	341	367	395	414

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Body weight and body weight gain (g)

Individual values - From arrival to Day 91

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	DAY OF ARRIVAL	DAY -7	DAY -1	DAY 1	DAY 8	DAY 15	DAY 22	DAY 29	DAY 36
3 (336.7)	41	113	176	236	244	292	331	355	384	407
	42	128	186	236	245	297	328	343	366	379
	43	117	183	237	245	300	335	369	395	414
	44	122	189	246	255	306	344	372	400	420
	45	125	186	235	241	294	336	367	399	414
	46	111	163	208	220	269	317	343	365	385
	47	122	180	227	239	288	328	362	389	409
	48	115	174	227	237	294	339	364	392	412
	49	117	176	229	236	283	318	347	370	389
	50	114	173	225	229	283	325	353	383	406
4 (1020)	61	122	190	203	195	302	346	377	403	428
	62	116	180	192	181	278	322	356	380	415
	63	122	182	233	244	297	340	370	405	425
	64	111	177	235	240	306	376	420	457	485
	65	112	174	231	244	308	355	386	411	428
	66	127	187	243	251	308	361	391	426	455
	67	124	185	243	254	308	352	376	406	438
	68	122	185	240	246	304	348	379	400	423
	69	123	188	247	254	309	353	385	424	449
	70	120	187	247	257	311	348	378	400	422

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Body weight and body weight gain (g)

Individual values - From arrival to Day 91

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	BODY WT								GAIN 1 TO 91
		DAY 43	DAY 50	DAY 57	DAY 64	DAY 71	DAY 78	DAY 85	DAY 91	
1 (0)	1	354	361	361	376	390	390	402	396	170
	2	455	469	458	464	471	495	501	492	253
	3	473	491	497	504	523	535	557	554	308
	4	434	444	444	448	460	466	476	468	214
	5	397	411	411	428	438	447	453	449	226
	6	424	442	447	457	461	469	481	473	239
	7	427	444	447	459	468	489	494	492	253
	8	427	459	456	470	480	495	513	502	249
	9	428	445	444	455	466	479	488	492	246
	10	410	421	421	424	440	444	451	449	217
2 (102)	21	448	461	472	479	499	508	519	511	261
	22	429	452	452	469	483	497	509	509	262
	23	436	448	439	452	462	468	475	483	248
	24	412	422	429	444	453	469	476	480	253
	25	452	472	465	486	492	501	510	505	261
	26	379	391	387	403	410	429	438	434	195
	27	507	529	536	522	544	565	582	588	330
	28	440	457	465	472	470	487	503	486	245
	29	443	457	458	474	483	490	497	503	270
	30	429	446	444	453	465	475	481	482	245

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Body weight and body weight gain (g)

Individual values - From arrival to Day 91

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	DAY								BODY WT GAIN 1 TO 91
		43	50	57	64	71	78	85	91	
3 (336.7)	41	423	430	422	431	445	451	461	454	210
	42	391	402	395	393	406	416	425	423	178
	43	428	443	439	449	467	477	486	482	237
	44	435	447	442	463	478	488	497	504	249
	45	434	450	440	454	467	478	490	489	248
	46	403	414	422	433	443	451	458	461	241
	47	420	428	425	436	449	456	468	460	221
	48	435	443	446	436	468	471	496	497	260
	49	402	414	405	418	428	436	450	448	212
	50	429	437	438	444	459	467	481	482	253
4 (1020)	61	435	451	452	466	479	487	496	493	298
	62	429	442	435	453	461	474	471	479	298
	63	447	469	471	488	492	503	521	518	274
	64	505	534	538	551	560	572	595	587	347
	65	442	453	468	463	464	471	486	492	248
	66	465	476	453	483	479	498	510	513	262
	67	456	472	471	479	490	511	521	519	265
	68	435	442	433	438	446	454	466	473	227
	69	461	480	472	483	503	506	522	523	269
	70	437	448	444	462	472	472	485	481	224

Xylanase, PPQ33502

Body weight and body weight gain (g)

Individual values - From arrival to Day 91

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	DAY OF ARRIVAL	DAY -7	DAY -1	DAY 1	DAY 8	DAY 15	DAY 22	DAY 29	DAY 36
1 (0)	11	123	155	180	183	223	219	241	248	259
	12	126	159	185	191	211	222	240	250	253
	13	109	148	175	179	195	221	236	247	247
	14	117	155	185	190	217	236	251	262	287
	15	121	153	186	190	201	204	228	243	257
	16	116	151	177	182	196	219	237	238	251
	17	124	161	182	188	221	237	247	267	270
	18	115	156	172	182	209	217	244	246	247
	19	111	149	176	178	197	209	225	245	265
	20	111	153	179	176	208	230	243	263	266
2 (102)	31	112	152	181	182	197	218	236	251	254
	32	119	154	186	178	213	237	248	253	275
	33	122	145	171	171	187	208	219	224	224
	34	119	164	189	193	226	255	247	248	270
	35	107	145	173	170	199	216	237	251	260
	36	125	170	197	200	199	228	242	247	257
	37	111	152	175	181	213	223	247	256	269
	38	109	150	169	175	200	223	230	251	261
	39	121	154	169	175	190	221	221	244	250
	40	118	163	185	194	209	242	266	284	278

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Body weight and body weight gain (g)

Individual values - From arrival to Day 91

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	DAY OF ARRIVAL	DAY -7	DAY -1	DAY 1	DAY 8	DAY 15	DAY 22	DAY 29	DAY 36
3 (336.7)	51	109	139	160	164	183	198	218	227	230
	52	113	153	192	197	225	233	229	260	260
	53	113	154	182	188	223	208	255	269	257
	54	121	156	179	184	200	225	226	258	246
	55	127	165	190	194	196	221	236	250	248
	56	114	158	176	184	208	233	257	250	265
	57	119	152	180	180	191	200	218	229	235
	58	110	154	182	184	224	250	251	268	277
	59	106	146	167	178	201	237	241	267	279
	60	109	153	188	188	204	227	227	249	256
4 (1020)	71	117	156	183	186	216	229	244	261	272
	72	120	156	180	185	202	210	232	241	246
	73	116	152	177	178	204	227	243	259	259
	74	121	145	174	175	192	221	235	244	251
	75	127	165	191	185	209	224	234	254	256
	76	120	156	183	182	205	219	239	253	259
	77	121	156	182	175	203	214	235	242	244
	78	123	159	179	179	193	203	224	232	227
	79	120	154	181	173	205	237	251	251	254
	80	113	148	166	169	197	220	226	247	246

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Body weight and body weight gain (g)

Individual values - From arrival to Day 91

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	DAY 43	DAY 50	DAY 57	DAY 64	DAY 71	DAY 78	DAY 85	DAY 91	BODY WT GAIN 1 TO 91
1 (0)	11	266	284	291	285	283	283	276	274	91
	12	257	261	267	268	276	281	288	284	93
	13	255	267	268	267	279	283	283	282	103
	14	293	284	268	282	291	291	291	300	110
	15	242	255	253	277	268	261	276	279	89
	16	256	262	269	268	278	277	289	297	115
	17	276	284	286	279	291	298	309	307	119
	18	254	257	253	253	256	276	268	279	97
	19	255	258	252	257	259	263	270	269	91
	20	259	276	274	281	288	281	293	289	113
2 (102)	31 d	251								
	32	285	280	278	296	288	295	298	300	122
	33	234	238	232	244	241	245	243	250	79
	34	274	277	278	285	289	295	289	301	108
	35	268	265	270	274	281	281	287	291	121
	36	260	267	258	266	269	276	270	276	76
	37	269	271	272	281	281	280	292	290	109
	38	269	273	270	270	279	291	290	294	119
	39	250	256	256	250	267	271	275	276	101
	40	282	287	280	295	292	307	310	298	104

d = unscheduled death

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Body weight and body weight gain (g)

Individual values - From arrival to Day 91

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	DAY								BODY WT GAIN 1 TO 91
		43	50	57	64	71	78	85	91	
3 (336.7)	51	234	242	241	243	246	252	259	258	94
	52	259	279	279	280	277	290	293	294	97
	53	282	282	277	291	283	303	296	309	121
	54	259	269	264	264	277	282	284	285	101
	55	262	268	260	265	275	283	285	281	87
	56	267	270	266	268	281	276	288	286	102
	57	235	240	235	244	248	247	260	257	77
	58	277	294	291	297	299	301	313	312	128
	59	281	293	276	292	300	304	305	315	137
	60	252	270	259	266	268	272	278	273	85
4 (1020)	71	275	279	279	286	282	295	301	296	110
	72	241	254	254	251	246	260	267	261	76
	73	266	272	268	266	282	284	283	286	108
	74	250	259	244	264	249	262	257	268	93
	75	247	269	251	270	270	268	288	281	96
	76	256	270	270	275	274	281	288	278	96
	77	255	260	257	261	269	273	278	278	103
	78	238	247	245	242	253	250	248	260	81
	79	267	260	267	271	274	276	281	289	116
	80	256	262	261	261	272	277	298	294	125

Table 23 Food consumption – Individual values

Xylanase, PPQ33502								
A 90-Day Gavage Toxicity Study in Rats								
Food consumption (g)								
Values per animal - Week 1 to Week 13								
Males								
GROUP (Dose mg TOS/kg bw/day)	CAGE NO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7
1 (0)	1	169.5	168.5	170.5	170.5	171.0	165.0	152.0
	2	178.5	180.5	184.0	183.0	178.5	177.0	173.0
	3	167.5	169.0	170.0	172.0	169.5	169.5	168.5
	4	187.5	188.5	183.0	183.5	187.5	178.0	171.5
	5	167.5	170.5	172.5	170.5	166.5	168.0	169.0
2 (102)	11	179.0	174.0	173.5	170.5	176.5	177.0	173.0
	12	169.5	168.5	169.5	172.5	168.5	167.0	160.5
	13	171.0	172.0	163.5	165.0	172.5	165.5	160.5
	14	181.5	190.5	191.0	185.5	193.0	189.0	183.0
	15	181.0	186.5	177.5	175.0	179.5	174.5	166.0
3 (336.7)	21	177.0	169.0	165.0	168.5	170.0	167.5	157.5
	22	175.5	175.5	186.5	172.0	178.0	171.5	170.5
	23	167.0	164.5	175.5	170.5	165.0	170.5	156.5
	24	174.0	179.0	178.5	174.5	174.5	172.5	158.0
	25	173.5	175.5	177.5	167.5	171.5	171.0	164.5
4 (1020)	31	190.0	173.5	172.5	168.5	171.0	170.5	166.0
	32	179.5	192.0	196.5	195.0	179.0	190.5	190.0
	33	185.5	190.5	190.5	182.0	186.0	175.5	167.0
	34	180.0	187.5	191.0	180.0	190.0	182.5	175.5
	35	184.0	180.5	182.0	182.5	187.0	183.5	180.0

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Food consumption (g)

Values per animal - Week 1 to Week 13

Males

GROUP (Dose mg TOS/kg bw/day)	CAGE NO	WEEK 8	WEEK 9	WEEK 10	WEEK 11	WEEK 12	WEEK 13	TOTAL, WEEK 1 TO WEEK 13
1 (0)	1	164.0	176.0	177.5	174.0	179.5	132.5	2170.5
	2	177.5	186.0	192.0	188.5	195.5	145.5	2339.5
	3	175.5	185.5	179.5	181.5	176.5	135.0	2219.5
	4	185.5	198.5	195.5	205.5	198.0	145.0	2407.5
	5	171.0	182.5	180.0	178.5	173.5	134.5	2204.5
2 (102)	11	185.0	195.5	186.5	192.0	196.5	145.5	2324.5
	12	165.5	183.5	177.5	177.5	177.5	134.0	2191.5
	13	169.0	190.5	186.0	185.0	179.0	131.5	2211.0
	14	186.0	183.5	193.5	199.5	201.0	148.5	2425.5
	15	174.5	188.5	183.0	180.0	180.5	134.0	2280.5
3 (336.7)	21	161.5	171.5	176.0	170.5	168.5	125.0	2147.5
	22	170.5	185.5	186.5	186.0	183.5	135.0	2276.5
	23	160.5	171.5	186.5	183.5	186.5	137.5	2195.5
	24	164.0	183.0	185.0	180.0	186.0	134.0	2243.0
	25	156.5	172.5	177.0	175.0	178.5	129.5	2190.0
4 (1020)	31	166.5	179.0	180.5	179.5	188.0	138.0	2243.5
	32	191.5	200.0	194.0	205.5	209.0	157.0	2479.5
	33	172.5	186.0	169.5	185.5	178.0	134.5	2303.0
	34	175.0	194.0	189.0	193.5	191.0	143.0	2372.0
	35	162.0	190.0	187.0	187.5	187.5	135.0	2328.5

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Food consumption (g)

Values per animal - Week 1 to Week 13

Females

GROUP (Dose mg TOS/kg bw/day)	CAGE NO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7
1 (0)	6	128.0	111.5	123.0	118.5	115.5	118.0	123.0
	7	119.5	120.5	121.0	117.0	126.5	123.5	107.5
	8	117.5	111.0	117.5	112.5	120.5	108.5	110.0
	9	125.5	124.0	131.0	126.5	116.5	120.5	125.0
	10	115.0	118.5	116.5	125.0	130.5	108.5	107.0
2 (102)	16	123.5	129.0	127.5	121.5	122.5	121.5	.
	17	116.0	124.5	103.5	108.0	113.5	110.5	105.0
	18	114.5	114.5	121.5	117.5	113.5	112.5	107.5
	19	121.0	121.5	127.0	126.0	125.5	118.5	110.0
	20	125.0	129.5	133.0	142.0	120.0	118.0	115.0
3 (336.7)	26	118.5	111.0	108.5	115.0	113.0	113.0	112.0
	27	129.0	111.0	125.5	143.5	114.0	122.5	122.5
	28	106.5	116.0	124.5	112.5	117.5	116.5	106.0
	29	112.0	184.5	114.0	113.0	119.5	110.5	114.0
	30	119.5	129.0	121.5	128.5	121.5	119.5	122.0
4 (1020)	36	118.5	115.0	118.0	118.5	121.0	115.0	110.0
	37	115.0	127.5	119.5	121.0	113.0	115.0	111.0
	38	109.0	114.5	123.0	119.0	121.5	122.5	117.5
	39	109.0	111.5	117.5	106.5	109.0	109.5	102.5
	40	125.0	134.0	130.0	115.0	113.5	122.0	113.5

. = cage mate unscheduled death

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Food consumption (g)

Values per animal - Week 1 to Week 13

Females

GROUP (Dose mg TOS/kg bw/day)	CAGE NO	WEEK 8	WEEK 9	WEEK 10	WEEK 11	WEEK 12	WEEK 13	TOTAL, WEEK 1 TO WEEK 13
1 (0)	6	138.5	138.0	118.5	120.0	120.5	86.0	1559.0
	7	114.5	129.0	130.0	128.5	78.5	102.5	1518.5
	8	119.0	136.5	117.0	121.5	124.0	105.5	1521.0
	9	129.5	128.0	127.5	142.0	127.5	97.0	1620.5
	10	111.0	116.5	123.0	122.0	123.0	92.0	1508.5
2 (102)	16	138.0	149.0	136.0	149.0	137.0	105.0	.
	17	117.5	128.0	117.5	120.5	114.0	91.5	1470.0
	18	108.0	115.0	116.0	119.0	105.5	91.5	1456.5
	19	115.0	119.5	123.5	129.5	125.0	93.5	1555.5
	20	118.5	127.5	137.0	134.5	133.0	86.0	1619.0
3 (336.7)	26	113.0	115.5	125.0	123.5	113.5	87.0	1468.5
	27	116.0	139.5	132.0	141.0	134.0	99.5	1630.0
	28	107.0	119.0	125.5	120.5	118.0	87.5	1477.0
	29	114.0	121.0	118.0	132.5	122.5	89.5	1565.0
	30	99.5	135.5	124.5	138.0	132.0	101.0	1592.0
4 (1020)	36	112.5	126.0	116.5	122.0	121.0	85.5	1499.5
	37	106.5	118.5	117.5	126.5	115.0	86.5	1492.5
	38	116.5	129.0	128.5	123.0	129.5	88.5	1542.0
	39	107.5	116.0	115.5	115.5	115.0	89.0	1424.0
	40	111.5	127.5	121.0	127.5	134.5	100.0	1575.0

. = cage mate unscheduled death

Table 24 Water consumption – Values per animal

Xylanase, PPQ33502										
A 90-Day Gavage Toxicity Study in Rats										
Water consumption (g)										
Values per animal - Day 1 to Day 91										
Males										
GROUP (Dose mg TOS/kg bw/day)	CAGE NO	DAY 1-4	DAY 4-8	DAY 8-11	DAY 11-15	DAY 15-18	DAY 18-22	DAY 22-25	DAY 25-29	DAY 29-32
1 (0)	1	85.0	121.5	91.5	133.0	91.0	121.5	87.0	127.0	97.0
	2	98.0	141.5	102.5	141.0	114.0	139.5	98.5	149.5	108.0
	3	82.5	.	89.0	133.0	95.0	126.5	92.0	136.5	106.0
	4	96.5	144.0	100.5	146.0	99.0	132.0	99.5	141.0	113.5
	5	84.0	129.0	90.5	128.5	89.0	126.0	93.0	126.5	95.5
2 (102)	11	93.0	138.5	120.0	141.5	100.0	137.5	102.0	148.5	119.5
	12	82.5	123.0	93.0	122.0	88.0	124.0	90.0	136.0	97.5
	13	90.0	135.5	94.0	133.5	95.5	125.5	93.0	136.0	101.0
	14	95.5	130.5	98.0	141.0	102.0	140.0	99.0	152.0	110.5
	15	93.5	137.5	104.0	137.5	98.0	138.0	105.5	149.5	114.0
3 (336.7)	21	100.0	137.5	100.0	133.0	97.5	126.5	92.0	136.5	103.5
	22	89.5	138.0	.	136.0	100.5	133.0	89.5	133.0	103.5
	23	92.5	131.5	105.0	143.5	98.0	134.5	99.0	142.0	100.0
	24	87.0	136.0	97.0	136.5	91.5	135.0	94.5	140.5	108.0
	25	97.5	133.0	104.5	143.5	103.0	136.0	96.5	137.0	117.0
4 (1020)	31	.	77.0	104.5	139.5	100.5	155.5	106.5	148.0	111.0
	32	95.5	133.5	102.5	142.5	104.5	141.0	105.5	156.0	121.0
	33	100.0	140.0	.	134.0	101.5	171.0	104.5	146.5	104.5
	34	88.0	132.5	98.5	146.5	104.0	38.0#	.	146.5	113.5
	35	101.0	151.0	103.0	.	107.0	151.0	114.0	183.0	133.0

= outlier excluded from statistical analysis
 . = problems with the bottle

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Water consumption (g)

Values per animal - Day 1 to Day 91

Males

GROUP (Dose mg TOS/kg bw/day)	CAGE NO	DAY 32-36	DAY 36-39	DAY 39-43	DAY 43-46	DAY 46-50	DAY 50-53	DAY 53-57	DAY 57-60	DAY 60-64
1 (0)	1	124.0	89.0	122.0	70.5	114.5	98.5	110.5	83.5	116.0
	2	137.5	103.5	134.5	83.5	E	116.0	339.5#	111.0	140.5
	3	139.5	92.5	126.5	83.0	117.0	108.5	110.0	101.0	136.5
	4	145.5	98.5	131.0	84.0	122.5	106.5	112.5	129.0	150.5
	5	121.5	86.0	115.5	73.0	111.5	100.0	116.0	93.5	127.0
2 (102)	11	140.0	107.5	155.0	88.0	154.0	137.0	128.0	126.0	156.5
	12	122.5	90.5	126.0	70.5	120.0	99.5	106.0	101.0	137.5
	13	135.0	92.0	132.0	74.0	128.0	115.0	131.0	121.5	149.0
	14	150.5	109.0	143.0	90.5	140.0	108.0	116.5	97.5	144.5
	15	141.0	104.0	139.5	85.5	138.0	111.5	131.0	123.0	147.5
3 (336.7)	21	130.5	98.5	133.5	78.5	124.0	103.0	103.5	98.5	136.0
	22	120.5	91.5	122.5	86.5	128.0	111.0	116.5	112.0	138.0
	23	138.5	102.5	134.0	77.5	120.5	98.0	114.5	109.0	148.5
	24	130.0	98.0	131.0	72.5	119.0	99.5	88.0	113.0	136.0
	25	138.5	96.0	133.5	79.0	131.5	112.0	110.0	100.5	136.5
4 (1020)	31	158.0	112.0	139.0	85.0	144.0	131.5	110.5	110.5	139.0
	32	154.0	106.5	148.5	99.0	155.0	110.5	134.0	118.0	148.0
	33	19.0#	104.0	139.5	83.5	121.5	108.0	120.0	104.5	145.5
	34	144.5	99.5	146.5	103.0	131.5	110.0	116.0	122.0	157.0
	35	155.5	165.0	162.5	94.0	153.5	119.5	104.0	131.0	143.5

= outlier excluded from statistical analysis
E = not recorded in error

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Water consumption (g)

Values per animal - Day 1 to Day 91

Males

GROUP (Dose mg TOS/kg bw/day)	CAGE NO	DAY 64-67	DAY 67-71	DAY 71-74	DAY 74-78	DAY 78-81	DAY 81-85	DAY 85-88	DAY 88-91	TOTAL, DAY 1 TO DAY 91
1 (0)	1	100.0	112.0	91.0	112.0	103.5	135.0	78.5	115.0	2730.0
	2	121.0	151.0	95.0	144.5	114.0	158.5	87.0	145.0	¤
	3	106.5	153.0	108.0	138.5	109.5	139.0	89.5	117.5	¤
	4	131.0	152.0	123.0	149.5	144.5	156.0	90.0	120.0	3218.0
	5	97.0	148.0	96.0	106.0	93.0	123.0	68.0	106.0	2743.0
2 (102)	11	135.0	180.0	131.5	151.5	152.5	180.5	108.0	147.0	3478.5
	12	109.0	142.5	113.5	123.0	117.0	135.5	82.5	119.5	2872.0
	13	121.5	290.5	110.5	125.0	124.0	142.5	80.0	118.0	3193.5
	14	122.5	136.0	108.0	125.5	126.0	147.5	78.5	123.0	3135.0
	15	131.0	162.0	120.5	150.0	129.0	151.0	81.5	126.0	3249.5
3 (336.7)	21	109.5	140.5	106.5	122.0	114.0	135.0	80.5	106.5	2947.0
	22	103.5	142.0	108.5	130.5	110.0	140.0	80.5	120.5	¤
	23	121.5	178.0	131.0	154.0	137.0	157.0	91.0	122.0	3180.5
	24	121.5	145.0	128.5	151.5	154.5	164.0	84.5	121.5	3084.0
	25	120.5	153.0	130.0	134.0	117.5	141.0	79.0	126.5	3107.0
4 (1020)	31	126.5	157.0	120.5	139.0	143.0	151.5	93.5	125.0	¤
	32	118.0	166.0	139.5	128.5	145.0	176.5	102.5	134.0	3385.5
	33	90.0	151.0	120.0	129.0	121.0	131.5	87.0	111.0	¤
	34	124.0	158.5	122.5	159.5	113.0	151.5	95.0	123.0	¤
	35	128.5	162.0	129.0	146.0	146.0	144.0	101.0	124.0	¤

¤ Not calculated as individual values on some days were not recorded, either in error or due to problems with the water bottle.

