FOOD STANDARDS
Australia New Zealand
Te Mana Kounga Kai – Ahitereiria me Aotearoa

11/03
13 August 2003

INITIAL ASSESSMENT REPORT

APPLICATION A501

PHOSPHOLIPASE A_2 AS A PROCESSING AID (ENZYME)

DEADLINE FOR PUBLIC SUBMISSIONS to FSANZ in relation to this matter:
24 September 2003
(See 'Invitation for Public Submissions' for details)