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Water consumption (g)

Values per animal - Day 1 to Day 91

Females

GROUP (Dose mg TOS/kg bw/day)	CAGE NO	DAY 1-4	DAY 4-8	DAY 8-11	DAY 11-15	DAY 15-18	DAY 18-22	DAY 22-25	DAY 25-29	DAY 29-32
1 (0)	6	67.5	104.5	62.0	91.5	70.5	94.5	63.5	110.0	76.0
	7	82.5	109.0	173.5	113.5	80.0	110.5	82.5	114.5	101.0
	8	80.0	105.5	.	98.5	73.5	103.5	65.0	109.5	85.0
	9	84.0	121.5	91.5	110.5	85.5	116.5	86.5	129.0	95.0
	10	70.0	97.5	66.0	99.0	74.5	98.5	74.0	113.5	94.5
2 (102)	16	74.0	97.5	73.0	97.0	132.5	91.0	68.5	94.5	73.0
	17	71.0	105.5	81.0	107.0	74.0	94.5	66.5	107.5	84.5
	18	70.0	106.0	74.0	105.5	73.5	109.5	74.5	122.0	88.5
	19	67.5	95.0	62.5	102.5	71.0	89.0	70.0	107.0	77.0
	20	68.0	95.5	77.0	107.5	73.5	111.5	82.5	113.0	78.0
3 (336.7)	26	71.5	108.0	69.0	91.5	63.5	93.5	71.0	101.0	106.5
	27	67.5	103.5	63.0	86.0	72.5	92.5	77.0	104.5	68.0
	28	58.0	80.5	59.5	85.0	61.5	96.0	59.0	92.5	74.0
	29	65.5	97.5	80.5	108.0	74.0	94.5	68.0	100.5	108.0
	30	68.5	98.0	80.5	105.5	69.0	98.0	83.5	112.0	84.0
4 (1020)	36	67.5	94.5	69.0	86.0	66.0	88.0	70.0	108.0	74.5
	37	72.5	101.0	79.0	101.0	74.5	104.0	74.0	114.5	75.5
	38	72.5	94.5	66.5	99.0	73.5	96.5	70.0	105.5	76.5
	39	75.5	90.0	64.5	.	74.0	92.5	65.5	E	71.0
	40	72.5	93.0	66.0	101.0	70.5	135.0	68.0	98.5	71.5

. = problems with the bottle
E = not recorded in error

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Water consumption (g)

Values per animal - Day 1 to Day 91

Females

GROUP (Dose mg TOS/kg bw/day)	CAGE NO	DAY 32-36	DAY 36-39	DAY 39-43	DAY 43-46	DAY 46-50	DAY 50-53	DAY 53-57	DAY 57-60	DAY 60-64
1 (0)	6	94.0	68.0	101.0	57.5	109.5	92.5	92.0	81.0	90.0
	7	135.5	95.0	117.5	65.0	98.0	86.0	80.5	89.5	113.0
	8	116.0	73.0	108.0	63.0	97.5	91.5	77.0	89.5	118.0
	9	119.0	82.0	117.0	65.0	116.5	97.5	97.0	98.0	100.0
	10	116.0	74.5	93.5	58.0	91.0	72.0	82.0	83.0	110.0
2 (102)	16	94.0	71.5	112.5	111.0	111.0	102.0	112.0	91.0	118.0
	17	107.0	77.0	98.5	60.0	E	111.0	95.5	92.5	116.5
	18	122.5	83.5	116.0	54.0	110.0	87.0	111.5	85.5	104.0
	19	105.5	58.0	93.5	53.0	82.5	72.0	71.0	61.5	89.0
	20	104.0	73.5	96.0	57.0	98.0	83.5	98.0	84.5	99.5
3 (336.7)	26	93.5	69.0	90.5	60.5	91.0	70.5	83.5	72.5	103.5
	27	92.5	72.0	92.5	48.0	109.0	79.5	81.5	79.5	98.5
	28	88.5	61.5	91.0	51.5	75.5	60.5	70.5	76.0	95.0
	29	102.0	73.0	93.0	60.5	97.0	75.0	73.5	77.0	97.5
	30	104.5	76.5	108.5	64.0	110.0	81.5	79.5	90.5	111.0
4 (1020)	36	102.5	68.5	93.5	56.0	86.0	74.0	78.0	87.0	144.5
	37	105.5	70.0	100.0	60.0	80.5	66.0	71.0	73.5	85.5
	38	110.0	70.0	108.0	67.5	86.0	74.0	68.5	80.0	94.5
	39	98.0	75.0	95.5	58.0	89.0	217.5#	77.5	68.5	91.0
	40	93.5	73.5	97.0	53.5	83.0	68.0	71.0	70.0	95.5

= outlier excluded from statistical analysis

E = not recorded in error

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Water consumption (g)

Values per animal - Day 1 to Day 91

Females

GROUP (Dose mg TOS/kg bw/day)	CAGE NO	DAY 64-67	DAY 67-71	DAY 71-74	DAY 74-78	DAY 78-81	DAY 81-85	DAY 85-88	DAY 88-91	TOTAL, DAY 1 TO DAY 91
1 (0)	6	75.0	97.5	81.0	100.0	90.0	97.5	62.5	83.5	2212.5
	7	89.0	117.0	99.0	119.5	114.5	132.0	82.0	95.5	2695.5
	8	73.5	118.0	90.5	101.5	95.5	121.5	74.5	114.5	⌘
	9	77.5	123.5	94.5	116.5	101.0	128.0	77.5	106.5	2637.0
	10	88.5	112.0	82.5	99.5	85.5	103.0	74.0	101.0	2313.5
2 (102)	16	91.0	138.0	101.0	141.0	117.0	116.0	73.0	114.0	2615.0
	17	91.0	114.5	91.0	108.5	94.5	122.0	79.0	92.0	⌘
	18	82.0	111.0	89.5	105.0	84.5	120.5	71.0	100.5	2461.5
	19	78.0	97.0	82.5	91.0	84.0	98.5	58.5	93.5	2110.5
	20	87.5	109.5	84.0	99.0	77.0	114.0	60.0	76.5	2308.0
3 (336.7)	26	86.0	95.0	86.0	101.0	92.5	96.0	60.5	86.5	2213.5
	27	78.0	106.5	83.5	100.0	85.5	108.0	71.0	76.5	2196.5
	28	77.0	98.5	71.0	88.0	71.0	95.5	53.5	80.0	1970.5
	29	85.5	123.0	94.5	118.0	92.0	111.5	68.0	89.0	2326.5
	30	111.0	124.5	7.5	133.0	102.0	131.5	72.0	105.0	2411.5
4 (1020)	36	71.5	92.0	73.0	91.5	83.0	92.0	62.0	84.0	2162.5
	37	77.5	106.0	88.0	101.5	83.0	.	62.0	83.0	⌘
	38	84.0	111.0	87.0	93.0	85.0	105.5	58.5	91.0	2228.0
	39	76.5	98.5	81.5	98.0	73.5	107.5	62.5	88.5	⌘
	40	81.0	103.0	79.5	105.0	90.0	116.0	70.0	89.0	2214.5

. = problems with the bottle

⌘ Not calculated as individual values on some days were not recorded, either in error or due to problems with the water bottle.

Table 25 Ophthalmoscopy – Individual values

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Ophthalmoscopy

Group 1

Animal No/Sex	Before start of treatment	Before termination of treatment
1, male	No abnormal findings	No abnormal findings
2, male	No abnormal findings	Both eyes: Slight lenticular opacity
3, male	No abnormal findings	No abnormal findings
4, male	No abnormal findings	No abnormal findings
5, male	No abnormal findings	No abnormal findings
6, male	No abnormal findings	No abnormal findings
7, male	No abnormal findings	Right eye: No abnormal findings Left eye: Superficial corneal opacities
8, male	No abnormal findings	No abnormal findings
9, male	No abnormal findings	No abnormal findings
10, male	No abnormal findings	No abnormal findings
11, female	No abnormal findings	No abnormal findings
12, female	No abnormal findings	No abnormal findings
13, female	No abnormal findings	No abnormal findings
14, female	No abnormal findings	No abnormal findings
15, female	No abnormal findings	No abnormal findings
16, female	No abnormal findings	Right eye: No abnormal findings Left eye: Slight central lenticular opacities
17, female	No abnormal findings	No abnormal findings
18, female	No abnormal findings	No abnormal findings
19, female	No abnormal findings	Right eye: Slight lenticular opacity Left eye: No abnormal findings
20, female	No abnormal findings	No abnormal findings

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Ophthalmoscopy

Group 2

Animal No/Sex	Before start of treatment	Before termination of treatment
21, male	No abnormal findings	
22, male	No abnormal findings	
23, male	No abnormal findings	
24, male	No abnormal findings	
25, male	No abnormal findings	
26, male	No abnormal findings	
27, male	No abnormal findings	
28, male	Right eye: No abnormal findings Left eye: Superficial corneal opacities	
29, male	No abnormal findings	
30, male	No abnormal findings	
31, female	No abnormal findings	
32, female	No abnormal findings	
33, female	No abnormal findings	
34, female	Right eye: Superficial corneal opacities Left eye: No abnormal findings	
35, female	No abnormal findings	
36, female	No abnormal findings	
37, female	No abnormal findings	
38, female	No abnormal findings	
39, female	No abnormal findings	
40, female	No abnormal findings	

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Ophthalmoscopy

Group 3

Animal No/Sex	Before start of treatment	Before termination of treatment
41, male	No abnormal findings	
42, male	No abnormal findings	
43, male	No abnormal findings	
44, male	No abnormal findings	
45, male	No abnormal findings	
46, male	No abnormal findings	
47, male	No abnormal findings	
48, male	No abnormal findings	
49, male	No abnormal findings	
50, male	No abnormal findings	
51, female	No abnormal findings	
52, female	No abnormal findings	
53, female	No abnormal findings	
54, female	No abnormal findings	
55, female	No abnormal findings	
56, female	No abnormal findings	
57, female	No abnormal findings	
58, female	No abnormal findings	
59, female	No abnormal findings	
60, female	No abnormal findings	

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Ophthalmoscopy

Group 4

Animal No/Sex	Before start of treatment	Before termination of treatment
61, male	No abnormal findings	No abnormal findings
62, male	No abnormal findings	No abnormal findings
63, male	No abnormal findings	Both eyes: Slight central lenticular opacities
64, male	No abnormal findings	No abnormal findings
65, male	No abnormal findings	No abnormal findings
66, male	No abnormal findings	No abnormal findings
67, male	No abnormal findings	No abnormal findings
68, male	No abnormal findings	No abnormal findings
69, male	No abnormal findings	No abnormal findings
70, male	No abnormal findings	No abnormal findings
71, female	No abnormal findings	No abnormal findings
72, female	No abnormal findings	No abnormal findings
73, female	No abnormal findings	No abnormal findings
74, female	No abnormal findings	No abnormal findings
75, female	No abnormal findings	Right eye: No abnormal findings Left eye: Persistence of hyaloid artery
76, female	No abnormal findings	No abnormal findings
77, female	No abnormal findings	No abnormal findings
78, female	No abnormal findings	No abnormal findings
79, female	No abnormal findings	No abnormal findings
80, female	No abnormal findings	No abnormal findings

Table 26 Haematology – Individual values

Xylanase, PPQ33502										
A 90-Day Gavage Toxicity Study in Rats										
Haematology										
Individual values										
Males										
GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	Hb	RBC	% RETIC	RETIC	HT	MCV	MCH	MCHC	WBC
1 (0)	1	9.44	8.32	2.06	0.171	42	50	1.1	22.5	11.3
	2	9.43	8.19	2.63	0.215	42	51	1.2	22.6	16.3
	3	9.79	8.48	2.37	0.201	44	52	1.2	22.4	13.4
	4	9.20	8.07	2.07	0.167	40	50	1.1	23.0	7.4
	5	9.92	8.85	2.01	0.178	44	49	1.1	22.7	15.7
	6	9.56	8.36	1.89	0.158	42	50	1.1	22.9	9.0
	7	9.39	8.79	1.86	0.164	43	49	1.1	21.8	9.9
	8	9.48	8.46	2.13	0.180	43	51	1.1	22.1	9.2
	9	9.39	8.54	1.90	0.162	42	49	1.1	22.4	8.5
	10	9.50	8.58	2.03	0.174	43	50	1.1	22.2	16.3
2 (102)	21	9.43	9.28	1.89	0.175	42	45	1.0	22.4	12.8
	22	9.95	8.95	2.02	0.181	45	50	1.1	22.1	13.6
	23	9.55	8.87	2.42	0.215	43	48	1.1	22.5	10.8
	24	9.45	8.45	2.16	0.182	42	50	1.1	22.4	11.3
	25	9.79	9.14	1.95	0.178	44	48	1.1	22.4	13.8
	26	10.15	9.03	1.82	0.164	45	50	1.1	22.7	8.7
	27	9.63	8.26	2.69	0.222	43	52	1.2	22.5	9.7
	28	10.51	8.77	2.17	0.190	47	54	1.2	22.4	13.7
	29	10.49	9.19	2.16	0.199	47	51	1.1	22.3	11.0
	30	9.75	8.82	1.94	0.171	43	49	1.1	22.5	11.5

Abbreviations and units are explained in [Table 4](#)

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Haematology

Individual values

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	Hb	RBC	% RETIC	RETIC	HT	MCV	MCH	MCHC	WBC
3 (336.7)	41	9.55	8.49	1.84	0.157	42	50	1.1	22.5	10.6
	42	9.20	8.02	1.94	0.156	41	51	1.2	22.3	12.6
	43	9.56	8.67	1.84	0.160	43	49	1.1	22.3	10.9
	44	9.56	8.32	1.85	0.154	43	51	1.2	22.4	14.9
	45	9.66	8.56	2.11	0.180	43	50	1.1	22.4	13.6
	46	e								
	47	9.27	8.37	2.31	0.193	42	50	1.1	22.0	9.2
	48	9.51	8.47	2.17	0.184	43	50	1.1	22.3	10.6
	49	9.87	9.11	2.22	0.202	45	50	1.1	21.7	13.0
	50	9.74	8.45	2.17	0.184	44	52	1.2	22.0	10.4
4 (1020)	61	9.20	8.24	1.97	0.162	41	50	1.1	22.5	9.6
	62	9.32	8.55	2.22	0.190	42	49	1.1	22.1	7.7
	63	9.87	8.80	2.09	0.184	43	49	1.1	22.8	16.7
	64	9.64	8.38	2.30	0.193	42	51	1.2	22.8	9.1
	65	9.38	8.67	2.12	0.183	43	50	1.1	21.7	12.0
	66	9.28	8.74	2.53	0.221	42	48	1.1	22.2	9.7
	67	9.84	8.64	1.85	0.160	44	51	1.1	22.3	14.0
	68	8.38	8.42	3.38	0.284	38	45	1.0	22.3	11.0
	69	9.63	8.72	2.34	0.204	44	50	1.1	22.0	9.4
	70	9.84	8.80	1.96	0.173	44	50	1.1	22.5	14.2

Abbreviations and units are explained in [Table 4](#)

e = haematology not recorded, due to a too small amount of blood sample for the analysis.

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Haematology

Individual values

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	%		%		%		%	
		NEUTRO	NEUTRO	LYMPHO	LYMPHO	EOS	EOS	BASO	BASO
1 (0)	1	11	1.2	87	9.9	1	0.2	0	0.0
	2	11	1.8	87	14.2	1	0.2	0	0.1
	3	9	1.2	88	11.8	1	0.2	0	0.0
	4	9	0.7	88	6.4	1	0.1	0	0.0
	5	9	1.4	86	13.5	1	0.1	1	0.1
	6	12	1.1	84	7.6	1	0.1	0	0.0
	7	12	1.2	86	8.4	1	0.1	0	0.0
	8	7	0.7	92	8.5	0	0.0	0	0.0
	9	10	0.8	86	7.3	1	0.1	0	0.0
	10	10	1.6	87	14.1	1	0.1	0	0.1
2 (102)	21	13	1.6	85	10.8	1	0.1	0	0.0
	22	10	1.3	88	12.0	0	0.1	0	0.0
	23	8	0.9	89	9.6	1	0.1	0	0.0
	24	10	1.2	86	9.7	1	0.1	0	0.0
	25	12	1.6	84	11.6	1	0.2	0	0.0
	26	13	1.1	84	7.3	1	0.1	0	0.0
	27	10	1.0	87	8.4	1	0.1	0	0.0
	28	14	1.9	82	11.3	1	0.1	0	0.0
	29	8	0.9	87	9.6	1	0.1	0	0.0
	30	15	1.8	81	9.3	0	0.1	0	0.0

Abbreviations and units are explained in [Table 4](#)

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Haematology

Individual values

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	% NEUTRO	NEUTRO	% LYMPHO	LYMPHO	% EOS	EOS	% BASO	BASO
3 (336.7)	41	13	1.3	85	9.0	1	0.1	0	0.0
	42	9	1.1	89	11.2	1	0.1	0	0.0
	43	11	1.2	84	9.1	1	0.1	0	0.0
	44	13	1.9	84	12.5	1	0.1	0	0.0
	45	10	1.3	87	11.8	1	0.1	0	0.0
	46	e							
	47	10	0.9	86	7.9	2	0.2	0	0.0
	48	9	0.9	88	9.3	1	0.1	0	0.0
	49	10	1.3	87	11.3	1	0.1	0	0.0
	50	9	0.9	87	9.0	1	0.1	0	0.0
4 (1020)	61	7	0.7	90	8.7	1	0.1	0	0.0
	62	12	1.0	85	6.5	1	0.1	0	0.0
	63	8	1.3	89	14.9	1	0.1	0	0.1
	64	9	0.8	88	8.0	1	0.1	0	0.0
	65	9	1.1	89	10.7	1	0.1	0	0.0
	66	11	1.0	87	8.5	1	0.1	0	0.0
	67	18	2.5	80	11.2	1	0.1	0	0.0
	68	10	1.1	84	9.3	2	0.2	0	0.0
	69	10	1.0	86	8.1	1	0.1	0	0.0
	70	7	1.0	91	12.9	1	0.2	0	0.0

Abbreviations and units are explained in [Table 4](#)

e = haematology not recorded, due to a too small amount of blood sample for the analysis.

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Haematology

Individual values

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	% MONO	MONO	Plt	APTT	Pt	Fib
1 (0)	1	1	0.1	760	20.5	15.3	2.15
	2	1	0.2	878	15.0	15.2	3.06
	3	2	0.3	689	15.0	15.6	3.08
	4	2	0.2	766	15.0	14.9	3.37
	5	4	0.6	698	15.5	15.2	2.76
	6	3	0.3	680	14.0	15.5	2.86
	7	1	0.1	727	15.7	14.6	2.78
	8	0	0.0	850	14.2	15.3	3.44
	9	4	0.3	608	13.7	16.7	3.31
	10	2	0.4	653	13.7	16.2	2.31
2 (102)	21	2	0.2	590	14.7	14.6	2.85
	22	2	0.2	805	15.7	15.8	2.87
	23	2	0.3	751	17.5	16.4	2.23
	24	3	0.3	697	14.2	15.5	2.76
	25	3	0.4	717	13.7	16.2	2.42
	26	3	0.3	726	13.7	15.9	2.93
	27	2	0.2	713	15.7	15.2	3.47
	28	3	0.4	686	13.7	16.2	3.78
	29	3	0.3	761	14.0	16.4	3.71
	30	3	0.4	798	14.0	16.1	2.70

Abbreviations and units are explained in [Table 4](#)

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Haematology

Individual values

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	% MONO	MONO	Plt	APTT	Pt	Fib
3 (336.7)	41	1	0.1	686	15.7	15.0	2.68
	42	1	0.2	695	13.0	15.9	2.47
	43	4	0.5	717	13.7	16.4	3.25
	44	2	0.4	707	14.5	16.5	2.89
	45	2	0.3	743	15.5	15.5	2.77
	46 e				15.7	17.0	2.59
	47	2	0.1	707	11.5	16.2	3.20
	48	2	0.2	734	12.7	17.1	2.81
	49	2	0.3	731	12.2	15.6	2.69
	50	3	0.3	751	14.0	16.2	3.05
4 (1020)	61	1	0.1	669	15.2	14.9	2.51
	62	2	0.2	741	14.0	16.1	3.35
	63	2	0.4	769	16.0	16.1	2.46
	64	2	0.2	691	14.2	15.6	3.74
	65	1	0.1	819	14.7	16.8	3.36
	66	1	0.1	741	14.0	15.9	2.89
	67	1	0.1	641	13.7	16.8	2.99
	68	4	0.4	805	14.2	15.9	2.99
	69	2	0.2	806	12.2	15.9	3.17
	70	1	0.1	723	14.7	15.3	2.68

Abbreviations and units are explained in [Table 4](#)

e = haematology not recorded, due to a too small amount of blood sample for the analysis.

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Haematology

Individual values

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	Hb	RBC	% RETIC	RETIC	HT	MCV	MCH	MCHC	WBC
1 (0)	11	8.82	7.68	2.05	0.158	41	53	1.2	21.8	8.5
	12	9.50	8.44	1.98	0.167	43	51	1.1	22.0	14.5
	13	9.37	7.97	3.36	0.268	43	54	1.2	21.9	20.2
	14	9.14	7.85	3.31	0.260	42	53	1.2	21.9	12.8
	15	8.69	7.56	2.21	0.167	38	50	1.2	23.0	9.4
	16	e								
	17	8.93	7.30	1.85	0.135	40	55	1.2	22.3	8.6
	18	9.60	8.06	3.01	0.242	43	53	1.2	22.3	9.0
	19	9.38	8.04	2.28	0.183	42	53	1.2	22.2	8.2
	20	6.42	7.98	2.39	0.190	42	53	0.8	15.2	8.6
2 (102)	31	d								
	32		9.62	8.42	1.94	0.164	43	51	1.1	22.2
	33		9.15	8.20	2.49	0.204	41	50	1.1	22.1
	34	e								
	35		8.37	7.26	2.45	0.178	38	52	1.2	22.3
	36		9.15	8.11	2.57	0.209	42	51	1.1	22.0
	37	e								
	38		9.63	8.17	2.14	0.175	43	53	1.2	22.4
	39		8.38	7.12	2.56	0.182	38	53	1.2	22.2
	40		9.64	8.24	1.81	0.149	43	52	1.2	22.7

Abbreviations and units are explained in [Table 4](#)

e = haematology not recorded due to error in the analysing equipment

d = unscheduled death

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Haematology

Individual values

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	Hb	RBC	% RETIC	RETIC	HT	MCV	MCH	MCHC	WBC
3 (336.7)	51	9.08	7.94	2.38	0.189	42	52	1.1	21.8	10.2
	52	8.59	7.24	2.40	0.174	39	53	1.2	22.3	13.5
	53	8.81	7.29	2.85	0.208	39	54	1.2	22.6	8.1
	54	e								
	55	8.92	7.13	2.73	0.195	38	53	1.3	23.7	13.2
	56	9.15	7.88	2.35	0.185	41	52	1.2	22.5	9.9
	57	9.04	7.60	2.27	0.172	40	53	1.2	22.4	9.7
	58	9.50	8.30	2.04	0.169	42	51	1.1	22.5	7.4
	59	9.50	8.14	2.40	0.196	42	52	1.2	22.7	18.1
	60	9.04	7.74	2.49	0.192	40	52	1.2	22.5	10.8
4 (1020)	71	9.04	7.83	2.46	0.192	40	51	1.2	22.4	12.1
	72	9.38	8.05	2.57	0.207	43	53	1.2	21.9	10.5
	73	8.66	7.46	2.36	0.176	39	52	1.2	22.3	9.1
	74	8.92	7.52	1.88	0.141	41	54	1.2	21.9	9.6
	75	e								
	76	8.71	7.47	2.07	0.155	39	52	1.2	22.4	7.8
	77	9.04	7.81	2.93	0.229	41	52	1.2	22.3	8.1
	78	9.27	8.23	2.64	0.218	42	51	1.1	22.3	13.3
	79	9.50	8.06	2.33	0.188	42	52	1.2	22.6	10.1
	80	9.27	8.03	2.95	0.237	41	52	1.2	22.4	8.0

Abbreviations and units are explained in [Table 4](#)

e = haematology not recorded due to error in the analysing equipment

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Haematology

Individual values

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	% NEUTRO	NEUTRO	% LYMPHO	LYMPHO	% EOS	EOS	% BASO	BASO
1 (0)	11	12	1.0	83	7.1	1	0.1	0	0.0
	12	12	1.8	81	11.8	3	0.5	1	0.1
	13	15	3.0	80	16.1	3	0.6	1	0.1
	14	13	1.6	83	10.6	1	0.2	0	0.1
	15	9	0.9	88	8.3	1	0.1	0	0.0
	16	e							
	17	8	0.7	89	7.7	2	0.2	0	0.0
	18	6	0.6	92	8.3	1	0.0	0	0.0
	19	8	0.7	88	7.3	2	0.1	0	0.0
	20	8	0.7	91	7.8	1	0.1	0	0.0
2 (102)	31	d							
	32	10	1.0	86	9.0	1	0.2	0	0.0
	33	10	0.8	87	7.5	1	0.1	0	0.0
	34	e							
	35	8	1.0	89	11.6	1	0.1	1	0.1
	36	6	0.4	92	5.9	1	0.1	0	0.0
	37	e							
	38	8	0.8	90	9.1	2	0.2	0	0.0
	39	10	0.9	88	8.2	1	0.1	0	0.0
	40	7	0.7	89	8.1	1	0.1	0	0.0

Abbreviations and units are explained in [Table 4](#)

e = haematology not recorded due to error in the analysing equipment

d = unscheduled death

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Haematology

Individual values

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	% NEUTRO	NEUTRO	% LYMPHO	LYMPHO	% EOS	EOS	% BASO	BASO
3 (336.7)	51	7	0.7	91	9.3	1	0.1	0	0.0
	52	12	1.6	86	11.6	1	0.1	1	0.1
	53	12	1.0	82	6.6	2	0.1	0	0.0
	54	e							
	55	11	1.4	85	11.2	1	0.1	1	0.1
	56	10	1.0	86	8.5	1	0.1	1	0.1
	57	12	1.2	84	8.1	1	0.1	0	0.0
	58	9	0.7	88	6.5	1	0.1	0	0.0
	59	8	1.4	90	16.2	1	0.1	0	0.1
	60	12	1.2	85	9.2	2	0.2	1	0.1
4 (1020)	71	14	1.7	81	9.8	1	0.2	0	0.0
	72	10	1.1	87	9.1	1	0.1	0	0.0
	73	9	0.8	89	8.1	1	0.1	0	0.0
	74	10	1.0	87	8.3	1	0.1	0	0.0
	75	e							
	76	9	0.7	88	6.8	1	0.1	0	0.0
	77	8	0.7	90	7.2	1	0.0	0	0.0
	78	7	0.9	90	12.0	1	0.1	1	0.1
	79	9	0.9	87	8.8	1	0.1	0	0.0
	80	10	0.8	87	6.9	2	0.1	0	0.0

Abbreviations and units are explained in [Table 4](#)

e = haematology not recorded due to error in the analysing equipment

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Haematology

Individual values

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	% MONO	MONO	Plt	APTT	Pt	Fib
1 (0)	11	3	0.2	694	11.0	14.9	1.75
	12	3	0.4	740	C	14.0	3.23
	13	2	0.4	573	11.7	14.4	2.26
	14	3	0.4	838	10.5	14.9	2.02
	15	1	0.1	738	10.5	14.3	2.00
	16	e			15.0	14.1	2.59
	17	1	0.1	643	11.5	14.3	1.90
	18	1	0.1	825	10.5	15.0	1.84
	19	2	0.2	731	10.5	14.7	2.07
	20	0	0.0	914	14.0	14.4	2.77
2 (102)	31	d					
	32	2	0.2	613	10.5	13.7	2.26
	33	2	0.2	841	11.7	15.0	2.29
	34	e			10.5	15.2	2.24
	35	1	0.2	831	10.5	13.7	1.78
	36	1	0.1	701	10.7	14.4	2.56
	37	e			12.2	14.1	2.26
	38	0	0.0	666	10.5	14.4	2.68
	39	2	0.2	770	10.5	14.1	1.95
	40	2	0.2	614	10.5	14.4	2.38

Abbreviations and units are explained in [Table 4](#)

e = haematology not recorded due to error in the analysing equipment

d = unscheduled death

C = blood sample coagulated

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Haematology

Individual values

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	% MONO	MONO	Plt	APTT	Pt	Fib
3 (336.7)	51	1	0.1	810	10.5	14.0	2.15
	52	1	0.2	711	11.2	14.0	2.37
	53	4	0.3	690	12.2	14.9	1.95
	54	e			10.5	15.0	2.11
	55	3	0.4	736	10.7	14.7	2.12
	56	2	0.2	659	10.5	14.3	2.69
	57	3	0.3	687	11.2	13.4	2.26
	58	2	0.2	731	13.0	15.2	2.05
	59	1	0.3	789	11.7	14.4	2.43
	60	1	0.2	666	10.5	13.8	3.58
4 (1020)	71	3	0.3	681	10.5	14.1	2.42
	72	1	0.1	679	11.2	14.4	2.07
	73	1	0.1	644	10.7	14.6	2.50
	74	2	0.2	669	10.5	15.3	2.21
	75	e			10.5	14.4	2.12
	76	2	0.1	723	10.5	15.0	2.18
	77	2	0.1	614	10.7	14.1	2.07
	78	2	0.3	891	10.5	15.5	2.01
	79	3	0.3	743	10.7	14.6	2.04
	80	2	0.1	696	10.5	14.7	2.44

Abbreviations and units are explained in [Table 4](#)

e = haematology not recorded due to error in the analysing equipment

Table 27 Clinical chemistry – Individual values

Xylanase, PPQ33502								
A 90-Day Gavage Toxicity Study in Rats								
Clinical chemistry								
Individual values								
Males								
GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	ALAT	ASAT	ALKPH	TBILI	GGT	CHOL	TRIG
1 (0)	1	1.10	1.43	2.59	1.1	<LOD	1.95	1.61
	2	1.08	1.59	2.42	1.4	<LOD	2.49	1.32
	3	1.36	1.36	2.48	1.1	<LOD	2.38	2.52
	4	1.22	1.69	2.10	1.3	<LOD	2.85	1.35
	5	1.18	1.47	2.55	1.5	<LOD	2.76	1.72
	6	2.28	2.30	2.48	1.5	<LOD	2.25	1.49
	7	1.15	1.43	2.66	1.0	<LOD	1.92	1.42
	8	1.15	1.46	2.18	1.5	0.04	3.48	2.74
	9	1.46	1.67	2.74	1.3	<LOD	2.03	1.53
	10	1.00	1.33	2.47	1.9	<LOD	2.46	1.89
2 (102)	21	1.12	1.56	2.38	1.2	<LOD	2.48	1.91
	22	1.46	1.41	2.26	0.8	<LOD	2.38	1.28
	23	1.15	1.22	2.48	0.7	0.03	1.94	1.91
	24	2.20	2.21	3.10	1.8	0.05	2.19	1.74
	25	2.68	2.80	2.44	1.0	0.03	2.67	2.34
	26	1.47	1.47	1.86	0.7	<LOD	2.31	1.41
	27	0.99	1.21	2.57	1.3	<LOD	2.32	1.32
	28	1.63	1.65	2.83	1.3	<LOD	2.12	0.87
	29	1.22	1.28	2.35	2.0	<LOD	2.96	1.42
	30	1.14	1.60	1.63	1.6	<LOD	2.72	2.03

Abbreviations and units are explained in [Table 5](#)

Limit of detection for GGT = 0.03

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Clinical chemistry

Individual values

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	ALAT	ASAT	ALKPH	TBILI	GGT	CHOL	TRIG
3 (336.7)	41	1.99	2.19	3.31	0.9	<LOD	2.27	1.76
	42	1.41	1.57	2.72	0.9	<LOD	2.04	1.25
	43	1.65	1.68	2.04	1.5	<LOD	1.93	1.55
	44	1.70	1.70	3.14	0.7	<LOD	2.76	1.10
	45	1.16	1.25	2.36	1.3	<LOD	2.31	1.51
	46	1.28	1.34	1.97	1.3	<LOD	2.58	1.23
	47	0.89	1.12	1.67	2.5	<LOD	1.83	1.59
	48	1.46	1.48	2.35	1.3	<LOD	2.32	1.66
	49	1.13	1.47	2.34	2.4	<LOD	2.35	1.64
	50	1.15	1.14	1.81	2.1	<LOD	2.85	2.01
4 (1020)	61	1.68	1.69	2.59	0.8	<LOD	2.68	1.06
	62	1.53	1.63	2.37	0.8	<LOD	1.98	1.27
	63	1.31	1.68	2.31	1.4	<LOD	2.90	1.43
	64	0.98	1.15	1.95	1.2	0.13	3.03	2.01
	65	1.14	1.29	2.68	0.7	<LOD	2.04	1.32
	66	0.97	1.38	2.01	1.3	<LOD	3.12	1.75
	67	1.71	1.88	2.16	2.0	0.03	2.59	1.66
	68	1.29	1.75	2.24	1.3	<LOD	2.17	1.71
	69	0.93	1.20	2.10	2.0	<LOD	2.88	1.65
	70	1.37	1.59	1.90	2.7	<LOD	2.52	2.62

Abbreviations and units are explained in [Table 5](#)

Limit of detection for GGT = 0.03

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Clinical chemistry

Individual values

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	UREA	CREAT	GLUC	Na	K	Ca
1 (0)	1	9.94	26	6.1	145.1	8.52	2.79
	2	10.07	25	5.1	143.6	8.80	2.94
	3	10.32	26	6.1	146.5	8.45	2.84
	4	7.91	22	6.6	145.0	9.80	2.46
	5	9.25	24	6.6	144.3	8.82	2.88
	6	8.65	27	6.6	145.3	7.32	2.85
	7	8.16	24	5.7	146.5	7.86	2.74
	8	7.77	24	5.4	147.3	7.91	2.85
	9	6.90	25	6.5	146.4	6.78	2.80
	10	8.22	24	7.6	144.7	7.64	2.90
2 (102)	21	9.27	23	6.5	145.6	7.60	2.80
	22	7.23	28	6.2	145.6	8.80	2.90
	23	8.72	25	6.6	145.4	8.97	2.87
	24	8.60	26	7.4	145.8	8.53	2.83
	25	8.64	25	5.7	146.6	7.89	2.79
	26	7.88	23	6.9	145.6	8.81	2.95
	27	7.38	27	7.0	145.4	8.22	2.85
	28	7.96	26	6.1	144.1	7.14	2.81
	29	8.62	26	6.7	148.3	6.95	2.98
	30	6.43	22	5.9	143.0	9.12	2.86

Abbreviations and units are explained in [Table 5](#)

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Clinical chemistry

Individual values

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	UREA	CREAT	GLUC	Na	K	Ca
3 (336.7)	41	10.16	27	6.4	146.1	8.48	2.89
	42	7.56	24	5.6	145.6	8.37	2.87
	43	7.24	24	6.1	143.2	9.87	2.74
	44	7.39	23	7.0	145.7	6.97	2.93
	45	7.23	25	6.7	146.7	6.89	2.87
	46	8.24	25	6.7	147.1	7.28	2.78
	47	7.95	25	6.6	144.4	7.68	2.84
	48	9.35	23	7.0	144.3	7.71	2.78
	49	7.14	22	6.4	145.5	6.84	2.96
	50	6.62	21	6.4	144.1	8.31	2.90
4 (1020)	61	7.95	26	6.4	145.4	8.75	2.87
	62	7.46	26	5.0	144.7	9.45	2.83
	63	11.47	29	7.8	142.5	8.20	2.94
	64	10.25	24	6.0	145.3	8.16	2.96
	65	8.27	24	6.6	148.2	6.69	2.80
	66	7.66	23	6.7	146.9	7.00	3.02
	67	7.71	24	6.7	144.7	7.65	2.88
	68	8.05	22	5.8	146.3	7.63	2.87
	69	8.10	25	6.1	147.2	6.90	2.73
	70	7.49	23	6.1	146.1	7.14	2.86

Abbreviations and units are explained in [Table 5](#)

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Clinical chemistry

Individual values

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	Mg	P	Cl	PROTEIN	ALB	GLOBULIN	ALB/G Ratio
1 (0)	1	1.18	2.40	97.5	65.6	45	20.6	2.18
	2	1.20	2.62	95.8	68.7	47	21.7	2.17
	3	1.02	2.48	96.8	65.4	41	24.4	1.68
	4	0.85	3.11	99.5	68.9	44	24.9	1.77
	5	0.99	2.25	95.9	65.1	40	25.1	1.59
	6	1.03	2.66	98.0	66.0	42	24.0	1.75
	7	1.09	2.53	97.6	64.2	43	21.2	2.03
	8	1.12	2.63	96.3	70.0	43	27.0	1.59
	9	0.96	2.37	95.8	62.7	41	21.7	1.89
	10	0.97	2.54	96.5	63.6	40	23.6	1.69
2 (102)	21	1.09	2.57	96.3	65.3	42	23.3	1.80
	22	1.13	2.85	95.4	64.1	40	24.1	1.66
	23	1.03	2.89	95.8	65.3	40	25.3	1.58
	24	1.10	2.87	97.7	65.3	43	22.3	1.93
	25	0.95	2.28	96.9	66.3	43	23.3	1.85
	26	1.09	2.59	95.0	68.2	44	24.2	1.82
	27	1.13	2.77	95.4	65.5	42	23.5	1.79
	28	1.05	2.41	94.9	69.3	43	26.3	1.63
	29	0.98	2.33	96.4	67.4	42	25.4	1.65
	30	1.01	2.84	95.1	65.7	42	23.7	1.77

Abbreviations and units are explained in [Table 5](#)

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Clinical chemistry

Individual values

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	Mg	P	Cl	PROTEIN	ALB	GLOBULIN	ALB/G Ratio
3 (336.7)	41	1.23	2.79	95.4	67.8	45	22.8	1.97
	42	1.12	2.45	98.2	69.4	46	23.4	1.97
	43	1.10	2.72	95.7	62.8	41	21.8	1.88
	44	0.93	2.58	94.8	66.3	41	25.3	1.62
	45	0.95	2.48	96.1	63.7	41	22.7	1.81
	46	0.92	1.97	96.6	67.0	43	24.0	1.79
	47	1.06	2.56	96.9	63.0	41	22.0	1.86
	48	1.07	2.61	97.0	61.4	39	22.4	1.74
	49	0.93	2.61	94.9	68.8	45	23.8	1.89
	50	0.94	2.27	96.0	64.0	42	22.0	1.91
4 (1020)	61	1.04	2.95	95.7	62.4	40	22.4	1.79
	62	1.04	2.41	94.8	65.0	42	23.0	1.83
	63	1.02	2.69	98.9	65.9	41	24.9	1.65
	64	0.93	2.64	95.8	67.0	41	26.0	1.58
	65	0.86	2.26	96.1	63.8	41	22.8	1.80
	66	1.13	2.13	96.0	68.6	45	23.6	1.91
	67	0.97	2.54	94.9	66.3	41	25.3	1.62
	68	1.01	2.51	99.0	69.3	42	27.3	1.54
	69	0.86	2.15	95.9	61.8	38	23.8	1.60
	70	0.94	2.00	94.8	66.9	43	23.9	1.80

Abbreviations and units are explained in [Table 5](#)

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Clinical chemistry

Individual values

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	ALAT	ASAT	ALKPH	TBILI	GGT	CHOL	TRIG
1 (0)	11	0.89	1.30	1.25	0.7	<LOD	3.11	1.42
	12	1.57	2.04	1.31	1.1	<LOD	2.45	1.08
	13	1.01	1.63	1.63	1.3	0.09	1.91	1.27
	14	1.30	1.86	1.70	0.9	<LOD	2.39	1.33
	15	1.03	1.53	1.91	1.0	<LOD	2.97	1.16
	16	1.43	1.83	2.05	1.3	<LOD	2.42	1.35
	17	1.10	1.62	1.53	1.0	<LOD	2.38	1.10
	18	0.95	1.40	1.33	1.0	<LOD	2.06	0.88
	19	0.91	1.51	1.26	1.2	<LOD	2.81	1.28
	20	1.41	1.66	1.41	1.2	0.03	2.60	0.80
2 (102)	31	d						
	32	1.21	1.77	2.03	0.7	<LOD	2.65	1.51
	33	1.02	1.34	2.64	1.1	0.03	2.60	0.83
	34	1.02	1.22	1.40	0.5	<LOD	2.21	1.47
	35	0.93	1.20	1.67	1.0	<LOD	2.40	1.06
	36	0.91	1.29	1.65	0.9	<LOD	2.22	1.11
	37	1.44	1.87	1.84	1.1	<LOD	1.97	1.36
	38	1.10	1.56	1.25	1.0	0.03	2.56	0.66
	39	0.93	1.36	1.97	0.5	<LOD	2.90	1.32
	40	0.91	1.34	1.32	1.4	<LOD	2.35	1.13

Abbreviations and units are explained in [Table 5](#)

Limit of detection for GGT = 0.03

d = unscheduled death

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Clinical chemistry

Individual values

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	ALAT	ASAT	ALKPH	TBILI	GGT	CHOL	TRIG
3 (336.7)	51	1.06	1.61	1.38	0.9	<LOD	3.45	2.36
	52	0.84	1.59	1.83	1.2	<LOD	2.87	0.96
	53	1.06	1.55	1.96	1.2	<LOD	2.38	0.93
	54	1.27	2.14	2.16	0.9	<LOD	3.17	1.20
	55	1.49	2.63	2.09	1.5	<LOD	2.99	1.48
	56	1.18	1.44	1.85	1.1	<LOD	2.45	1.48
	57	2.06	4.74	1.82	1.4	<LOD	3.09	1.30
	58	1.19	1.72	1.67	0.9	<LOD	2.42	1.20
	59	1.04	1.45	1.90	2.1	<LOD	2.82	0.96
	60	0.77	1.35	0.72	0.8	<LOD	2.45	2.30
4 (1020)	71	0.97	1.55	1.47	0.7	<LOD	2.56	1.57
	72	0.92	1.62	1.32	1.1	<LOD	2.27	1.22
	73	0.88	1.20	1.47	0.7	<LOD	2.97	1.57
	74	0.96	1.26	1.53	1.0	0.04	1.67	1.53
	75	1.11	1.96	1.82	1.0	<LOD	3.33	0.68
	76	0.95	1.61	1.51	0.9	<LOD	2.24	0.89
	77	0.93	1.60	2.07	0.7	<LOD	2.72	0.96
	78	0.94	1.62	2.05	1.1	<LOD	3.53	1.27
	79	1.80	2.51	2.02	1.2	<LOD	2.42	1.05
	80	0.77	1.33	1.26	1.2	<LOD	2.34	1.40

Abbreviations and units are explained in [Table 5](#)

Limit of detection for GGT = 0.03

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Clinical chemistry

Individual values

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	UREA	CREAT	GLUC	Na	K	Ca
1 (0)	11	8.18	26	7.2	141.3	8.47	2.89
	12	8.62	29	7.1	145.2	6.29	3.00
	13	7.19	27	6.5	143.2	7.05	2.85
	14	8.79	28	6.6	141.8	6.31	2.98
	15	7.56	26	6.2	143.3	6.36	2.91
	16	9.04	24	5.5	144.4	6.34	3.05
	17	6.56	25	6.3	141.8	8.08	2.93
	18	9.37	28	6.5	141.7	8.18	2.95
	19	8.34	28	5.4	143.5	7.48	2.94
	20	7.04	28	5.9	144.0	7.02	2.95
2 (102)	31 d						
	32	10.40	27	6.9	143.9	6.42	2.88
	33	7.06	25	7.2	142.7	6.84	2.80
	34	8.40	28	6.0	140.8	8.78	3.03
	35	7.60	28	7.3	142.0	6.09	2.83
	36	8.98	33	7.5	142.7	6.05	2.84
	37	8.97	25	6.2	141.1	6.95	2.91
	38	8.14	29	9.7	143.9	6.63	3.05
	39	9.69	26	6.2	141.6	6.85	2.91
	40	7.94	27	6.1	144.2	6.70	3.08

Abbreviations and units are explained in [Table 5](#)

d = unscheduled death

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Clinical chemistry

Individual values

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	UREA	CREAT	GLUC	Na	K	Ca
3 (336.7)	51	10.84	29	7.0	144.8	6.45	2.94
	52	9.02	31	8.5	142.2	7.28	2.98
	53	7.25	25	7.2	141.1	7.74	2.90
	54	7.68	30	6.7	141.6	6.94	2.95
	55	11.03	28	6.4	142.4	6.06	2.98
	56	8.82	28	6.0	145.6	5.52	3.09
	57	10.27	26	6.0	144.7	6.00	2.88
	58	7.68	29	7.1	143.7	6.79	2.86
	59	7.07	32	6.4	142.3	6.29	3.00
	60	7.20	29	6.3	142.9	6.89	2.95
4 (1020)	71	9.49	27	6.3	146.1	6.82	2.95
	72	8.30	27	6.8	147.7	6.55	3.01
	73	7.45	28	7.1	142.3	6.03	2.92
	74	7.47	23	6.7	141.6	7.03	3.01
	75	8.57	29	7.6	143.5	5.77	2.89
	76	7.12	23	6.3	142.2	6.81	2.86
	77	8.54	26	5.4	143.0	7.38	2.80
	78	8.91	26	7.0	143.9	7.27	2.91
	79	6.61	24	6.6	142.6	6.99	2.95
	80	7.80	27	7.2	142.6	6.92	2.95

Abbreviations and units are explained in [Table 5](#)

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Clinical chemistry

Individual values

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	Mg	P	Cl	PROTEIN	ALB	GLOBULIN	ALB/G Ratio
1 (0)	11	1.13	2.48	101.3	66.2	45	21.2	2.12
	12	1.10	2.25	98.6	69.8	47	22.8	2.06
	13	1.03	2.13	98.2	66.1	45	21.1	2.13
	14	1.09	2.43	97.8	68.5	46	22.5	2.04
	15	1.06	2.25	98.1	67.4	46	21.4	2.15
	16	1.03	2.22	98.5	70.1	48	22.1	2.17
	17	1.06	2.07	97.4	66.8	47	19.8	2.37
	18	1.23	2.69	96.4	64.6	45	19.6	2.30
	19	1.14	2.13	98.7	65.5	45	20.5	2.20
	20	1.15	2.11	98.0	70.0	43	27.0	1.59
2 (102)	31	d						
	32	1.06	1.97	98.3	64.7	44	20.7	2.13
	33	1.09	2.29	99.5	65.0	43	22.0	1.95
	34	1.13	2.29	96.7	68.2	45	23.2	1.94
	35	1.02	2.18	101.3	60.2	42	18.2	2.31
	36	1.15	2.03	102.7	64.0	42	22.0	1.91
	37	1.06	2.28	99.6	68.9	46	22.9	2.01
	38	1.35	2.80	98.9	66.7	47	19.7	2.39
	39	1.06	1.95	100.4	69.4	48	21.4	2.24
	40	1.14	2.46	97.3	72.4	50	22.4	2.23

Abbreviations and units are explained in [Table 5](#)

d = unscheduled death

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Clinical chemistry

Individual values

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	Mg	P	Cl	PROTEIN	ALB	GLOBULIN	ALB/G Ratio
3 (336.7)	51	1.09	2.35	97.4	66.3	45	21.3	2.11
	52	1.06	2.33	100.9	64.1	43	21.1	2.04
	53	1.09	2.07	97.2	64.3	45	19.3	2.33
	54	1.14	2.44	98.2	69.1	45	24.1	1.87
	55	0.97	2.28	96.7	68.6	48	20.6	2.33
	56	1.02	1.95	98.6	72.5	50	22.5	2.22
	57	1.15	2.17	98.6	70.1	49	21.1	2.32
	58	1.15	1.65	97.3	69.9	47	22.9	2.05
	59	1.18	2.46	98.0	69.0	48	21.0	2.29
	60	1.08	2.89	99.6	58.3	39	19.3	2.02
4 (1020)	71	0.97	2.10	98.5	70.3	48	22.3	2.15
	72	0.94	2.32	99.6	68.1	47	21.1	2.23
	73	1.02	2.42	96.3	61.0	42	19.0	2.21
	74	1.03	2.55	97.4	66.3	47	19.3	2.44
	75	0.90	1.99	97.3	67.4	46	21.4	2.15
	76	0.98	2.37	98.2	66.8	45	21.8	2.06
	77	1.09	1.84	97.5	67.6	46	21.6	2.13
	78	1.09	1.99	99.7	67.2	45	22.2	2.03
	79	1.08	2.41	97.9	67.4	47	20.4	2.30
	80	1.13	2.84	98.8	66.6	46	20.6	2.23

Abbreviations and units are explained in [Table 5](#)

Table 28 Urinalysis – Individual values

Xylanase, PPQ33502							
A 90-Day Gavage Toxicity Study in Rats							
Urinalysis							
Individual values							
Males							
GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	VOLUME	SPECIFIC GRAVITY	pH	COLOUR	PROTEIN	LEUCO- CYTES
1 (0)	1	8	1.015	8.0	y	0.3	70
	2	12	1.015	8.0	y	0.3	15
	3	10	1.020	8.0	y	≥3.0	500
	4	10	1.020	8.0	y	1.0	70
	5	8	1.015	8.0	y	1.0	125
	6	10	1.015	8.0	y	0.3	70
	7	10	1.010	8.5	y	1.0	70
	8	8	1.025	7.0	dy	≥3.0	125
	9	10	1.020	7.5	y	0.3	70
	10	8	1.015	8.5	dy	1.0	70
2 (102)	21	10	1.020	8.5	dy	≥3.0	500
	22	10	1.015	8.0	y	0.3	15
	23	8	1.020	7.0	dy	1.0	70
	24	10	1.020	7.5	y	0.3	70
	25	12	1.020	7.5	y	0.3	15
	26	10	1.020	7.5	dy	1.0	70
	27	10	1.020	7.5	dy	0.3	15
	28	8	1.020	7.5	dy	1.0	125
	29	6	1.020	8.0	dy	≥3.0	500
	30	10	1.020	7.5	y	1.0	125

ly = light yellow y = yellow dy = dark yellow b = brown

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis

Individual values

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	VOLUME	SPECIFIC GRAVITY	pH	COLOUR	PROTEIN	LEUCO- CYTES
3 (336.7)	41	14	1.020	7.0	ly	0.3	70
	42	12	1.015	7.0	ly	Trace	15
	43	14	1.015	7.0	y	Trace	15
	44	12	1.020	7.0	y	0.3	70
	45	8	1.015	8.0	y	0.3	70
	46	10	1.020	8.0	y	1.0	70
	47	6	1.020	7.5	y	0.3	15
	48	8	1.015	8.5	dy	1.0	70
	49	8	1.020	7.5	y	1.0	70
	50	12	1.025	7.0	y	1.0	125
4 (1020)	61	16	1.020	7.0	ly	Trace	70
	62	10	1.025	8.5	y	0.3	-
	63	12	1.020	7.5	y	1.0	125
	64	16	1.025	7.5	ly	1.0	125
	65	14	1.025	7.0	ly	0.3	70
	66	14	1.025	7.0	ly	1.0	125
	67	14	1.025	7.0	y	1.0	70
	68	14	1.025	7.0	y	0.3	70
	69	10	1.025	7.5	y	1.0	125
	70	14	1.015	8.5	ly	Trace	70

ly = light yellow y = yellow dy = dark yellow b = brown

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis

Individual values

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	NITRITE	BLOOD	GLUCOSE	KETONES	BILI- RUBIN	UROBILI- NOGEN
1 (0)	1	-	-	-	Trace	-	3.2
	2	-	-	-	1.5	-	3.2
	3	-	-	-	1.5	-	3.2
	4	-	-	-	1.5	-	3.2
	5	-	-	-	1.5	-	3.2
	6	-	-	-	1.5	-	3.2
	7	-	-	-	1.5	-	3.2
	8	-	-	-	1.5	-	3.2
	9	-	-	-	1.5	-	3.2
	10	-	-	-	1.5	-	3.2
2 (102)	21	-	-	-	1.5	-	3.2
	22	-	-	-	1.5	-	3.2
	23	-	-	-	1.5	-	3.2
	24	+	-	-	1.5	-	3.2
	25	-	-	-	1.5	-	3.2
	26	-	-	-	1.5	-	3.2
	27	-	-	-	1.5	Small	3.2
	28	-	-	-	1.5	Small	16
	29	-	-	-	3.9	Small	3.2
	30	-	-	-	Trace	-	3.2

ly = light yellow y = yellow dy = dark yellow b = brown

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis

Individual values

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	NITRITE	BLOOD	GLUCOSE	KETONES	BILI- RUBIN	UROBILI- NOGEN
3 (336.7)	41	-	-	-	-	-	3.2
	42	+	-	-	1.5	-	3.2
	43	-	-	-	1.5	-	3.2
	44	-	-	-	Trace	-	3.2
	45	-	-	-	1.5	-	3.2
	46	-	-	-	1.5	-	3.2
	47	-	-	-	1.5	-	3.2
	48	-	-	-	1.5	-	3.2
	49	-	-	-	1.5	-	3.2
	50	-	-	-	1.5	-	3.2
4 (1020)	61	+	-	-	Trace	-	3.2
	62	-	Trace-Intact	-	1.5	-	3.2
	63	-	-	-	Trace	-	3.2
	64	+	-	-	Trace	-	3.2
	65	-	-	-	1.5	-	3.2
	66	+	-	-	1.5	-	3.2
	67	-	-	-	Trace	-	3.2
	68	-	-	-	Trace	-	3.2
	69	-	-	-	1.5	-	3.2
	70	+	-	-	Trace	-	3.2

ly = light yellow y = yellow dy = dark yellow b = brown

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis

Individual values

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	VOLUME	SPECIFIC GRAVITY	pH	COLOUR	PROTEIN	LEUCO- CYTES
1 (0)	11	4	≥1.030	6.5	y	0.3	-
	12	6	1.025	7.0	y	0.3	15
	13	6	1.025	7.0	y	0.3	15
	14	12	1.015	7.5	ly	Trace	-
	15	8	1.010	8.5	y	0.3	-
	16	8	1.015	7.5	y	Trace	-
	17	6	1.025	6.5	y	0.3	-
	18	4	1.025	6.5	y	0.3	-
	19	4	≥1.030	6.5	y	1.0	15
	20	8	1.020	7.0	y	Trace	15
2 (102)	31	d					
	32	6	1.025	6.5	y	1.0	15
	33	8	1.020	7.0	y	-	-
	34	8	1.020	7.0	y	-	-
	35	4	1.020	7.5	y	0.3	-
	36	4	≥1.030	7.0	y	≥3.0	125
	37	6	1.025	6.5	y	0.3	-
	38	6	1.015	8.0	y	Trace	-
	39	12	1.020	7.0	ly	-	-
	40	6	≥1.030	6.5	y	0.3	15

ly = light yellow y = yellow dy = dark yellow b = brown

d = unscheduled death

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis

Individual values

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	VOLUME	SPECIFIC GRAVITY	pH	COLOUR	PROTEIN	LEUCO- CYTES
3 (336.7)	51	4	≥1.030	6.5	y	0.3	-
	52	4	≥1.030	6.5	y	Trace	-
	53	6	1.025	7.0	y	0.3	-
	54	4	1.020	7.0	y	0.3	15
	55	4	≥1.030	6.5	y	1.0	70
	56	4	1.025	6.5	y	0.3	-
	57	6	1.025	6.5	y	0.3	15
	58	4	1.025	7.0	y	0.3	15
	59	8	1.025	6.5	y	0.3	70
	60	4	1.025	7.0	y	Trace	-
4 (1020)	71	8	1.020	6.5	y	0.3	15
	72	4	≥1.030	6.0	y	Trace	-
	73	6	1.025	6.5	y	Trace	-
	74	6	1.025	7.0	y	0.3	15
	75	6	≥1.030	6.0	y	Trace	-
	76	4	≥1.030	6.0	y	0.3	-
	77	6	1.025	6.0	y	Trace	-
	78	6	1.025	7.0	ly	-	-
	79	6	1.025	6.5	y	0.3	-
	80	6	1.025	6.5	y	-	-

ly = light yellow y = yellow dy = dark yellow b = brown

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis

Individual values

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	NITRITE	BLOOD	GLUCOSE	KETONES	BILI- RUBIN	UROBILI- NOGEN
1 (0)	11	-	-	-	-	-	16
	12	-	-	-	-	-	3.2
	13	-	-	-	-	-	3.2
	14	-	-	-	-	-	3.2
	15	+	-	-	-	-	3.2
	16	-	-	-	-	-	3.2
	17	-	-	-	-	-	3.2
	18	-	-	-	-	-	3.2
	19	-	-	-	-	-	16
	20	-	-	-	Trace	-	3.2
2 (102)	31	d					
	32	-	-	-	Trace	-	3.2
	33	-	-	-	-	-	3.2
	34	-	-	-	-	-	3.2
	35	-	-	-	Trace	-	16
	36	-	-	-	-	-	3.2
	37	-	-	-	-	-	3.2
	38	-	-	-	Trace	-	3.2
	39	+	-	-	-	-	3.2
	40	-	-	-	Trace	-	3.2

ly = light yellow y = yellow dy = dark yellow b = brown

d = unscheduled death

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis

Individual values

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	NITRITE	BLOOD	GLUCOSE	KETONES	BILI- RUBIN	UROBILI- NOGEN
3 (336.7)	51	-	-	-	-	-	3.2
	52	-	-	-	Trace	-	3.2
	53	-	-	-	-	-	3.2
	54	-	-	-	-	-	3.2
	55	-	-	-	-	-	3.2
	56	-	-	-	Trace	-	16
	57	-	-	-	-	-	3.2
	58	-	-	-	Trace	-	3.2
	59	-	-	-	-	-	3.2
	60	-	-	-	Trace	-	3.2
4 (1020)	71	-	-	-	-	-	3.2
	72	-	-	-	-	-	3.2
	73	-	-	-	-	-	3.2
	74	-	-	-	-	-	3.2
	75	-	-	-	-	-	3.2
	76	-	-	-	Trace	-	3.2
	77	-	-	-	-	-	3.2
	78	-	-	-	-	-	3.2
	79	-	-	-	Trace	-	3.2
	80	-	-	-	Trace	-	3.2

ly = light yellow y = yellow dy = dark yellow b = brown

Table 29 Urinalysis – Microscopy – Individual values

Xylanase, PPQ33502									
A 90-Day Gavage Toxicity Study in Rats									
Urinalysis - Microscopy									
Individual values									
Males									
GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	ERYTH- RO- CYTES	LEUCO- CYTES	EPI- THE- LIAL CELLS	CRYS- TALS	U- RATES	HYA- LINE CASTS	GRAN- ULAR CASTS	BAC- TERIA
1 (0)	1	(+)	-	-	+++	+	-	-	++
	2	(+)	-	(+)	++	+	-	-	+++
	3	+	+	(+)	+++	+	-	-	+++
	4	(+)	(+)	(+)	+++	+	-	-	+++
	5	(+)	(+)	(+)	+++	+	-	-	++
	6	(+)	(+)	-	+++	+	-	-	++
	7	-	-	-	+++	+	-	-	+++
	8	(+)	(+)	-	++	-	-	-	++
	9	(+)	(+)	(+)	++	++	-	-	++
	10	(+)	(+)	(+)	+++	+	-	-	++
2 (102)	21	+	-	(+)	+++	+	-	-	++
	22	(+)	-	(+)	+++	++	-	-	+++
	23	+	(+)	(+)	+++	-	-	-	++
	24	+	-	(+)	+++	+	-	-	+++
	25	(+)	-	(+)	++	-	-	-	+++
	26	(+)	-	-	+++	+	-	-	++
	27	(+)	-	(+)	+++	+	-	-	+++
	28	+	-	(+)	+++	+	-	-	++
	29	+	-	-	+++	-	-	-	++
	30	+	-	-	+++	+	-	-	+++

Abbreviations and units are explained in [Table 6](#)

- = no trace (+) = traces + = slight ++ = moderate +++ = marked

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis - Microscopy

Individual values

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	ERYTH- RO- CYTES	LEUCO- CYTES	EPI- THE- LIAL CELLS	CRYS- TALS	U- RATES	HYA- LINE CASTS	GRAN- ULAR CASTS	BAC- TERIA
3 (336.7)	41	(+)	-	-	++	+	-	-	+++
	42	(+)	-	-	++	+	-	-	+++
	43	+	-	-	+	-	-	-	+++
	44	(+)	-	(+)	++	+	-	-	+++
	45	+	-	-	++	+	-	-	++
	46	(+)	-	-	+++	+	-	-	+++
	47	(+)	-	-	+++	-	-	-	++
	48	+	-	(+)	+++	+	-	-	++
	49	+	-	(+)	+++	+	-	-	++
	50	(+)	-	(+)	++	+	-	-	+++
4 (1020)	61	(+)	-	-	++	-	-	-	+++
	62	-	-	-	+	++	-	-	+++
	63	+	-	-	+++	(+)	-	-	++
	64	(+)	-	-	++	-	-	-	+++
	65	(+)	-	(+)	++	+	-	-	+++
	66	+	-	-	+++	++	-	-	+++
	67	(+)	(+)	(+)	++	+	-	-	++
	68	(+)	-	(+)	+++	++	-	-	+++
	69	-	-	-	+++	+	-	-	++
	70	(+)	-	(+)	++	+	-	-	+++

Abbreviations and units are explained in [Table 6](#)

- = no trace (+) = traces + = slight ++ = moderate +++ = marked

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis - Microscopy

Individual values

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	ERYTH- RO- CYTES	LEUCO- CYTES	EPI- THE- LIAL CELLS	CRYS- TALS	U- RATES	HYA- LINE CASTS	GRAN- ULAR CASTS	BAC- TERIA
1 (0)	11	(+)	-	-	++	-	-	-	++
	12	(+)	-	(+)	++	(+)	-	-	+++
	13	(+)	-	(+)	++	+	-	-	++
	14	-	-	-	++	-	-	-	+++
	15	-	-	(+)	+++	+	-	-	+++
	16	(+)	-	(+)	++	+	-	-	+++
	17	(+)	-	(+)	++	-	-	-	++
	18	(+)	-	-	++	-	-	-	++
	19	-	-	-	++	-	-	-	++
	20	(+)	-	(+)	++	(+)	-	-	+++
2 (102)	31	d							
	32	(+)	-	(+)	++	+	-	-	++
	33	(+)	-	(+)	++	-	-	-	+++
	34	-	-	-	++	(+)	-	-	+++
	35	(+)	-	(+)	++	-	-	-	++
	36	(+)	+	-	++	-	-	-	++
	37	(+)	(+)	-	+	(+)	-	-	++
	38	(+)	(+)	(+)	++	-	-	-	++
	39	(+)	-	(+)	+	+++	-	-	+++
	40	(+)	-	-	+	-	-	-	++

Abbreviations and units are explained in [Table 6](#)

- = no trace (+) = traces + = slight ++ = moderate +++ = marked

d = unscheduled death

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Urinalysis - Microscopy

Individual values

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	ERYTH- RO- CYTES	LEUCO- CYTES	EPI- THE- LIAL CELLS	CRYS- TALS	U- RATES	HYA- LINE CASTS	GRAN- ULAR CASTS	BAC- TERIA
3 (336.7)	51	-	-	-	++	(+)	-	-	++
	52	(+)	-	(+)	++	-	-	-	++
	53	+	-	(+)	+++	-	-	-	+++
	54	-	-	-	+++	-	-	-	+++
	55	-	-	-	+	(+)	-	-	+
	56	(+)	(+)	(+)	++	-	-	-	++
	57	(+)	-	(+)	++	-	-	-	++
	58	-	-	(+)	+++	(+)	-	-	+++
	59	-	(+)	-	++	-	-	-	+++
	60	-	(+)	(+)	+++	+	-	-	+++
4 (1020)	71	(+)	-	-	++	+	-	-	+++
	72	-	-	-	(+)	-	-	-	++
	73	-	-	+	++	+++	-	-	+++
	74	(+)	-	(+)	++	+++	-	-	+++
	75	-	-	(+)	+	+	-	-	++
	76	-	-	-	++	(+)	-	-	++
	77	(+)	-	(+)	++	+	-	-	+++
	78	(+)	(+)	(+)	++	-	-	-	++
	79	-	-	-	+	-	-	-	++
	80	(+)	(+)	-	++	++	-	-	+++

Abbreviations and units are explained in [Table 6](#)

- = no trace (+) = traces + = slight ++ = moderate +++ = marked

Table 30 Organ weight – Individual values

Xylanase, PPQ33502						
A 90-Day Gavage Toxicity Study in Rats						
Absolute (mg) organ weight						
Individual values - Day 91/92						
Males						
GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	ADRENALS	BRAIN	EPIDI- DYMIDES	HEART	KIDNEYS
1 (0)	1	41	2098	1223	1389	2496
	2	45	2310	1250	1509	3292
	3	55	2387	1587	1935	3339
	4	39	2223	1394	1575	3419
	5	62	2103	1327	1392	3139
	6	58	2238	1261	1566	2932
	7	49	2158	1419	1544	3204
	8	55	2373	1614	1863	3280
	9	45	2292	1374	1574	3136
	10	60	2248	1453	1670	3191
2 (102)	21	47	2399	1405	1761	3694
	22	61	2336	1745	1523	3096
	23	54	2260	1264	1342	3329
	24	41	2178	1481	1603	2833
	25	64	2292	1457	1555	3549
	26	57	2169	1430	1375	2933
	27	38	2347	1535	1817	3503
	28	65	2335	1411	1793	3202
	29	56	2296	1512	1533	3261
	30	46	2146	1520	1523	3245

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Absolute (mg) organ weight

Individual values - Day 91/92

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	ADRENALS	BRAIN	EPIDI- DYMIDES	HEART	KIDNEYS
3 (336.7)	41	49	2267	1193	1623	2920
	42	45	2260	1271	1532	3065
	43	53	2162	1328	1508	3047
	44	55	2305	1403	1582	2942
	45	56	2316	1439	1523	2990
	46	57	2132	1488	1443	2958
	47	49	2289	1429	1489	2798
	48	60	2340	1496	1545	3143
	49	52	2181	1252	1603	2885
	50	53	2177	1585	1482	3070
4 (1020)	61	55	2290	1439	1710	3167
	62	57	2321	1445	1601	3258
	63	51	2306	1495	1763	3238
	64	64	2328	1448	1838	3673
	65	49	2245	1473	1644	2942
	66	57	2278	1566	1597	3588
	67	70	2304	1549	1579	3471
	68	65	2289	1448	1578	3556
	69	53	2230	1482	1642	3260
	70	54	2358	1479	1669	3135

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Absolute (mg) organ weight

Individual values - Day 91/92

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	LIVER	PITUITARY	PROSTATE	SPLEEN	TESTES	THYMUS
1 (0)	1	14626	11	619	820	3344	531
	2	19000	13	700	1214	3951	457
	3	22406	16	1140	1054	3935	617
	4	16809	16	915	793	3744	359
	5	17516	12	662	1076	3465	314
	6	17627	14	819	951	3672	404
	7	17249	12	1010	1034	3733	312
	8	18584	14	854	806	4150	396
	9	17053	14	839	832	3454	439
	10	16015	12	643	986	3728	483
2 (102)	21	20789	14	931	1300	3792	331
	22	19561	17	919	1074	3962	415
	23	17943	13	498	999	3330	382
	24	16640	10	708	957	3232	394
	25	19479	14	1044	1053	3962	369
	26	15965	12	754	778	3890	254
	27	20660	16	746	1135	4121	493
	28	17161	16	800	1012	4168	313
	29	18366	13	869	1050	4229	447
	30	17197	11	665	927	4115	389

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Absolute (mg) organ weight

Individual values - Day 91/92

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	LIVER	PITUI- TARY	PROSTATE	SPLEEN	TESTES	THYMUS
3 (336.7)	41	16037	13	515	770	3287	328
	42	15252	13	1015	885	3612	303
	43	17546	12	778	1201	3882	399
	44	19125	11	788	1007	3751	493
	45	17173	14	837	960	3633	488
	46	15857	5	660	815	4201	460
	47	15108	13	754	898	4331	368
	48	17768	14	1078	991	3661	516
	49	16224	12	574	1001	3216	420
	50	16796	13	596	895	4333	466
4 (1020)	61	17917	14	936	974	3842	273
	62	17832	13	840	781	3635	213
	63	20947	12	519	1245	3975	529
	64	22785	16	833	1196	3972	515
	65	17141	11	870	1065	3690	407
	66	20232	14	601	1136	4136	297
	67	20588	13	875	1608	3913	377
	68	19080	14	716	1422	3836	348
	69	17815	12	614	721	3828	452
	70	18386	15	1044	963	4187	393

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Relative (% of body wt) organ weight

Individual values - Day 91/92

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	BODY WT, g	ADRENALS	BRAIN	EPIDI- DYMIDES	HEART	KIDNEYS
1 (0)	1	396	0.0104	0.530	0.309	0.351	0.630
	2	492	0.0091	0.470	0.254	0.307	0.669
	3	554	0.0099	0.431	0.286	0.349	0.603
	4	468	0.0083	0.475	0.298	0.337	0.731
	5	449	0.0138	0.468	0.296	0.310	0.699
	6	473	0.0123	0.473	0.267	0.331	0.620
	7	492	0.0100	0.439	0.288	0.314	0.651
	8	502	0.0110	0.473	0.322	0.371	0.653
	9	492	0.0091	0.466	0.279	0.320	0.637
	10	449	0.0134	0.501	0.324	0.372	0.711
2 (102)	21	511	0.0092	0.469	0.275	0.345	0.723
	22	509	0.0120	0.459	0.343	0.299	0.608
	23	483	0.0112	0.468	0.262	0.278	0.689
	24	480	0.0085	0.454	0.309	0.334	0.590
	25	505	0.0127	0.454	0.289	0.308	0.703
	26	434	0.0131	0.500	0.329	0.317	0.676
	27	588	0.0065	0.399	0.261	0.309	0.596
	28	486	0.0134	0.480	0.290	0.369	0.659
	29	503	0.0111	0.456	0.301	0.305	0.648
	30	482	0.0095	0.445	0.315	0.316	0.673

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Relative (% of body wt) organ weight

Individual values - Day 91/92

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	BODY WT, g	ADRENALS	BRAIN	EPIDI- DYMIDES	HEART	KIDNEYS
3 (336.7)	41	454	0.0108	0.499	0.263	0.357	0.643
	42	423	0.0106	0.534	0.300	0.362	0.725
	43	482	0.0110	0.449	0.276	0.313	0.632
	44	504	0.0109	0.457	0.278	0.314	0.584
	45	489	0.0115	0.474	0.294	0.311	0.611
	46	461	0.0124	0.462	0.323	0.313	0.642
	47	460	0.0107	0.498	0.311	0.324	0.608
	48	497	0.0121	0.471	0.301	0.311	0.632
	49	448	0.0116	0.487	0.279	0.358	0.644
	50	482	0.0110	0.452	0.329	0.307	0.637
4 (1020)	61	493	0.0112	0.465	0.292	0.347	0.642
	62	479	0.0119	0.485	0.302	0.334	0.680
	63	518	0.0098	0.445	0.289	0.340	0.625
	64	587	0.0109	0.397	0.247	0.313	0.626
	65	492	0.0100	0.456	0.299	0.334	0.598
	66	513	0.0111	0.444	0.305	0.311	0.699
	67	519	0.0135	0.444	0.298	0.304	0.669
	68	473	0.0137	0.484	0.306	0.334	0.752
	69	523	0.0101	0.426	0.283	0.314	0.623
	70	481	0.0112	0.490	0.307	0.347	0.652

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Relative (% of body wt) organ weight

Individual values - Day 91/92

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	LIVER	PITUI- TARY	PROSTATE	SPLEEN	TESTES	THYMUS
1 (0)	1	3.69	0.00278	0.156	0.207	0.844	0.1341
	2	3.86	0.00264	0.142	0.247	0.803	0.0929
	3	4.04	0.00289	0.206	0.190	0.710	0.1114
	4	3.59	0.00342	0.196	0.169	0.800	0.0767
	5	3.90	0.00267	0.147	0.240	0.772	0.0699
	6	3.73	0.00296	0.173	0.201	0.776	0.0854
	7	3.51	0.00244	0.205	0.210	0.759	0.0634
	8	3.70	0.00279	0.170	0.161	0.827	0.0789
	9	3.47	0.00285	0.171	0.169	0.702	0.0892
	10	3.57	0.00267	0.143	0.220	0.830	0.1076
2 (102)	21	4.07	0.00274	0.182	0.254	0.742	0.0648
	22	3.84	0.00334	0.181	0.211	0.778	0.0815
	23	3.71	0.00269	0.103	0.207	0.689	0.0791
	24	3.47	0.00208	0.148	0.199	0.673	0.0821
	25	3.86	0.00277	0.207	0.209	0.785	0.0731
	26	3.68	0.00276	0.174	0.179	0.896	0.0585
	27	3.51	0.00272	0.127	0.193	0.701	0.0838
	28	3.53	0.00329	0.165	0.208	0.858	0.0644
	29	3.65	0.00258	0.173	0.209	0.841	0.0889
	30	3.57	0.00228	0.138	0.192	0.854	0.0807

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Relative (% of body wt) organ weight

Individual values - Day 91/92

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	LIVER	PITUI- TARY	PROSTATE	SPLEEN	TESTES	THYMUS
3 (336.7)	41	3.53	0.00286	0.113	0.170	0.724	0.0722
	42	3.61	0.00307	0.240	0.209	0.854	0.0716
	43	3.64	0.00249	0.161	0.249	0.805	0.0828
	44	3.79	0.00218	0.156	0.200	0.744	0.0978
	45	3.51	0.00286	0.171	0.196	0.743	0.0998
	46	3.44	0.00108	0.143	0.177	0.911	0.0998
	47	3.28	0.00283	0.164	0.195	0.942	0.0800
	48	3.58	0.00282	0.217	0.199	0.737	0.1038
	49	3.62	0.00268	0.128	0.223	0.718	0.0938
	50	3.48	0.00270	0.124	0.186	0.899	0.0967
4 (1020)	61	3.63	0.00284	0.190	0.198	0.779	0.0554
	62	3.72	0.00271	0.175	0.163	0.759	0.0445
	63	4.04	0.00232	0.100	0.240	0.767	0.1021
	64	3.88	0.00273	0.142	0.204	0.677	0.0877
	65	3.48	0.00224	0.177	0.216	0.750	0.0827
	66	3.94	0.00273	0.117	0.221	0.806	0.0579
	67	3.97	0.00250	0.169	0.310	0.754	0.0726
	68	4.03	0.00296	0.151	0.301	0.811	0.0736
	69	3.41	0.00229	0.117	0.138	0.732	0.0864
	70	3.82	0.00312	0.217	0.200	0.870	0.0817

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Relative (% of brain wt) organ weight

Individual values - Day 91/92

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	ADRENALS	EPIDI- DYMIDES	HEART	KIDNEYS
1 (0)	1	1.95	58.3	66.2	119.0
	2	1.95	54.1	65.3	142.5
	3	2.30	66.5	81.1	139.9
	4	1.75	62.7	70.9	153.8
	5	2.95	63.1	66.2	149.3
	6	2.59	56.3	70.0	131.0
	7	2.27	65.8	71.5	148.5
	8	2.32	68.0	78.5	138.2
	9	1.96	59.9	68.7	136.8
	10	2.67	64.6	74.3	141.9
2 (102)	21	1.96	58.6	73.4	154.0
	22	2.61	74.7	65.2	132.5
	23	2.39	55.9	59.4	147.3
	24	1.88	68.0	73.6	130.1
	25	2.79	63.6	67.8	154.8
	26	2.63	65.9	63.4	135.2
	27	1.62	65.4	77.4	149.3
	28	2.78	60.4	76.8	137.1
	29	2.44	65.9	66.8	142.0
	30	2.14	70.8	71.0	151.2

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Relative (% of brain wt) organ weight

Individual values - Day 91/92

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	ADRENALS	EPIDI- DYMIDES	HEART	KIDNEYS
3 (336.7)	41	2.16	52.6	71.6	128.8
	42	1.99	56.2	67.8	135.6
	43	2.45	61.4	69.8	140.9
	44	2.39	60.9	68.6	127.6
	45	2.42	62.1	65.8	129.1
	46	2.67	69.8	67.7	138.7
	47	2.14	62.4	65.1	122.2
	48	2.56	63.9	66.0	134.3
	49	2.38	57.4	73.5	132.3
	50	2.43	72.8	68.1	141.0
4 (1020)	61	2.40	62.8	74.7	138.3
	62	2.46	62.3	69.0	140.4
	63	2.21	64.8	76.5	140.4
	64	2.75	62.2	79.0	157.8
	65	2.18	65.6	73.2	131.0
	66	2.50	68.7	70.1	157.5
	67	3.04	67.2	68.5	150.7
	68	2.84	63.3	68.9	155.4
	69	2.38	66.5	73.6	146.2
	70	2.29	62.7	70.8	133.0

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Relative (% of brain wt) organ weight

Individual values - Day 91/92

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	LIVER	PITUI- TARY	PROSTATE	SPLEEN	TESTES	THYMUS
1 (0)	1	697.1	0.524	29.5	39.1	159.4	25.3
	2	822.5	0.563	30.3	52.6	171.0	19.8
	3	938.7	0.670	47.8	44.2	164.9	25.8
	4	756.1	0.720	41.2	35.7	168.4	16.1
	5	832.9	0.571	31.5	51.2	164.8	14.9
	6	787.6	0.626	36.6	42.5	164.1	18.1
	7	799.3	0.556	46.8	47.9	173.0	14.5
	8	783.1	0.590	36.0	34.0	174.9	16.7
	9	744.0	0.611	36.6	36.3	150.7	19.2
	10	712.4	0.534	28.6	43.9	165.8	21.5
2 (102)	21	866.6	0.584	38.8	54.2	158.1	13.8
	22	837.4	0.728	39.3	46.0	169.6	17.8
	23	793.9	0.575	22.0	44.2	147.3	16.9
	24	764.0	0.459	32.5	43.9	148.4	18.1
	25	849.9	0.611	45.5	45.9	172.9	16.1
	26	736.1	0.553	34.8	35.9	179.3	11.7
	27	880.3	0.682	31.8	48.4	175.6	21.0
	28	734.9	0.685	34.3	43.3	178.5	13.4
	29	799.9	0.566	37.8	45.7	184.2	19.5
	30	801.4	0.513	31.0	43.2	191.8	18.1

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Relative (% of brain wt) organ weight

Individual values - Day 91/92

Males

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	LIVER	PITUI- TARY	PROSTATE	SPLEEN	TESTES	THYMUS
3 (336.7)	41	707.4	0.573	22.7	34.0	145.0	14.5
	42	674.9	0.575	44.9	39.2	159.8	13.4
	43	811.6	0.555	36.0	55.6	179.6	18.5
	44	829.7	0.477	34.2	43.7	162.7	21.4
	45	741.5	0.604	36.1	41.5	156.9	21.1
	46	743.8	0.235	31.0	38.2	197.0	21.6
	47	660.0	0.568	32.9	39.2	189.2	16.1
	48	759.3	0.598	46.1	42.4	156.5	22.1
	49	743.9	0.550	26.3	45.9	147.5	19.3
	50	771.5	0.597	27.4	41.1	199.0	21.4
4 (1020)	61	782.4	0.611	40.9	42.5	167.8	11.9
	62	768.3	0.560	36.2	33.6	156.6	9.2
	63	908.4	0.520	22.5	54.0	172.4	22.9
	64	978.7	0.687	35.8	51.4	170.6	22.1
	65	763.5	0.490	38.8	47.4	164.4	18.1
	66	888.1	0.615	26.4	49.9	181.6	13.0
	67	893.6	0.564	38.0	69.8	169.8	16.4
	68	833.6	0.612	31.3	62.1	167.6	15.2
	69	798.9	0.538	27.5	32.3	171.7	20.3
	70	779.7	0.636	44.3	40.8	177.6	16.7

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Absolute (mg) organ weight

Individual values - Day 91/92

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO		ADRENALS	BRAIN	HEART	KIDNEYS	LIVER
1 (0)	11		66	2013	986	2041	10109
	12		65	2035	964	2007	10594
	13		66	2109	1100	1750	10222
	14		82	2169	1061	1982	11772
	15		69	2158	972	1982	11140
	16		79	2084	1176	2068	11998
	17		78	2140	1180	2079	10322
	18		63	2147	1010	1693	9963
	19		86	2090	963	1878	10320
	20		80	2030	951	2037	8639
2 (102)	31	d	82	2124	977	1874	9736
	32		75	2178	1007	1998	11255
	33		70	1990	888	1872	8182
	34		84	2172	948	2079	12240
	35		71	2131	1010	1865	10008
	36		65	2033	996	1780	9493
	37		74	2059	1048	1919	10853
	38		82	2112	1012	1851	8879
	39		66	1989	914	1744	9355
	40		161	2080	1166	2262	10972

d = unscheduled death - results excluded from statistical analysis

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Absolute (mg) organ weight

Individual values - Day 91/92

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	ADRENALS	BRAIN	HEART	KIDNEYS	LIVER
3 (336.7)	51	59	2078	942	1709	10006
	52	99	2158	982	1895	9830
	53	78	2050	1136	2066	11492
	54	82	2145	1012	1845	9309
	55	73	2069	1019	1819	10086
	56	85	2062	1065	1991	10710
	57	70	2069	964	1802	9525
	58	90	2136	1109	2051	10442
	59	78	2027	1019	1883	9910
	60	78	2118	1111	1887	10781
4 (1020)	71	87	2044	1020	2059	11168
	72	87	2177	951	1891	9112
	73	86	2152	1055	1834	10860
	74	78	2066	976	1923	9657
	75	77	2103	977	1915	10411
	76	72	2062	974	1960	9677
	77	79	2161	1169	1869	9661
	78	71	2064	953	1816	9019
	79	75	2016	1011	2028	10222
	80	60	2169	1085	2020	9913

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Absolute (mg) organ weight

Individual values - Day 91/92

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO		OVARIES	PITUI- TARY	SPLEEN	THYMUS	UTERUS
1 (0)	11		101	14	627	292	548
	12		79	15	838	364	581
	13		134	17	728	291	939
	14		154	19	785	346	885
	15		76	19	624	325	606
	16		114	18	875	374	593
	17		106	16	832	378	690
	18		118	13	662	283	475
	19		93	13	692	288	563
	20		99	15	561	210	843
2 (102)	31	d	105	15	700	419	558
	32		86	18	625	303	647
	33		95	11	567	239	1193
	34		117	15	657	325	683
	35		82	17	796	405	1115
	36		86	16	747	258	768
	37		133	14	843	407	830
	38		97	16	722	333	695
	39		111	10	601	259	700
	40		94	20	839	269	825

d = unscheduled death - results excluded from statistical analysis

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Absolute (mg) organ weight

Individual values - Day 91/92

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	OVARIES	PITUI- TARY	SPLEEN	THYMUS	UTERUS
3 (336.7)	51	76	15	772	418	673
	52	122	17	722	385	808
	53	109	17	828	240	858
	54	70	18	626	268	1881
	55	113	15	730	372	705
	56	116	18	759	292	616
	57	85	14	828	427	541
	58	91	19	1099	392	1161
	59	92	17	948	345	656
	60	98	12	744	343	596
4 (1020)	71	108	19	724	309	692
	72	83	16	635	372	502
	73	83	18	703	284	803
	74	107	16	579	196	611
	75	105	15	686	277	743
	76	94	17	767	259	547
	77	94	16	708	303	1149
	78	72	17	666	274	1438
	79	92	15	700	199	757
	80	128	12	707	459	547

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Relative (% of body wt) organ weight

Individual values - Day 91/92

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL		BODY	ADRENALS	BRAIN	HEART	KIDNEYS	LIVER
	NO		WT, g					
1 (0)	11		278	0.0237	0.724	0.355	0.734	3.64
	12		284	0.0229	0.717	0.339	0.707	3.73
	13		278	0.0237	0.759	0.396	0.629	3.68
	14		300	0.0273	0.723	0.354	0.661	3.92
	15		282	0.0245	0.765	0.345	0.703	3.95
	16		309	0.0256	0.674	0.381	0.669	3.88
	17		306	0.0255	0.699	0.386	0.679	3.37
	18		283	0.0223	0.759	0.357	0.598	3.52
	19		268	0.0321	0.780	0.359	0.701	3.85
	20		294	0.0272	0.690	0.323	0.693	2.94
2 (102)	31	d	261	0.0314	0.814	0.374	0.718	3.73
	32		309	0.0243	0.705	0.326	0.647	3.64
	33		244	0.0287	0.816	0.364	0.767	3.35
	34		298	0.0282	0.729	0.318	0.698	4.11
	35		290	0.0245	0.735	0.348	0.643	3.45
	36		279	0.0233	0.729	0.357	0.638	3.40
	37		295	0.0251	0.698	0.355	0.651	3.68
	38		288	0.0285	0.733	0.351	0.643	3.08
	39		278	0.0237	0.715	0.329	0.627	3.37
	40		309	0.0521	0.673	0.377	0.732	3.55

d = unscheduled death - results excluded from statistical analysis

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Relative (% of body wt) organ weight

Individual values - Day 91/92

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	BODY WT, g	ADRENALS	BRAIN	HEART	KIDNEYS	LIVER
3 (336.7)	51	261	0.0226	0.796	0.361	0.655	3.83
	52	291	0.0340	0.742	0.337	0.651	3.38
	53	312	0.0250	0.657	0.364	0.662	3.68
	54	280	0.0293	0.766	0.361	0.659	3.32
	55	288	0.0253	0.718	0.354	0.632	3.50
	56	288	0.0295	0.716	0.370	0.691	3.72
	57	259	0.0270	0.799	0.372	0.696	3.68
	58	308	0.0292	0.694	0.360	0.666	3.39
	59	307	0.0254	0.660	0.332	0.613	3.23
	60	279	0.0280	0.759	0.398	0.676	3.86
4 (1020)	71	301	0.0289	0.679	0.339	0.684	3.71
	72	265	0.0328	0.822	0.359	0.714	3.44
	73	287	0.0300	0.750	0.368	0.639	3.78
	74	270	0.0289	0.765	0.361	0.712	3.58
	75	274	0.0281	0.768	0.357	0.699	3.80
	76	285	0.0253	0.724	0.342	0.688	3.40
	77	276	0.0286	0.783	0.424	0.677	3.50
	78	258	0.0275	0.800	0.369	0.704	3.50
	79	292	0.0257	0.690	0.346	0.695	3.50
	80	290	0.0207	0.748	0.374	0.697	3.42

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Relative (% of body wt) organ weight

Individual values - Day 91/92

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO		OVARIES	PITUI- TARY	SPLEEN	THYMUS	UTERUS
1 (0)	11		0.0363	0.00504	0.226	0.1050	0.197
	12		0.0278	0.00528	0.295	0.1282	0.205
	13		0.0482	0.00612	0.262	0.1047	0.338
	14		0.0513	0.00633	0.262	0.1153	0.295
	15		0.0270	0.00674	0.221	0.1152	0.215
	16		0.0369	0.00583	0.283	0.1210	0.192
	17		0.0346	0.00523	0.272	0.1235	0.225
	18		0.0417	0.00459	0.234	0.1000	0.168
	19		0.0347	0.00485	0.258	0.1075	0.210
	20		0.0337	0.00510	0.191	0.0714	0.287
2 (102)	31	d	0.0402	0.00575	0.268	0.1605	0.214
	32		0.0278	0.00583	0.202	0.0981	0.209
	33		0.0389	0.00451	0.232	0.0980	0.489
	34		0.0393	0.00503	0.220	0.1091	0.229
	35		0.0283	0.00586	0.274	0.1397	0.384
	36		0.0308	0.00573	0.268	0.0925	0.275
	37		0.0451	0.00475	0.286	0.1380	0.281
	38		0.0337	0.00556	0.251	0.1156	0.241
	39		0.0399	0.00360	0.216	0.0932	0.252
	40		0.0304	0.00647	0.272	0.0871	0.267

d = unscheduled death - results excluded from statistical analysis

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Relative (% of body wt) organ weight

Individual values - Day 91/92

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	OVARIES	PITUI- TARY	SPLEEN	THYMUS	UTERUS
3 (336.7)	51	0.0291	0.00575	0.296	0.1602	0.258
	52	0.0419	0.00584	0.248	0.1323	0.278
	53	0.0349	0.00545	0.265	0.0769	0.275
	54	0.0250	0.00643	0.224	0.0957	0.672
	55	0.0392	0.00521	0.253	0.1292	0.245
	56	0.0403	0.00625	0.264	0.1014	0.214
	57	0.0328	0.00541	0.320	0.1649	0.209
	58	0.0295	0.00617	0.357	0.1273	0.377
	59	0.0300	0.00554	0.309	0.1124	0.214
	60	0.0351	0.00430	0.267	0.1229	0.214
4 (1020)	71	0.0359	0.00631	0.241	0.1027	0.230
	72	0.0313	0.00604	0.240	0.1404	0.189
	73	0.0289	0.00627	0.245	0.0990	0.280
	74	0.0396	0.00593	0.214	0.0726	0.226
	75	0.0383	0.00547	0.250	0.1011	0.271
	76	0.0330	0.00596	0.269	0.0909	0.192
	77	0.0341	0.00580	0.257	0.1098	0.416
	78	0.0279	0.00659	0.258	0.1062	0.557
	79	0.0315	0.00514	0.240	0.0682	0.259
	80	0.0441	0.00414	0.244	0.1583	0.189

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Relative (% of brain wt) organ weight

Individual values - Day 91/92

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	ADRENALS	HEART	KIDNEYS	LIVER	
1 (0)	11	3.28	49.0	101.4	502.2	
	12	3.19	47.4	98.6	520.6	
	13	3.13	52.2	83.0	484.7	
	14	3.78	48.9	91.4	542.7	
	15	3.20	45.0	91.8	516.2	
	16	3.79	56.4	99.2	575.7	
	17	3.64	55.1	97.1	482.3	
	18	2.93	47.0	78.9	464.0	
	19	4.11	46.1	89.9	493.8	
	20	3.94	46.8	100.3	425.6	
2 (102)	31	d	3.86	46.0	88.2	458.4
	32		3.44	46.2	91.7	516.8
	33		3.52	44.6	94.1	411.2
	34		3.87	43.6	95.7	563.5
	35		3.33	47.4	87.5	469.6
	36		3.20	49.0	87.6	466.9
	37		3.59	50.9	93.2	527.1
	38		3.88	47.9	87.6	420.4
	39		3.32	46.0	87.7	470.3
	40		7.74	56.1	108.8	527.5

d = unscheduled death - results excluded from statistical analysis

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Relative (% of brain wt) organ weight

Individual values - Day 91/92

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	ADRENALS	HEART	KIDNEYS	LIVER
3 (336.7)	51	2.84	45.3	82.2	481.5
	52	4.59	45.5	87.8	455.5
	53	3.80	55.4	100.8	560.6
	54	3.82	47.2	86.0	434.0
	55	3.53	49.3	87.9	487.5
	56	4.12	51.6	96.6	519.4
	57	3.38	46.6	87.1	460.4
	58	4.21	51.9	96.0	488.9
	59	3.85	50.3	92.9	488.9
	60	3.68	52.5	89.1	509.0
4 (1020)	71	4.26	49.9	100.7	546.4
	72	4.00	43.7	86.9	418.6
	73	4.00	49.0	85.2	504.6
	74	3.78	47.2	93.1	467.4
	75	3.66	46.5	91.1	495.1
	76	3.49	47.2	95.1	469.3
	77	3.66	54.1	86.5	447.1
	78	3.44	46.2	88.0	437.0
	79	3.72	50.1	100.6	507.0
	80	2.77	50.0	93.1	457.0

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Relative (% of brain wt) organ weight

Individual values - Day 91/92

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO		OVARIES	PITUI- TARY	SPLEEN	THYMUS	UTERUS
1 (0)	11		5.02	0.695	31.1	14.5	27.2
	12		3.88	0.737	41.2	17.9	28.6
	13		6.35	0.806	34.5	13.8	44.5
	14		7.10	0.876	36.2	16.0	40.8
	15		3.52	0.880	28.9	15.1	28.1
	16		5.47	0.864	42.0	17.9	28.5
	17		4.95	0.748	38.9	17.7	32.2
	18		5.50	0.605	30.8	13.2	22.1
	19		4.45	0.622	33.1	13.8	26.9
	20		4.88	0.739	27.6	10.3	41.5
2 (102)	31	d	4.94	0.706	33.0	19.7	26.3
	32		3.95	0.826	28.7	13.9	29.7
	33		4.77	0.553	28.5	12.0	59.9
	34		5.39	0.691	30.2	15.0	31.4
	35		3.85	0.798	37.4	19.0	52.3
	36		4.23	0.787	36.7	12.7	37.8
	37		6.46	0.680	40.9	19.8	40.3
	38		4.59	0.758	34.2	15.8	32.9
	39		5.58	0.503	30.2	13.0	35.2
	40		4.52	0.962	40.3	12.9	39.7

d = unscheduled death - results excluded from statistical analysis

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Relative (% of brain wt) organ weight

Individual values - Day 91/92

Females

GROUP (Dose mg TOS/kg bw/day)	ANIMAL NO	OVARIES	PITUI- TARY	SPLEEN	THYMUS	UTERUS
3 (336.7)	51	3.66	0.722	37.2	20.1	32.4
	52	5.65	0.788	33.5	17.8	37.4
	53	5.32	0.829	40.4	11.7	41.9
	54	3.26	0.839	29.2	12.5	87.7
	55	5.46	0.725	35.3	18.0	34.1
	56	5.63	0.873	36.8	14.2	29.9
	57	4.11	0.677	40.0	20.6	26.1
	58	4.26	0.890	51.5	18.4	54.4
	59	4.54	0.839	46.8	17.0	32.4
	60	4.63	0.567	35.1	16.2	28.1
4 (1020)	71	5.28	0.930	35.4	15.1	33.9
	72	3.81	0.735	29.2	17.1	23.1
	73	3.86	0.836	32.7	13.2	37.3
	74	5.18	0.774	28.0	9.5	29.6
	75	4.99	0.713	32.6	13.2	35.3
	76	4.56	0.824	37.2	12.6	26.5
	77	4.35	0.740	32.8	14.0	53.2
	78	3.49	0.824	32.3	13.3	69.7
	79	4.56	0.744	34.7	9.9	37.5
	80	5.90	0.553	32.6	21.2	25.2

Appendix I Analysis of dose formulation (11 pages, incl. this cover page)

Novozymes A/S
Enzyme Laboratories
Enzyme Analytical Laboratory

TmVd
2012SEP20
Luna no. 2012-16372-01

CiToxLAB Scantox Study No.: 74852
Novozymes Reference No.: 20126010

Investigation Report

Xylanase, PPQ33502
A 90-Day Oral (gavage) Toxicity Study in Rats

Analysis of Dose Formulation Samples Returned from CitoxLAB Scantox

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1. GLP Compliance

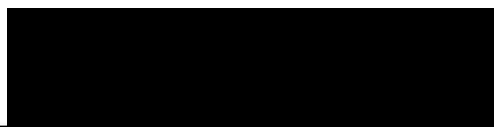
This investigation was conducted at the Enzyme Laboratories, Enzyme Analytical Laboratory, Novozymes A/S, in compliance with the OECD's principles of Good Laboratory Practice, ENV/MC/CHEM(98)17.

2. Approval

Approved by:

Date: 20 SEP 2012

Signature: _____

A black rectangular box redacting the signature of the Principal Investigator.

Principal Investigator

3. Quality Assurance Statement

REPORT: Xylanase PPQ33502:
A 90-Day Gavage Toxicity Study in Rats
Analysis of Dose formulation Samples Returned from CitoxLAB
Scantox

STUDY NUMBER CitoxLAB Scantox Study No 74852

REFERENCE
NUMBER 20126010

The conduct of this study has been subject to appropriate inspections and the report has been reviewed according to the relevant Standard Operation Procedures of Novozymes A/S Quality Assurance.

Inspection/Audit	Dates of inspection	Inspection results reported to Study Director and Study Management
Analysis, GH8XU	14 AUG 2012	14 AUG 2012
Report	19 SEP 2012	19 SEP 2012

I hereby confirm that the report reflects the raw data.

21 September 2012


Date

Quality Assurance

4. General Information

Principal Investigator: **Thomas Vadsholt**
Enzyme Analytical Laboratory
Enzyme Laboratories
Novozymes A/S
Krogshoejvej 36, 6E
2880 Bagsvaerd, Denmark
TmVd@novozymes.com

Laboratory: Enzyme Analytical Laboratory
Enzyme Laboratories
Novozymes A/S
Krogshoejvej 36, 6E
2880 Bagsvaerd, Denmark

Sponsor/Monitor: 
Toxicology
Novozymes A/S
Krogshoejvej 36
DK-2880 Bagsvaerd, Denmark
BTR@novozymes.com

Personnel: 

5. Purpose

The samples of the present investigation are dose solutions of Xylanase, PPQ33502.

The purpose of this phase of the study is to determine whether the enzyme activities (GH8XU/g) in the dose solutions prepared for use in week 1, 6 and 13 are approximately equal comparing preparations of corresponding levels of activity. It will also be checked if the activity of the 100% dose solution complies with the enzyme activity of the tox-batch. Furthermore, the control formulations from week 1, 6 and 13 will be analysed for proof of absence of enzyme activity.

Content check analysis is required as part of the OECD guideline for oral toxicity studies.

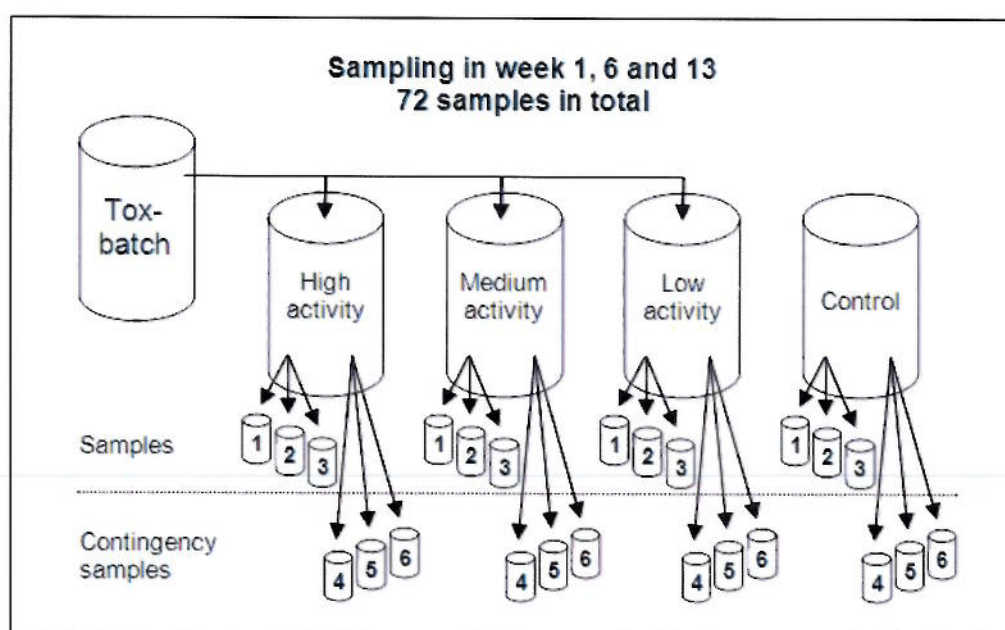
6. Sample Handling

Sample sampling

During the study 36 samples were prepared for analysis of activity and another 36 samples were prepared as contingency samples (72 samples in total). These were categorised into four groups:

- High activity (approx. 100%)
- Medium activity (approx. 33%)
- Low activity (approx. 10%)
- Control group (approx. 0%)

In week 1, 6 and 13, six samples of 10 mL were taken from each of the groups and labelled, as illustrated below.



More details about the schedule for the analytical phase are found in the current version 11.0 of PSL-SP-0107.01-D.

Sample transportation and registration

Controls and samples marked "1", "2" and "3" from CitoxLAB Scantox were sent frozen (on dry ice) directly to the Enzyme Analytical Laboratory (EAL) on 2012AUG07 where the samples were registered later the same day.

Storage of Samples for Analysis

The 36 samples, incl. controls, were registered in EAL. 4 tubes with control samples were broken. The remaining 32 samples incl. controls were stored frozen (-18 °C) until analysis.

Sample Defrost and Date of Analysis

All samples, incl. controls, labelled "1" were defrosted at room temperature before analysis on 2012AUG14.

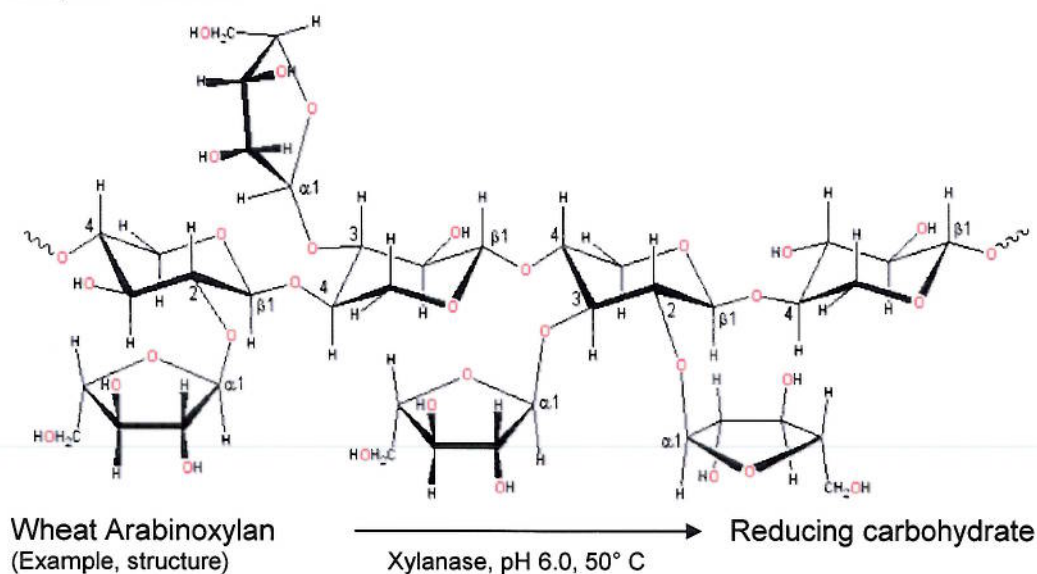
All samples, excl. controls, labelled "2" and "3" were defrosted at room temperature before analysis on 2012SEP05.

7. Method

All analyses were performed according to the validated method described the valid version 4.0 of PSL-SM-5027.01-D.

Xylanases (e.g. 1.4-endo-xylanase 3.2.1.8) hydrolyze Wheat arabinoxylan to release reducing carbohydrate. The reaction is stopped by an alkaline reagent containing PAHBAH and Bismuth which complexes with reducing sugar, producing colour, detected at 405 nm. The produced colour is proportional to the xylanase activity. Enzymatic reaction and absorption measurement proceed automatically in the Konelab Analyzer

Enzyme reaction:



Detection reaction:

Reducing carbohydrate + PAHBAH + Bi³⁺ (Alkaline pH, 50° C) →
Reducing carbohydrate-PAHBAH- Bi³⁺ complex

Endo xylanase activity is measured in GH8XU/g relative to a Novozymes
Glycoside Hydrolase 8 Xylanase Unit enzyme standard.

The samples were analysed as 2 weighings at 1 standard curve as specified
for GLP samples in the valid version 4.0 of PSL-SP-0598.01-D.

The control samples were analysed as 1 weighing at 1 standard curve as
specified for control samples in valid version 11.0 of PSL-SP-0107.01-D

8. Deviations

During registration of the samples in EAL it was observed that two tubes with
controls from week 1 and two tubes with controls from week 6 were cracked.
In addition only samples from week 13 were marked 1, 2 and 3 as indicated in
Table 2 in the Study Plan. The four broken tubes were discarded in agreement
with the study director. The remaining control from weeks 1 and 6 were both
registered and analysed as sample 1. The samples from week 1 and 6 were
registered as samples '1', '2' and '3'.

The analyses were completed within 5 weeks from registration in EAL and not
4 weeks as described in the Investigation Protocol.

The described deviations do not have any influence on the results.

9. Results and Discussion

The analytical results in GH8XU/g were evaluated according to valid version
11.0 of PSL-SP-0107.01-D. Results are represented with three significant
digits. Results below the methods determination limit is reported as <22.8
GH8XU/g according to PSL-SM-5027.01-D.

All calculations were carried out using SAS JMP Script according valid version
2.0 of to PSL-AS-0123. SAS JMP ver. 8.0.1 was used for the calculations.

Results from samples "1"

*No activity above the detection limit (<22.8 GH8XU/g) was found for the
Control group.*

The observed CV from determination of samples "1" excl. controls was 1.57%,
which is acceptable, i.e. below the method CV (7.2 %).

A significant difference is observed between 'Week No * Group' when
performing the statistical evaluation of samples "1" excl. controls. Thus,
samples "2" and "3", excl. controls, were analysed and further statistical
calculations were based on results from samples "1", "2" and "3".

Table 1: Results from statistical analysis of difference between weeks for samples "1".

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F	Is there sign.diff. ('Prob>F' < 0.05)
Group	2	2	15.625396	31658.93	<.0001*	Yes*
Week No.	2	2	0.000635	1.2873	0.3223	No
Week No.*Group	4	4	0.003634	3.6810	0.0484*	Yes

* The significant difference between groups high, medium and low is as expected.

Results from samples "1", "2" and "3", excl. controls.

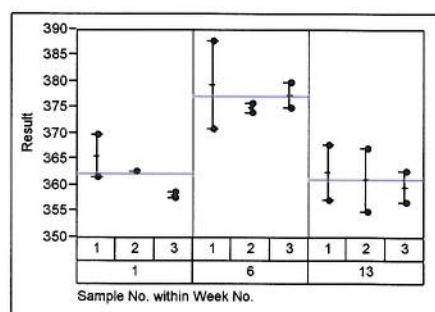
Table 2. Average result of each sample for the dose groups High, Medium and Low given in GH8XU/g:

Week	Sample No.	High	Medium	Low
1	1	3660	1200	366
	2	3610	1190	363
	3	3590	1200	358
6	1	3630	1210	380
	2	3510	1180	375
	3	3530	1250	378
13	1	3560	1240	363
	2	3560	1220	361
	3	3570	1190	360

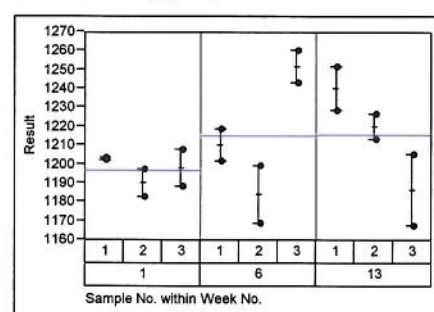
The observed CV was 1.74%, which is acceptable, i.e. below the method CV (7.2 %).

Below is a visual presentation of the individual results. The red line in the presentation of group high shows the mean activity of the tox-batch.

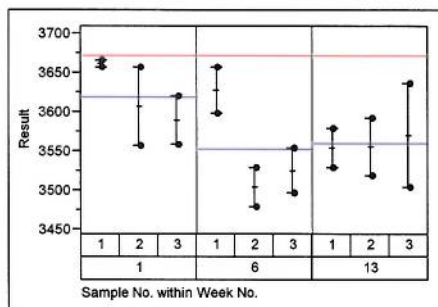
Low activity group:



Medium activity group:



High activity group:



Investigation of whether dose solutions prepared for use in week 1, 6 and 13 are approximately equal comparing preparations of corresponding levels of activity:

The results of the statistical test show that there are significant difference between the dose formulations given in weeks 1, 6 and 13 as shown in table 3.

Table 3: Results from statistical analysis of difference between weeks.

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F	Is there sign.diff. ('Prob>F' < 0.05)
Group	2	2	46.713942	77043.62	<.0001*	Yes*
Week No.	2	2	0.002050	3.3810	0.0429	Yes
Week No.*Group	4	4	0.007274	5.9986	0.0006	Yes

* The significant difference between groups high, medium and low is as expected.

The significant difference between dose formulations is evaluated by a pairwise comparison using Tukey (Table 4):

Week,Level	Group	Least Sq Mean
1, High	A	3620.2102
13, High	A	3561.0290
6, High	A	3552.8196
13, Medium	B	1215.7238
6, Medium	B	1215.4578
1, Medium	B	1197.4675
6, Low	C	377.3941
1, Low	D	362.3287
13, Low	D	361.2469

Levels not connected by same letter are significantly different.

As can be seen from the comparison using Tukey the significant difference is only observed for dose group low. In this group results from week 6 is significant higher than those from from weeks 1 and 13.

The mean activities are listed in Table 5.

Table 5. Mean activity (GH8XU/g) per group for groups High and Medium and per group and week for group Low.

Week No.	High	Medium	Low
1	3580	1210	362
6			377
13			361

Investigation of whether the activity is approximately equal for group High and the tox-batch:

The results of the statistical test show that there are *no significant difference between the dose formulation for group High and the tox-batch*. Table 6 shows the result of the statistical test.

Table 6: Results from statistical analysis of difference between group High and tox-batch

Analysis result for tox-batch GH8XU/g	Mean of group High GH8XU/g	Prob > F	Is there significant difference? ('Prob>F' < 0.05)
3670	3580	0.0864	No

10. Conclusion

The Xylanase activity (GH8XU/g) in the two groups High and Medium were found not to differ significantly for weeks 1, 6 and 13. In the group Low the activity in week 6 was significantly higher than the activity in weeks 1 and 13.

The following mean activity (GH8XU/g) per group for groups High and Medium and per group and week for group Low were determined.

Week No.	High	Medium	Low
1	3580	1210	362
6			377
13			361

There is no significant difference between the xylanase activity (GH8XU/g) of group High (100 % dose solution) and the tox-batch.

Absence of activity in the control samples was shown.

11. Archiving

The Investigation Plan, all raw data and Investigation Report are archived in Novozymes QM Central Archive by the Principal Investigator.

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Appendix II Pathology Report (86 pages, incl. this cover page)

PHASE REPORT

PATHOLOGY

Xylanase, PPQ33502

A 90-Day Gavage Toxicity Study in Rats

Study No:	74852
Sponsor Ref No:	20126010
Date:	12 December 2012
Prepared by:	<div></div>
Number of pages:	85
Sponsor:	Novozymes A/S

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1 Summary

Animals were treated orally with Xylanase, PPQ33502, daily for 90 days. Dose concentrations were: 0, 10, 33 and 100 %.

At necropsy only few incidental macroscopic findings were reported and histological evaluation of Groups 1 and 4 revealed no treatment related changes.

2 Results

2.1 Macroscopic findings

[Appendix I](#)

Only few, incidental findings were reported at necropsy.

In animal No 31, sacrificed on Day 45 of the study, a subcutaneous nodule was recorded in the chest region. A renal cyst was found in animal No 6.

2.2 Microscopic findings

[Appendix I](#)

The microscopic examination of the subcutaneous nodule from animal No 31 revealed an adenocarcinoma arising in the mammary gland. This was considered to be an incidental finding with no relation to treatment.

The macroscopically recorded renal cyst in Animal No 6 was confirmed at the microscopic examination - this was similarly considered to be an incidental finding with no relation to treatment.

Focal infiltration of inflammatory cells and/or haemorrhage and necrosis between/in the myofibres of the tongue were found in 19 animals in Group 1 and in 12 animals in Group 4. These findings are considered consequences of the repeated needle insertion for blood sampling.

All findings reported are considered to be within the background incidence of findings reported in this age and strain of laboratory maintained rats and as such to be of no toxicological significance.

3 Discussion and Conclusion

No treatment related pathological findings were reported in this study.

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EXPLANATION OF CODES AND SYMBOLS

CODES AND SYMBOLS USED AT ANIMAL LEVEL:

M = Male animal
F = Female animal
K0 = Terminal sacrifice group
+ = Intercurrent death/sacrificed moribund
+2 = Sacrificed moribund

CODES AND SYMBOLS USED AT ORGAN LEVEL:

G = Gross observation checked off histologically
0 = Tissue not present for histologic examination
' = Histologic examination not required
+ = Organ examined, findings present
- = Organ examined, no pathologic findings noted (AOFT only)
(= Only one of paired organs examined/present

CODES AND SYMBOLS USED AT FINDING LEVEL:

GRADE 1 = Minimal / very few / very small
GRADE 2 = Slight / few / small
GRADE 3 = Moderate / moderate number / moderate size
P = Finding present, severity not scored
N0 = Malignant neoplasm
(= Finding unilateral in paired organs

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NUMBER OF ANIMALS WITH NECROPSY FINDINGS BY ORGAN/GROUP/SEX
STATUS AT NECROPSY: K0, INCL. DEATHS

	DOSE GROUP:	01	02	03	04				
	SEX:	M	F	M	F	M	F	M	F
ORGAN/FINDING	ANIM.EXAM.:	10	10	10	10	10	10	10	10
KIDNEYS	:								
- cyst: watery.	:	1	-	-	-	-	-	-	-
SKIN/SUBCUTIS	:								
- nodule, pale, firm.	:	-	-	-	1	-	-	-	-

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TEST SYSTEM : RAT, 90-DAYS, ORAL
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DATE : 11-DEC-12
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NUMBER OF ANIMALS WITH MICROSCOPIC FINDINGS BY ORGAN/GROUP/SEX
STATUS AT NECROPSY: K0, INCL. DEATHS

	DOSE GROUP:		01		02		03		04	
SEX :	M	F	M	F	M	F	M	F	M	F
NO.ANIMALS:	10	10	10	10	10	10	10	10	10	10
HEART :	10	10	-	1	-	-	-	-	10	10
- Mononucl cells focal:	1	2	-	-	-	-	-	-	2	1
Grade 1:	1	2	-	-	-	-	-	-	2	1
LUNG :	10	10	-	1	-	-	-	-	10	10
- Inflam cells focal :	-	-	-	-	-	-	-	-	-	1
Grade 1:	-	-	-	-	-	-	-	-	-	1
- Macrophages alveolar:	1	-	-	-	-	-	-	-	1	-
Grade 1:	1	-	-	-	-	-	-	-	1	-
- Osseous metaplasia :	1	-	-	-	-	-	-	-	1	-
TONGUE :	10	10	-	1	-	-	-	-	10	10
- Inflam/hemorrh focal:	10	9	-	1	-	-	-	-	6	6
STOMACH GLANDULAR :	10	10	-	1	-	-	-	-	10	10
- Inflam cells focal :	-	2	-	-	-	-	-	-	-	-
Grade 1:	-	2	-	-	-	-	-	-	-	-
LIVER :	10	10	-	1	-	-	-	-	10	10
- Vacuolation focal :	-	-	-	-	-	-	-	-	2	-
Grade 1:	-	-	-	-	-	-	-	-	2	-
- Peri-/arteritis foc :	-	-	-	-	-	-	-	-	1	-
Grade 1:	-	-	-	-	-	-	-	-	1	-
- EMH multifocal :	1	5	-	1	-	-	-	-	1	8
Grade 1:	1	5	-	1	-	-	-	-	1	8
PANCREAS :	10	10	-	1	-	-	-	-	10	10
- Mononucl cells focal:	1	2	-	-	-	-	-	-	2	1
Grade 1:	1	2	-	-	-	-	-	-	2	1

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NUMBER OF ANIMALS WITH MICROSCOPIC FINDINGS BY ORGAN/GROUP/SEX
STATUS AT NECROPSY: K0, INCL. DEATHS

	DOSE GROUP:	01		02		03		04	
	SEX :	M	F	M	F	M	F	M	F
	NO.ANIMALS:	10	10	10	10	10	10	10	10
KIDNEYS	:	10	10	-	1	-	-	10	10
- Tubular basoph focal:		6	1	-	-	-	-	8	2
Grade 1:		4	1	-	-	-	-	7	2
Grade 2:		2	-	-	-	-	-	1	-
- Tubular hyaline cast:		5	1	-	-	-	-	4	1
Grade 1:		4	1	-	-	-	-	4	1
Grade 2:		1	-	-	-	-	-	-	-
- Inflamm cells focal :		-	-	-	-	-	-	1	-
Grade 1:		-	-	-	-	-	-	1	-
- Mononucle cells focal:		4	1	-	-	-	-	7	1
Grade 1:		4	1	-	-	-	-	7	1
- Cyst focal	:	1	-	-	-	-	-	-	-
- Cystic dilated tubul:		-	1	-	-	-	-	-	-
EPIDIDYMIDES	:	10	-	-	-	-	-	10	-
- Vacuolation focal	:	1	-	-	-	-	-	-	-
Grade 1:		1	-	-	-	-	-	-	-
PROSTATE GLAND	:	10	-	-	-	-	-	10	-
- Mononucle cells focal:		2	-	-	-	-	-	1	-
Grade 1:		2	-	-	-	-	-	-	-
Grade 2:		-	-	-	-	-	-	1	-
UTERUS	:	-	10	-	1	-	-	-	10
- Estrus	:	-	2	-	-	-	-	-	1
- Metestrus	:	-	1	-	-	-	-	-	4
- Diestrus	:	-	3	-	-	-	-	-	-
- Proestrus	:	-	4	-	1	-	-	-	5
THYROID GLAND	:	10	9	-	1	-	-	10	10
- Mononucle cells focal:		-	-	-	-	-	-	1	-
Grade 1:		-	-	-	-	-	-	1	-
- Cyst ultimobranchial :		1	-	-	-	-	-	-	-

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NUMBER OF ANIMALS WITH MICROSCOPIC FINDINGS BY ORGAN/GROUP/SEX
STATUS AT NECROPSY: K0, INCL. DEATHS

	DOSE GROUP:		01		02		03		04	
SEX :	M	F	M	F	M	F	M	F	M	F
NO.ANIMALS:	10	10	10	10	10	10	10	10	10	10
ADRENAL GLANDS :	10	10	-	-	-	-	-	-	10	10
- Vacuolation z fascic:	3	-	-	-	-	-	-	-	4	-
Grade 1:	2	-	-	-	-	-	-	-	1	-
Grade 2:	-	-	-	-	-	-	-	-	1	-
Grade 3:	1	-	-	-	-	-	-	-	2	-
THYMUS :	10	10	-	1	-	-	-	-	9	10
- Lymphocytolysis incr:	1	-	-	-	-	-	-	-	2	1
Grade 1:	1	-	-	-	-	-	-	-	2	1
- Hemorrhage focal :	7	5	-	-	-	-	-	-	5	4
Grade 1:	7	5	-	-	-	-	-	-	5	4
MESENT. LYMPH NODE :	10	10	-	1	-	-	-	-	10	10
- Erythroph/hemorrhage:	-	2	-	-	-	-	-	-	-	-
Grade 1:	-	2	-	-	-	-	-	-	-	-
MANDIBULAR LN RIGHT :	10	10	-	1	-	-	-	-	10	10
- Hemorrhage/erythroph:	3	3	-	-	-	-	-	-	2	2
Grade 1:	3	3	-	-	-	-	-	-	2	2
SUBMANDIB.GLD. RIGHT :	10	10	-	1	-	-	-	-	10	10
- Atrophy acinar focal:	-	1	-	-	-	-	-	-	-	-
Grade 1:	-	1	-	-	-	-	-	-	-	-
MAMMARY GLAND :	9	10	-	1	-	-	-	-	10	10
- Adenecarcinoma :	-	-	-	1	-	-	-	-	-	-

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PATHOL. NO.: 74852 GN
DATE : 11-DEC-12
PathData©System V6.2a2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 01, 0% (v/v)

ANIMAL NUMBER :

	1	2	3	4	5	6	7	8	9	10
	MK0	MK0	MK0	MK0	MK0	MK0	MK0	MK0	MK0	MK0
COLON	-	-	-	-	-	-	-	-	-	-
RECTUM	-	-	-	-	-	-	-	-	-	-
LIVER	-	-	-	-	-	+	-	-	-	-
- EMH multifocal	.	.	.	.	.	1.	.	.	.	.
PANCREAS	-	-	-	-	-	-	-	-	+	-
- Mononucl cells focal	.	.	.	.	.	.	.	.	1.	.
KIDNEYS	+	-	+	+	+	+G	+	+	-	+
- Tubular basoph focal (	1.	.	2.	.	2.	.	1.	1.	.	1.
- Tubular hyaline cast (	1.	.	2.	(1.	1.	.	.	(1.	.	.
- Mononucl cells focal	.	.	(1.	.	(1.	.	.	(1.	.	1.
- Cyst focal	.	.	.	.	.	( P.	.	.	.	.
URETERS	-	-	-	-	(-	-	-	-	-	-
URINARY BLADDER	-	-	-	-	-	-	-	-	-	-
TESTES	-	-	-	-	-	-	-	-	-	-
EPIDIDYMIDES	-	-	-	+	-	-	-	-	-	-
- Vacuolation focal	.	.	.	(1.	.	.	.	.	.	.
PROSTATE GLAND	+	-	-	-	-	-	-	-	+	-
- Mononucl cells focal	1.	.	.	.	.	.	.	.	1.	.
SEMIN.VESICLE	-	-	-	-	-	-	-	-	-	-
PITUITARY GLAND	-	-	-	-	-	-	-	-	-	-
THYROID GLAND	+	-	-	-	-	-	-	-	-	-
- Cyst ultimobranchial (P.
PARATHYROID GLANDS	0	-	-	-	0	-	-	-	-	-
ADRENAL GLANDS	-	-	-	-	-	+	+	-	-	+
- Vacuolation z fascic	3.	1.	.	.	1.

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TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 01, 0% (v/v)

ANIMAL NUMBER :

	11	12	13	14	15	16	17	18	19	20
	FK0	FK0	FK0	FK0	FK0	FK0	FK0	FK0	FK0	FK0
COLON	-	-	-	-	-	-	-	-	-	-
RECTUM	-	-	-	-	-	-	-	-	-	-
LIVER	-	+	-	-	+	+	+	-	-	+
- EMH multifocal	.	1.	.	.	1.	1.	1.	.	.	1.
PANCREAS	-	+	-	-	-	+	-	-	-	-
- Mononucl cells focal	.	1.	.	.	.	1.	.	.	.	.
KIDNEYS	-	-	-	-	+	-	-	-	+	-
- Tubular basoph focal	.	.	.	.	( 1.	.	.	.	.	.
- Tubular hyaline cast	.	.	.	.	.	.	.	.	( 1.	.
- Mononucl cells focal	.	.	.	.	( 1.	.	.	.	.	.
- Cystic dilated tubul	.	.	.	.	( P.	.	.	.	.	.
URETERS	-	-	-	-	-	-	-	-	-	(-
URINARY BLADDER	-	-	-	-	-	-	-	-	-	-
OVARIES	-	-	-	-	-	-	-	-	-	-
OVIDUCTS	-	-	-	-	-	-	-	-	-	-
UTERUS	+	+	+	+	+	+	+	+	+	+
- Estrus	.	.	P.	.	.	.	.	.	.	P.
- Metestrus	.	.	.	.	.	.	.	.	P.	.
- Diestrus	P.	P.	.	.	.	.	P.	.	.	.
- Proestrus	.	.	.	P.	P.	P.	.	P.	.	.
CERVIX	-	-	-	-	-	-	-	-	-	-
VAGINA	-	-	-	-	-	-	-	-	-	-
PITUITARY GLAND	-	-	-	-	-	-	-	-	-	-
THYROID GLAND	-	-	-	-	-	0	-	(-	-	-
PARATHYROID GLANDS	0	-	-	-	-	0	0	0	(-	-

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PATHOL. NO.: 74852 GN
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PathData©System V6.2a2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 04, 100% (v/v)

ANIMAL NUMBER :

	61	62	63	64	65	66	67	68	69	70
	MK0	MK0	MK0	MK0	MK0	MK0	MK0	MK0	MK0	MK0
COLON	-	-	-	-	-	-	-	-	-	-
RECTUM	-	-	-	-	-	-	-	-	-	-
LIVER	+	+	-	-	-	-	-	+	-	+
- Vacuolation focal	.	1.	.	.	.	.	.	1.	.	.
- Peri-/arteritis foc	1.	.	.	.	.	.	.	.	.	.
- EMH multifocal	.	.	.	.	.	.	.	.	.	1.
PANCREAS	-	-	-	-	-	-	-	+	-	+
- Mononucl cells focal	.	.	.	.	.	.	.	1.	.	1.
KIDNEYS	+	-	+	+	-	+	+	+	+	+
- Tubular basoph focal	1.	.	2.	1.	.	1.	1.	(1.	1.	(1.
- Tubular hyaline cast	1.	.	(1.	(1.	.	.	1.	.	.	.
- Inflamm cells focal	.	.	.	.	.	.	.	( 1.	.	.
- Mononucl cells focal	(1.	.	(1.	1.	.	1.	1.	.	1.	(1.
URETERS	-	-	-	-	-	-	-	-	(-	-
URINARY BLADDER	-	-	-	-	-	-	-	-	-	-
TESTES	-	-	-	-	-	-	-	-	-	-
EPIDIDYIMIDES	-	-	-	-	-	-	-	-	-	-
PROSTATE GLAND	-	-	-	-	-	-	-	+	-	-
- Mononucl cells focal	.	.	.	.	.	.	.	2.	.	.
SEMIN.VESICLE	-	-	-	-	-	-	-	-	-	-
PITUITARY GLAND	-	-	-	-	-	-	-	-	-	-
THYROID GLAND	-	-	-	(+	-	-	-	-	-	-
- Mononucl cells focal	.	.	.	(1.
PARATHYROID GLANDS	-	-	-	(-	-	(-	-	-	-	-

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SPONSOR : Novozymes A/S

PATHOL. NO.: 74852 GN
DATE : 11-DEC-12
PathData©System V6.2a2

ANIMAL HEADING DATA
DOSE GROUP : 01, 0% (v/v)

ANIMAL NUMBER	SEX M/F	DEFINED AND FINAL STATE OF NECROPSY	TEST DAYS	FIRST AND LAST DAY UNDER TEST	DATE OF NECROPSY
1	M	K0	K0	91	01-MAY-12 30-JUL-12
2	M	K0	K0	91	01-MAY-12 30-JUL-12
3	M	K0	K0	91	01-MAY-12 30-JUL-12
4	M	K0	K0	91	01-MAY-12 30-JUL-12
5	M	K0	K0	91	01-MAY-12 30-JUL-12
6	M	K0	K0	91	01-MAY-12 30-JUL-12
7	M	K0	K0	91	01-MAY-12 30-JUL-12
8	M	K0	K0	91	01-MAY-12 30-JUL-12
9	M	K0	K0	91	01-MAY-12 30-JUL-12
10	M	K0	K0	91	01-MAY-12 30-JUL-12
11	F	K0	K0	92	01-MAY-12 31-JUL-12
12	F	K0	K0	92	01-MAY-12 31-JUL-12
13	F	K0	K0	92	01-MAY-12 31-JUL-12
14	F	K0	K0	92	01-MAY-12 31-JUL-12
15	F	K0	K0	92	01-MAY-12 31-JUL-12
16	F	K0	K0	92	01-MAY-12 31-JUL-12
17	F	K0	K0	92	01-MAY-12 31-JUL-12
18	F	K0	K0	92	01-MAY-12 31-JUL-12
19	F	K0	K0	92	01-MAY-12 31-JUL-12
20	F	K0	K0	92	01-MAY-12 31-JUL-12

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PATHOLOGY REPORT PAGE : 22/ 78
INDIVIDUAL ANIMAL DATA Ref No 20126010

TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 01, 0% (v/v) MALE

* STATE AT NECROPSY: K0
DAYS ON TEST : 91 * ANIMAL NO. : 1
.....

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

TONGUE:
-Inflammation/hemorrhage, focal, between myofibres
DUODENUM:
Tissue not present for histologic examination
KIDNEYS:
-Tubular basophilia, focal, in cortex, unilateral, grade 1
-Tubular hyaline casts, focal, cortex, assoc basoph tubules,
unilateral, grade 1
PROSTATE GLAND:
-Infiltration of mononuclear cells, focal, interstitial,
grade 1
THYROID GLAND (BOTH LOBES):
-Cyst, ultimobranchial, focal, unilateral
PARATHYROID GLANDS:
Tissue not present for histologic examination
THYMUS:
-Hemorrhage, focal, grade 1
ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

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PATHOLOGY REPORT PAGE : 23/ 78
INDIVIDUAL ANIMAL DATA Ref No 20126010

TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 01, 0% (v/v) MALE

* STATE AT NECROPSY: K0
DAYS ON TEST : 91 * ANIMAL NO. : 2
.....

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

TONGUE:
-Inflammation/hemorrhage, focal, between myofibres
THYMUS:
-Hemorrhage, focal, grade 1
ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

* STATE AT NECROPSY: K0
DAYS ON TEST : 91 * ANIMAL NO. : 3
.....

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

LUNG:
-Osseous metaplasia, focal
TONGUE:
-Inflammation/hemorrhage, focal, between myofibres
KIDNEYS:
-Tubular basophilia, focal, in cortex, bilateral, grade 2
-Tubular hyaline casts, focal, cortex, assoc basoph tubules,
bilateral, grade 2
-Infiltration of mononuclear cells, foc interst as bas tub,

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PATHOLOGY REPORT PAGE : 24/ 78
INDIVIDUAL ANIMAL DATA Ref No 20126010

TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 01, 0% (v/v) MALE

CONT./FF. ANIMAL NO. : 3

unilateral, grade 1
ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

* STATE AT NECROPSY: K0
DAYS ON TEST : 91 * ANIMAL NO. : 4

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

TONGUE:
-Inflammation/hemorrhage, focal, between myofibres
KIDNEYS:
-Tubular hyaline casts, focal medulla, unilateral, grade 1
EPIDIDYMIDES:
-Vacuolation, focal, unilateral, grade 1
THYMUS:
-Lymphocytolysis, increased, diffuse, grade 1
-Hemorrhage, focal, grade 1
MANDIBULAR LYMPH NODE, RIGHT:
-Hemorrhage/erythrophagocytosis, focal, in the sinus, grade 1
MAMMARY GLAND:
Tissue not present for histologic examination
SKIN/SUBCUTIS:
Tissue not present for histologic examination
ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

Study No: 74852
Sponsor Ref No: 20126010

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PATHOLOGY REPORT PAGE : 25/ 78
INDIVIDUAL ANIMAL DATA Ref No 20126010

TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 01, 0% (v/v) MALE

* STATE AT NECROPSY: K0
DAYS ON TEST : 91 * ANIMAL NO. : 5
.....

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

TONGUE:

-Inflammation/hemorrhage, focal, between myofibres

KIDNEYS:

-Tubular basophilia, focal, in cortex, inc interst fibrosis,
bilateral, grade 2

-Tubular hyaline casts, focal, cortex, assoc basoph tubules,
bilateral, grade 1

-Infiltration of mononuclear cells, foc interst as bas tub,
unilateral, grade 1

URETERS:

Only one of paired organs examined/present

PARATHYROID GLANDS:

Tissue not present for histologic examination

THYMUS:

-Hemorrhage, focal, grade 1

ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

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PATHOLOGY REPORT PAGE : 26/ 78
INDIVIDUAL ANIMAL DATA Ref No 20126010

TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 01, 0% (v/v) MALE

* STATE AT NECROPSY: K0
DAYS ON TEST : 91 * ANIMAL NO. : 6
.....

* NECROPSY FINDINGS

KIDNEYS:
01: Right side: Cyst: watery, Single, Up to 2 mm in diameter.
NO OTHER NECROPSY OBSERVATIONS NOTED

* MICROSCOPIC FINDINGS

TONGUE:
-Inflammation/hemorrhage, focal, between myofibres
LIVER:
-Extramedullary haematopoiesis, multifocal, grade 1
KIDNEYS:
-Cyst, focal, in medulla, unilateral
This finding corresponds to necropsy observation no: 01.
ADRENAL GLANDS:
-Vacuolation, macrovescicular, diffuse, in z fasciculata,
bilateral, grade 3
THYMUS:
-Hemorrhage, focal, grade 1
MANDIBULAR LYMPH NODE, RIGHT:
-Hemorrhage/erythrophagocytosis, focal, in the sinus, grade 1
OPTIC NERVES:
Tissue not present for histologic examination
ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

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PATHOLOGY REPORT PAGE : 27/ 78
INDIVIDUAL ANIMAL DATA Ref No 20126010

TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 01, 0% (v/v) MALE

* STATE AT NECROPSY: K0
DAYS ON TEST : 91 * ANIMAL NO. : 7
.....

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

TONGUE:
-Inflammation/hemorrhage, focal, between myofibres
KIDNEYS:
-Tubular basophilia, focal, in cortex, inc interst fibrosis,
bilateral, grade 1
ADRENAL GLANDS:
-Vacuolation, macrovesicular, focal, in z fasciculata,
bilateral, grade 1
ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

* STATE AT NECROPSY: K0
DAYS ON TEST : 91 * ANIMAL NO. : 8
.....

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

TONGUE:
-Inflammation/hemorrhage, focal, between myofibres
KIDNEYS:
-Tubular basophilia, focal, in cortex, bilateral, grade 1
-Tubular hyaline casts, focal, cortex, assoc basoph tubules,

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PATHOLOGY REPORT PAGE : 28/ 78
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TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 01, 0% (v/v) MALE

CONT./FF. ANIMAL NO. : 8

.....
unilateral, grade 1
-Infiltration of mononuclear cells, foc interst as bas tub,
unilateral, grade 1
ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

* STATE AT NECROPSY: K0
DAYS ON TEST : 91 * ANIMAL NO. : 9
.....

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

LUNG:
-Macrophages, alveolar, focal, grade 1
TONGUE:
-Inflammation/hemorrhage, focal, between myofibres
PANCREAS:
-Infiltration of mononuclear cells, focal, assoc exocr duct,
grade 1
PROSTATE GLAND:
-Infiltration of mononuclear cells, focal, interstitial,
grade 1
THYMUS:
-Hemorrhage, focal, grade 1
ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

Study No: 74852
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PATHOLOGY REPORT PAGE : 29/ 78
INDIVIDUAL ANIMAL DATA Ref No 20126010

TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 01, 0% (v/v) MALE

* STATE AT NECROPSY: K0
DAYS ON TEST : 91 * ANIMAL NO. : 10
.....

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

HEART:

-Infiltration of mononuclear cells, focal, subepicardial,
grade 1

TONGUE:

-Inflammation/hemorrhage, focal, between myofibres

KIDNEYS:

-Tubular basophilia, focal, in cortex, bilateral, grade 1
-Infiltration of mononuclear cells, foc interst as bas tub,
bilateral, grade 1

ADRENAL GLANDS:

-Vacuolation, macrovescicular, focal, in z fasciculata,
bilateral, grade 1

THYMUS:

-Hemorrhage, focal, grade 1

MANDIBULAR LYMPH NODE, RIGHT:

-Hemorrhage/erythrophagocytosis, focal, in the sinus, grade 1

ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

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PATHOLOGY REPORT PAGE : 30/ 78
INDIVIDUAL ANIMAL DATA Ref No 20126010

TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 01, 0% (v/v) FEMALE

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 11
.....

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

TONGUE:
-Inflammation/hemorrhage, focal, between myofibres
UTERUS:
-Diestrus
PARATHYROID GLANDS:
Tissue not present for histologic examination
MANDIBULAR LYMPH NODE, RIGHT:
-Hemorrhage/erythrophagocytosis, focal, in the sinus, grade 1
ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 12
.....

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

TONGUE:
-Inflammation/hemorrhage, focal, between myofibres
STOMACH GLANDULAR PART:
-Infiltration of inflammatory cells, mixed, focal, serosa,
grade 1

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PATHOLOGY REPORT PAGE : 31/ 78
INDIVIDUAL ANIMAL DATA Ref No 20126010

TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 01, 0% (v/v) FEMALE

CONT./FF. ANIMAL NO. : 12

LIVER:
-Extramedullary haematopoiesis, multifocal, grade 1
PANCREAS:
-Infiltration of mononuclear cells, focal, assoc exocr duct,
grade 1
UTERUS:
-Diestrus
MESENTERIC LYMPH NODE:
-Erythrophagocytosis/hemorrhage, focal, in sinus, grade 1
MANDIBULAR LYMPH NODE, RIGHT:
-Hemorrhage/erythrophagocytosis, focal, in the sinus, grade 1
ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 13

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

HEART:
-Infiltration of mononuclear cells, focal, in atrial wall,
grade 1
TONGUE:
-Inflammation/hemorrhage, focal, between myofibres
UTERUS:
-Estrus
THYMUS:
-Hemorrhage, focal, grade 1

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PATHOLOGY REPORT PAGE : 32/ 78
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TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 01, 0% (v/v) FEMALE

CONT./FF. ANIMAL NO. : 13

ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 14

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

TONGUE:
-Inflammation/hemorrhage, focal, between myofibres
UTERUS:
-Proestrus
ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 15

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

Study No: 74852
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PATHOLOGY REPORT PAGE : 33/ 78
INDIVIDUAL ANIMAL DATA Ref No 20126010

TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 01, 0% (v/v) FEMALE

CONT./FF. ANIMAL NO. : 15

* MICROSCOPIC FINDINGS

TONGUE:
-Inflammation/hemorrhage, focal, between myofibres
LIVER:
-Extramedullary haematopoiesis, multifocal, grade 1
KIDNEYS:
-Tubular basophilia, focal, in cortex, inc interst fibrosis,
unilateral, grade 1
-Infiltration of mononuclear cells, foc interst as bas tub,
unilateral, grade 1
-Cystic dilated tubule, focal, in the medulla, unilateral
UTERUS:
-Proestrus
THYMUS:
-Hemorrhage, focal, grade 1
ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 16

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

HEART:
-Infiltration of mononuclear cells, focal, grade 1
TONGUE:
-Inflammation/hemorrhage, focal, between myofibres

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PATHOLOGY REPORT PAGE : 34/ 78
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TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 01, 0% (v/v) FEMALE

CONT./FF. ANIMAL NO. : 16

STOMACH GLANDULAR PART:

-Infiltration of inflammatory cells, mixed, focal, mucosa,
grade 1

LIVER:

-Extramedullary haematopoiesis, multifocal, grade 1

PANCREAS:

-Infiltration of mononuclear cells, focal, assoc exocr duct,
grade 1

UTERUS:

-Proestrus

THYROID GLAND (BOTH LOBES):

Tissue not present for histologic examination

PARATHYROID GLANDS:

Tissue not present for histologic examination

THYMUS:

-Hemorrhage, focal, grade 1

ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

* STATE AT NECROPSY: K0

DAYS ON TEST : 92

* ANIMAL NO. : 17

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

LIVER:

-Extramedullary haematopoiesis, multifocal, grade 1

UTERUS:

-Diestrus

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PATHOLOGY REPORT PAGE : 35/ 78
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TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 01, 0% (v/v) FEMALE

CONT./FF. ANIMAL NO. : 17

PARATHYROID GLANDS:

Tissue not present for histologic examination

MESENTERIC LYMPH NODE:

-Erythrophagocytosis/hemorrhage, focal, in sinus, grade 1

MANDIBULAR LYMPH NODE, RIGHT:

-Hemorrhage/erythrophagocytosis, focal, in the sinus, grade 1

ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

* STATE AT NECROPSY: K0

DAYS ON TEST : 92

* ANIMAL NO. : 18

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

TONGUE:

-Inflammation/hemorrhage, focal, between myofibres

UTERUS:

-Proestrus

THYROID GLAND (BOTH LOBES):

Only one of paired organs examined/present

PARATHYROID GLANDS:

Tissue not present for histologic examination

ADRENAL GLANDS:

Only one of paired organs examined/present

THYMUS:

-Hemorrhage, focal, grade 1

SUBMANDIBULAR GLAND, RIGHT:

-Atrophy, acinar, focal, grade 1

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PATHOLOGY REPORT PAGE : 36/ 78
INDIVIDUAL ANIMAL DATA Ref No 20126010

TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 01, 0% (v/v) FEMALE

CONT./FF. ANIMAL NO. : 18

ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 19

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

TONGUE:
-Inflammation/hemorrhage, focal, between myofibres
KIDNEYS:
-Tubular hyaline casts, focal, cortex, unilateral, grade 1
UTERUS:
-Metestrus
PARATHYROID GLANDS:
Only one of paired organs examined/present
THYMUS:
-Hemorrhage, focal, grade 1
ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

Study No: 74852
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PATHOLOGY REPORT PAGE : 37/ 78
INDIVIDUAL ANIMAL DATA Ref No 20126010

TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 01, 0% (v/v) FEMALE

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 20
.....

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

TONGUE:
-Inflammation/hemorrhage, focal, between myofibres
LIVER:
-Extramedullary haematopoiesis, multifocal, grade 1
URETERS:
Only one of paired organs examined/present
UTERUS:
-Estrus
ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

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PATHOLOGY REPORT
INDIVIDUAL ANIMAL DATA

PAGE : 38/ 78
Ref No 20126010

TEST ARTICLE : Xylanase PPQ33502
TEST SYSTEM : RAT, 90-DAYS, ORAL
SPONSOR : Novozymes A/S

PATHOL. NO.: 74852 GN
DATE : 11-DEC-12
PathData©System V6.2a2

ANIMAL HEADING DATA
DOSE GROUP : 02, 10% (v/v)

ANIMAL NUMBER	SEX M/F	DEFINED AND FINAL STATE OF NECROPSY	TEST DAYS	FIRST AND LAST DAY UNDER TEST	DATE OF NECROPSY
21	M	K0	K0	91	01-MAY-12 30-JUL-12
22	M	K0	K0	91	01-MAY-12 30-JUL-12
23	M	K0	K0	91	01-MAY-12 30-JUL-12
24	M	K0	K0	91	01-MAY-12 30-JUL-12
25	M	K0	K0	91	01-MAY-12 30-JUL-12
26	M	K0	K0	91	01-MAY-12 30-JUL-12
27	M	K0	K0	91	01-MAY-12 30-JUL-12
28	M	K0	K0	91	01-MAY-12 30-JUL-12
29	M	K0	K0	91	01-MAY-12 30-JUL-12
30	M	K0	K0	91	01-MAY-12 30-JUL-12
31	F	K0	+2	45	01-MAY-12 14-JUN-12
32	F	K0	K0	92	01-MAY-12 31-JUL-12
33	F	K0	K0	92	01-MAY-12 31-JUL-12
34	F	K0	K0	92	01-MAY-12 31-JUL-12
35	F	K0	K0	92	01-MAY-12 31-JUL-12
36	F	K0	K0	92	01-MAY-12 31-JUL-12
37	F	K0	K0	92	01-MAY-12 31-JUL-12
38	F	K0	K0	92	01-MAY-12 31-JUL-12
39	F	K0	K0	92	01-MAY-12 31-JUL-12
40	F	K0	K0	92	01-MAY-12 31-JUL-12

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TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 02, 10% (v/v) MALE

* STATE AT NECROPSY: K0
DAYS ON TEST : 91 * ANIMAL NO. : 21
.....

* NECROPSY FINDINGS
NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS
NO EXAMINATION REQUIRED.

* STATE AT NECROPSY: K0
DAYS ON TEST : 91 * ANIMAL NO. : 22
.....

* NECROPSY FINDINGS
NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS
NO EXAMINATION REQUIRED.

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TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 02, 10% (v/v) MALE

* STATE AT NECROPSY: K0
DAYS ON TEST : 91 * ANIMAL NO. : 23
.....

* NECROPSY FINDINGS
NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS
NO EXAMINATION REQUIRED.

* STATE AT NECROPSY: K0
DAYS ON TEST : 91 * ANIMAL NO. : 24
.....

* NECROPSY FINDINGS
NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS
NO EXAMINATION REQUIRED.

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TEST ARTICLE : Xylanase PPQ33502
TEST SYSTEM : RAT, 90-DAYS, ORAL
SPONSOR : Novozymes A/S

PATHOL. NO.: 74852 GN
DATE : 11-DEC-12
PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 02, 10% (v/v) MALE

* STATE AT NECROPSY: K0
DAYS ON TEST : 91 * ANIMAL NO. : 25

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

NO EXAMINATION REQUIRED.

* STATE AT NECROPSY: K0
DAYS ON TEST : 91 * ANIMAL NO. : 26

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

NO EXAMINATION REQUIRED.

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TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 02, 10% (v/v) MALE

* STATE AT NECROPSY: K0
DAYS ON TEST : 91 * ANIMAL NO. : 27
.....

* NECROPSY FINDINGS
NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS
NO EXAMINATION REQUIRED.

* STATE AT NECROPSY: K0
DAYS ON TEST : 91 * ANIMAL NO. : 28
.....

* NECROPSY FINDINGS
NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS
NO EXAMINATION REQUIRED.

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TEST ARTICLE : Xylanase PPQ33502
TEST SYSTEM : RAT, 90-DAYS, ORAL
SPONSOR : Novozymes A/S

PATHOL. NO.: 74852 GN
DATE : 11-DEC-12
PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 02, 10% (v/v) MALE

* STATE AT NECROPSY: K0
DAYS ON TEST : 91 * ANIMAL NO. : 29

* NECROPSY FINDINGS
NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS
NO EXAMINATION REQUIRED.

* STATE AT NECROPSY: K0
DAYS ON TEST : 91 * ANIMAL NO. : 30

* NECROPSY FINDINGS
NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS
NO EXAMINATION REQUIRED.

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TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 02, 10% (v/v) FEMALE

* STATE AT NECROPSY: K0/+2
DAYS ON TEST : 45 * ANIMAL NO. : 31
.....

* NECROPSY FINDINGS

SKIN/SUBCUTIS:
01: Subcutis, Chest region, left: Nodule, Single, Size:
20X15X10MM, Pale, Firm.
NO OTHER NECROPSY OBSERVATIONS NOTED

* MICROSCOPIC FINDINGS

BRAIN:
Organ examined, no pathologic findings noted
SPINAL CORD (CERVICAL SEGMENT):
Organ examined, no pathologic findings noted
SPINAL CORD (THORACIC SEGMENT):
Organ examined, no pathologic findings noted
SPINAL CORD (LUMBAR SEGMENT):
Organ examined, no pathologic findings noted
SCIATIC NERVE (RIGHT):
Organ examined, no pathologic findings noted
HEART:
Organ examined, no pathologic findings noted
AORTA:
Organ examined, no pathologic findings noted
LARYNX:
Organ examined, no pathologic findings noted
TRACHEA:
Organ examined, no pathologic findings noted
LUNG:
Organ examined, no pathologic findings noted
TONGUE:
-Inflammation/hemorrhage, focal, between myofibres
ESOPHAGUS:
Organ examined, no pathologic findings noted

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TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 02, 10% (v/v) FEMALE

CONT./FF. ANIMAL NO. : 31
.....

STOMACH NONGLANDULAR PART:
Organ examined, no pathologic findings noted
STOMACH GLANDULAR PART:
Organ examined, no pathologic findings noted
DUODENUM:
Organ examined, no pathologic findings noted
JEJUNUM:
Organ examined, no pathologic findings noted
ILEUM:
Organ examined, no pathologic findings noted
CECUM:
Organ examined, no pathologic findings noted
COLON:
Organ examined, no pathologic findings noted
RECTUM:
Organ examined, no pathologic findings noted
LIVER:
-Extramedullary haematopoiesis, multifocal, grade 1
PANCREAS:
Organ examined, no pathologic findings noted
KIDNEYS:
Organ examined, no pathologic findings noted
URETERS:
Organ examined, no pathologic findings noted
URINARY BLADDER:
Organ examined, no pathologic findings noted
OVARIES:
Organ examined, no pathologic findings noted
OVIDUCTS:
Organ examined, no pathologic findings noted
UTERUS:
-Proestrus
CERVIX:
Organ examined, no pathologic findings noted
VAGINA:
Organ examined, no pathologic findings noted

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SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 02, 10% (v/v) FEMALE

CONT./FF. ANIMAL NO. : 31

PITUITARY GLAND:

Organ examined, no pathologic findings noted

THYROID GLAND (BOTH LOBES):

Organ examined, no pathologic findings noted

PARATHYROID GLANDS:

Organ examined, no pathologic findings noted

ADRENAL GLANDS:

Organ not examined

SPLEEN:

Organ examined, no pathologic findings noted

THYMUS:

Organ examined, no pathologic findings noted

MESENTERIC LYMPH NODE:

Organ examined, no pathologic findings noted

MANDIBULAR LYMPH NODE, RIGHT:

Organ examined, no pathologic findings noted

PAROTID GLAND (RIGHT):

Organ examined, no pathologic findings noted

SUBLINGUAL GLAND (RIGHT):

Organ examined, no pathologic findings noted

SUBMANDIBULAR GLAND, RIGHT:

Organ examined, no pathologic findings noted

MAMMARY GLAND:

-Adenocarcinoma (malignant neoplasm)

This finding corresponds to necropsy observation no.: 01
in the SKIN/SUBCUTIS.

SKIN/SUBCUTIS:

Organ examined, no pathologic findings noted

SKELETAL MUSCLE:

Organ examined, no pathologic findings noted

BONE, FEMUR:

Organ examined, no pathologic findings noted

JOINT (KNEE, RIGHT):

Organ examined, no pathologic findings noted

EYES:

Organ examined, no pathologic findings noted

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SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 02, 10% (v/v) FEMALE

CONT./FF. ANIMAL NO. : 31

OPTIC NERVES:

Organ examined, no pathologic findings noted

STERNUM:

Organ examined, no pathologic findings noted

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 32

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

NO EXAMINATION REQUIRED.

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 33

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

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TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 02, 10% (v/v) FEMALE

CONT./FF. ANIMAL NO. : 33

* MICROSCOPIC FINDINGS

NO EXAMINATION REQUIRED.

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 34

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

NO EXAMINATION REQUIRED.

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 35

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

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TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 02, 10% (v/v) FEMALE

CONT./FF. ANIMAL NO. : 35

* MICROSCOPIC FINDINGS

NO EXAMINATION REQUIRED.

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 36

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

NO EXAMINATION REQUIRED.

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 37

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

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TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 02, 10% (v/v) FEMALE

CONT./FF. ANIMAL NO. : 37

* MICROSCOPIC FINDINGS

NO EXAMINATION REQUIRED.

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 38

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

NO EXAMINATION REQUIRED.

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 39

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

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TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 02, 10% (v/v) FEMALE

CONT./FF. ANIMAL NO. : 39

* MICROSCOPIC FINDINGS

NO EXAMINATION REQUIRED.

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 40

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

NO EXAMINATION REQUIRED.

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TEST ARTICLE : Xylanase PPQ33502
TEST SYSTEM : RAT, 90-DAYS, ORAL
SPONSOR : Novozymes A/S

PATHOL. NO.: 74852 GN
DATE : 11-DEC-12
PathData©System V6.2a2

ANIMAL HEADING DATA
DOSE GROUP : 03, 33% (v/v)

ANIMAL NUMBER	SEX M/F	DEFINED AND FINAL STATE OF NECROPSY	TEST DAYS	FIRST AND LAST DAY UNDER TEST	DATE OF NECROPSY
41	M	K0	K0	91	01-MAY-12 30-JUL-12
42	M	K0	K0	91	01-MAY-12 30-JUL-12
43	M	K0	K0	91	01-MAY-12 30-JUL-12
44	M	K0	K0	91	01-MAY-12 30-JUL-12
45	M	K0	K0	91	01-MAY-12 30-JUL-12
46	M	K0	K0	91	01-MAY-12 30-JUL-12
47	M	K0	K0	91	01-MAY-12 30-JUL-12
48	M	K0	K0	91	01-MAY-12 30-JUL-12
49	M	K0	K0	91	01-MAY-12 30-JUL-12
50	M	K0	K0	91	01-MAY-12 30-JUL-12
51	F	K0	K0	92	01-MAY-12 31-JUL-12
52	F	K0	K0	92	01-MAY-12 31-JUL-12
53	F	K0	K0	92	01-MAY-12 31-JUL-12
54	F	K0	K0	92	01-MAY-12 31-JUL-12
55	F	K0	K0	92	01-MAY-12 31-JUL-12
56	F	K0	K0	92	01-MAY-12 31-JUL-12
57	F	K0	K0	92	01-MAY-12 31-JUL-12
58	F	K0	K0	92	01-MAY-12 31-JUL-12
59	F	K0	K0	92	01-MAY-12 31-JUL-12
60	F	K0	K0	92	01-MAY-12 31-JUL-12

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TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 03, 33% (v/v) MALE

* STATE AT NECROPSY: K0
DAYS ON TEST : 91 * ANIMAL NO. : 41
.....

* NECROPSY FINDINGS
NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS
NO EXAMINATION REQUIRED.

* STATE AT NECROPSY: K0
DAYS ON TEST : 91 * ANIMAL NO. : 42
.....

* NECROPSY FINDINGS
NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS
NO EXAMINATION REQUIRED.

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TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 03, 33% (v/v) MALE

* STATE AT NECROPSY: K0
DAYS ON TEST : 91 * ANIMAL NO. : 43
.....

* NECROPSY FINDINGS
NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS
NO EXAMINATION REQUIRED.

* STATE AT NECROPSY: K0
DAYS ON TEST : 91 * ANIMAL NO. : 44
.....

* NECROPSY FINDINGS
NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS
NO EXAMINATION REQUIRED.

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TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 03, 33% (v/v) MALE

* STATE AT NECROPSY: K0
DAYS ON TEST : 91 * ANIMAL NO. : 45
.....

* NECROPSY FINDINGS
NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS
NO EXAMINATION REQUIRED.

* STATE AT NECROPSY: K0
DAYS ON TEST : 91 * ANIMAL NO. : 46
.....

* NECROPSY FINDINGS
NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS
NO EXAMINATION REQUIRED.

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TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 03, 33% (v/v) MALE

* STATE AT NECROPSY: K0
DAYS ON TEST : 91 * ANIMAL NO. : 47
.....

* NECROPSY FINDINGS
NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS
NO EXAMINATION REQUIRED.

* STATE AT NECROPSY: K0
DAYS ON TEST : 91 * ANIMAL NO. : 48
.....

* NECROPSY FINDINGS
NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS
NO EXAMINATION REQUIRED.

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TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 03, 33% (v/v) MALE

* STATE AT NECROPSY: K0
DAYS ON TEST : 91 * ANIMAL NO. : 49
.....

* NECROPSY FINDINGS
NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS
NO EXAMINATION REQUIRED.

* STATE AT NECROPSY: K0
DAYS ON TEST : 91 * ANIMAL NO. : 50
.....

* NECROPSY FINDINGS
NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS
NO EXAMINATION REQUIRED.

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TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 03, 33% (v/v) FEMALE

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 51
.....

* NECROPSY FINDINGS
NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS
NO EXAMINATION REQUIRED.

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 52
.....

* NECROPSY FINDINGS
NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS
NO EXAMINATION REQUIRED.

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TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 03, 33% (v/v) FEMALE

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 53
.....

* NECROPSY FINDINGS
NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS
NO EXAMINATION REQUIRED.

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 54
.....

* NECROPSY FINDINGS
NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS
NO EXAMINATION REQUIRED.

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TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 03, 33% (v/v) FEMALE

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 55
.....

* NECROPSY FINDINGS
NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS
NO EXAMINATION REQUIRED.

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 56
.....

* NECROPSY FINDINGS
NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS
NO EXAMINATION REQUIRED.

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TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 03, 33% (v/v) FEMALE

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 57
.....

* NECROPSY FINDINGS
NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS
NO EXAMINATION REQUIRED.

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 58
.....

* NECROPSY FINDINGS
NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS
NO EXAMINATION REQUIRED.

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PATHOLOGY REPORT
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Ref No 20126010

TEST ARTICLE : Xylanase PPQ33502
TEST SYSTEM : RAT, 90-DAYS, ORAL
SPONSOR : Novozymes A/S

PATHOL. NO.: 74852 GN
DATE : 11-DEC-12
PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 03, 33% (v/v) FEMALE

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 59

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

NO EXAMINATION REQUIRED.

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 60

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

NO EXAMINATION REQUIRED.

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TEST ARTICLE : Xylanase PPQ33502
TEST SYSTEM : RAT, 90-DAYS, ORAL
SPONSOR : Novozymes A/S

PATHOL. NO.: 74852 GN
DATE : 11-DEC-12
PathData©System V6.2a2

ANIMAL HEADING DATA
DOSE GROUP : 04, 100% (v/v)

ANIMAL NUMBER	SEX M/F	DEFINED AND FINAL STATE OF NECROPSY	TEST DAYS	FIRST AND LAST DAY UNDER TEST	DATE OF NECROPSY
61	M	K0	K0	91	01-MAY-12 30-JUL-12
62	M	K0	K0	91	01-MAY-12 30-JUL-12
63	M	K0	K0	91	01-MAY-12 30-JUL-12
64	M	K0	K0	91	01-MAY-12 30-JUL-12
65	M	K0	K0	91	01-MAY-12 30-JUL-12
66	M	K0	K0	91	01-MAY-12 30-JUL-12
67	M	K0	K0	91	01-MAY-12 30-JUL-12
68	M	K0	K0	91	01-MAY-12 30-JUL-12
69	M	K0	K0	91	01-MAY-12 30-JUL-12
70	M	K0	K0	91	01-MAY-12 30-JUL-12
71	F	K0	K0	92	01-MAY-12 31-JUL-12
72	F	K0	K0	92	01-MAY-12 31-JUL-12
73	F	K0	K0	92	01-MAY-12 31-JUL-12
74	F	K0	K0	92	01-MAY-12 31-JUL-12
75	F	K0	K0	92	01-MAY-12 31-JUL-12
76	F	K0	K0	92	01-MAY-12 31-JUL-12
77	F	K0	K0	92	01-MAY-12 31-JUL-12
78	F	K0	K0	92	01-MAY-12 31-JUL-12
79	F	K0	K0	92	01-MAY-12 31-JUL-12
80	F	K0	K0	92	01-MAY-12 31-JUL-12

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TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 04, 100% (v/v) MALE

* STATE AT NECROPSY: K0
DAYS ON TEST : 91 * ANIMAL NO. : 61
.....

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

TONGUE:

-Inflammation/hemorrhage, focal, between myofibres

LIVER:

-Peri-/arteritis, focal, subacute, grade 1

KIDNEYS:

-Tubular basophilia, focal, in cortex, bilateral, grade 1

-Tubular hyaline casts, focal medulla, bilateral, grade 1

-Infiltration of mononuclear cells, foc interst as bas tub,
unilateral, grade 1

ADRENAL GLANDS:

-Vacuolation, macrovescicular, diffuse, in z fasciculata,
bilateral, grade 3

THYMUS:

-Hemorrhage, focal, grade 1

SUBLINGUAL GLAND (RIGHT):

Tissue not present for histologic examination

ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

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PATHOLOGY REPORT PAGE : 65/ 78
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TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 04, 100% (v/v) MALE

* STATE AT NECROPSY: K0
DAYS ON TEST : 91 * ANIMAL NO. : 62
.....

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

HEART:
-Infiltration of mononuclear cells, focal, grade 1
LUNG:
-Osseous metaplasia, focal
LIVER:
-Vacuolation, focal, macrovesicular, grade 1
THYMUS:
-Hemorrhage, focal, grade 1
ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

* STATE AT NECROPSY: K0
DAYS ON TEST : 91 * ANIMAL NO. : 63
.....

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

TONGUE:
-Inflammation/hemorrhage, focal, between myofibres
KIDNEYS:
-Tubular basophilia, focal, in cortex, inc interst fibrosis,
bilateral, grade 2

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PATHOLOGY REPORT PAGE : 66/ 78
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TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 04, 100% (v/v) MALE

CONT./FF. ANIMAL NO. : 63

-Tubular hyaline casts, focal, cortex, assoc basoph tubules,
unilateral, grade 1
-Infiltration of mononuclear cells, foc interst as bas tub,
unilateral, grade 1

THYMUS:

-Hemorrhage, focal, grade 1

ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

* STATE AT NECROPSY: K0

DAYS ON TEST : 91

* ANIMAL NO. : 64

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

TONGUE:

-Inflammation/hemorrhage, focal, between myofibres

KIDNEYS:

-Tubular basophilia, focal, in cortex, inc interst fibrosis,
bilateral, grade 1

-Tubular hyaline casts, focal, cortex, assoc basoph tubules,
unilateral, grade 1

-Infiltration of mononuclear cells, foc interst as bas tub,
bilateral, grade 1

THYROID GLAND (BOTH LOBES):

Only one of paired organs examined/present

-Infiltration of mononuclear cells, focal, interstitial,
unilateral, grade 1

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TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 04, 100% (v/v) MALE

CONT./FF. ANIMAL NO. : 64

PARATHYROID GLANDS:

Only one of paired organs examined/present

THYMUS:

- Lymphocytolysis, increased, diffuse, grade 1
- Hemorrhage, focal, grade 1

OPTIC NERVES:

Tissue not present for histologic examination

ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

* STATE AT NECROPSY: K0

DAYS ON TEST : 91

* ANIMAL NO. : 65

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

TONGUE:

- Inflammation/hemorrhage, focal, between myofibres

ADRENAL GLANDS:

- Vacuolation, macrovescicular, diffuse, in z fasciculata, bilateral, grade 2

THYMUS:

- Hemorrhage, focal, grade 1

ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

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TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 04, 100% (v/v) MALE

* STATE AT NECROPSY: K0
DAYS ON TEST : 91 * ANIMAL NO. : 66
.....

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

KIDNEYS:

- Tubular basophilia, focal, in cortex, inc interst fibrosis, bilateral, grade 1
- Infiltration of mononuclear cells, foc interst as bas tub, bilateral, grade 1

PARATHYROID GLANDS:

Only one of paired organs examined/present

MANDIBULAR LYMPH NODE, RIGHT:

- Hemorrhage/erythrophagocytosis, focal, in the sinus, grade 1

ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

* STATE AT NECROPSY: K0
DAYS ON TEST : 91 * ANIMAL NO. : 67
.....

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

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TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 04, 100% (v/v) MALE

CONT./FF. ANIMAL NO. : 67

* MICROSCOPIC FINDINGS

LUNG:

-Macrophages, alveolar, focal, grade 1

TONGUE:

-Inflammation/hemorrhage, focal, between myofibres

KIDNEYS:

-Tubular basophilia, focal, in cortex, inc interst fibrosis,
bilateral, grade 1

-Tubular hyaline casts, focal, cortex, assoc basoph tubules,
bilateral, grade 1

-Infiltration of mononuclear cells, foc interst as bas tub,
bilateral, grade 1

THYMUS:

Tissue not present for histologic examination

ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

* STATE AT NECROPSY: K0

DAYS ON TEST : 91

* ANIMAL NO. : 68

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

LIVER:

-Vacuolation, focal, macrovescicular, grade 1

PANCREAS:

-Infiltration of mononuclear cells, focal, assoc exocr duct,
grade 1

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TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 04, 100% (v/v) MALE

CONT./FF. ANIMAL NO. : 68

KIDNEYS:

- Tubular basophilia, focal, in cortex, unilateral, grade 1
- Infiltration of inflammatory cells, mixed, focal, medulla, unilateral, grade 1

PROSTATE GLAND:

- Infiltration of mononuclear cells, focal, interstitial, grade 2

ADRENAL GLANDS:

- Vacuolation, macrovesicular, focal, in z fasciculata, bilateral, grade 1

MANDIBULAR LYMPH NODE, RIGHT:

- Hemorrhage/erythrophagocytosis, focal, in the sinus, grade 1

ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

* STATE AT NECROPSY: K0

DAYS ON TEST : 91

* ANIMAL NO. : 69

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

TONGUE:

- Inflammation/hemorrhage, focal, between myofibres

KIDNEYS:

- Tubular basophilia, focal, in cortex, inc interst fibrosis, bilateral, grade 1
- Infiltration of mononuclear cells, foc interst as bas tub, bilateral, grade 1

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TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
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TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 04, 100% (v/v) MALE

CONT./FF. ANIMAL NO. : 69

URETERS:

Only one of paired organs examined/present

THYMUS:

-Lymphocytolysis, increased, focal, grade 1

ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

* STATE AT NECROPSY: K0

DAYS ON TEST : 91

* ANIMAL NO. : 70

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

HEART:

-Infiltration of mononuclear cells, focal, grade 1

LIVER:

-Extramedullary haematopoiesis, multifocal, grade 1

PANCREAS:

-Infiltration of mononuclear cells, focal, assoc exocr duct,
grade 1

KIDNEYS:

-Tubular basophilia, focal, in cortex, unilateral, grade 1

-Infiltration of mononuclear cells, foc interst as bas tub,
unilateral, grade 1

ADRENAL GLANDS:

-Vacuolation, macrovescicular, diffuse, in z fasciculata,
bilateral, grade 3

ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

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TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 04, 100% (v/v) FEMALE

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 71
.....

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

TONGUE:
-Inflammation/hemorrhage, focal, between myofibres
LIVER:
-Extramedullary haematopoiesis, multifocal, grade 1
KIDNEYS:
-Tubular basophilia, focal, in cortex, bilateral, grade 1
-Tubular hyaline casts, focal, cortex/medulla, as baso tub,
bilateral, grade 1
-Infiltration of mononuclear cells, foc interst as bas tub,
bilateral, grade 1
UTERUS:
-Metestrus
ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 72
.....

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

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PATHOLOGY REPORT PAGE : 73/ 78
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TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 04, 100% (v/v) FEMALE

CONT./FF. ANIMAL NO. : 72

* MICROSCOPIC FINDINGS

TONGUE:
-Inflammation/hemorrhage, focal, between myofibres
LIVER:
-Extramedullary haematopoiesis, multifocal, grade 1
KIDNEYS:
-Tubular basophilia, focal, in cortex, unilateral, grade 1
UTERUS:
-Metestrus
PARATHYROID GLANDS:
Tissue not present for histologic examination
ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 73

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

TONGUE:
-Inflammation/hemorrhage, focal, between myofibres
LIVER:
-Extramedullary haematopoiesis, multifocal, grade 1
UTERUS:
-Proestrus
MANDIBULAR LYMPH NODE, RIGHT:
-Hemorrhage/erythrophagocytosis, focal, in the sinus, grade 1

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SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 04, 100% (v/v) FEMALE

CONT./FF. ANIMAL NO. : 73

ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 74

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

LUNG:
-Infiltration of inflammatory cells, mixed, focal, alveolar,
grade 1
UTERUS:
-Metestrus
THYROID GLAND (BOTH LOBES):
Only one of paired organs examined/present
PARATHYROID GLANDS:
Only one of paired organs examined/present
THYMUS:
-Hemorrhage, focal, grade 1
OPTIC NERVES:
Tissue not present for histologic examination
ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

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TEST ARTICLE : Xylanase PPQ33502 PATHOL. NO.: 74852 GN
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SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 04, 100% (v/v) FEMALE

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 75
.....

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

UTERUS:
-Estrus, late
PARATHYROID GLANDS:
Only one of paired organs examined/present
THYMUS:
-Hemorrhage, focal, grade 1
ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 76
.....

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

TONGUE:
-Inflammation/hemorrhage, focal, between myofibres
LIVER:
-Extramedullary haematopoiesis, multifocal, grade 1
PANCREAS:
-Infiltration of mononuclear cells, focal, assoc exocr duct,
grade 1

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SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 04, 100% (v/v) FEMALE

CONT./FF. ANIMAL NO. : 76

UTERUS:
-Metestrus
ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 77

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

LIVER:
-Extramedullary haematopoiesis, multifocal, grade 1
UTERUS:
-Proestrus
PARATHYROID GLANDS:
Tissue not present for histologic examination
ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

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SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 04, 100% (v/v) FEMALE

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 78
.....

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

LIVER:
-Extramedullary haematopoiesis, multifocal, grade 1
UTERUS:
-Proestrus
THYMUS:
-Hemorrhage, focal, grade 1
ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 79
.....

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

TONGUE:
-Inflammation/hemorrhage, focal, between myofibres
LIVER:
-Extramedullary haematopoiesis, multifocal, grade 1
UTERUS:
-Proestrus

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TEST SYSTEM : RAT, 90-DAYS, ORAL DATE : 11-DEC-12
SPONSOR : Novozymes A/S PathData©System V6.2a2

TEXT OF GROSS AND MICROSCOPIC FINDINGS
DOSE GROUP : 04, 100% (v/v) FEMALE

CONT./FF. ANIMAL NO. : 79

MANDIBULAR LYMPH NODE, RIGHT:
-Hemorrhage/erythrophagocytosis, focal, in the sinus, grade 1
ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.

* STATE AT NECROPSY: K0
DAYS ON TEST : 92 * ANIMAL NO. : 80

* NECROPSY FINDINGS

NO NECROPSY OBSERVATIONS NOTED.

* MICROSCOPIC FINDINGS

HEART:
-Infiltration of mononuclear cells, focal, grade 1
TONGUE:
-Inflammation/hemorrhage, focal, between myofibres
LIVER:
-Extramedullary haematopoiesis, multifocal, grade 1
UTERUS:
-Proestrus
THYMUS:
-Lymphocytolysis, increased, focal, grade 1
-Hemorrhage, focal, grade 1
ALL OTHER PROTOCOL TISSUES WITHOUT PATHOLOGIC FINDINGS.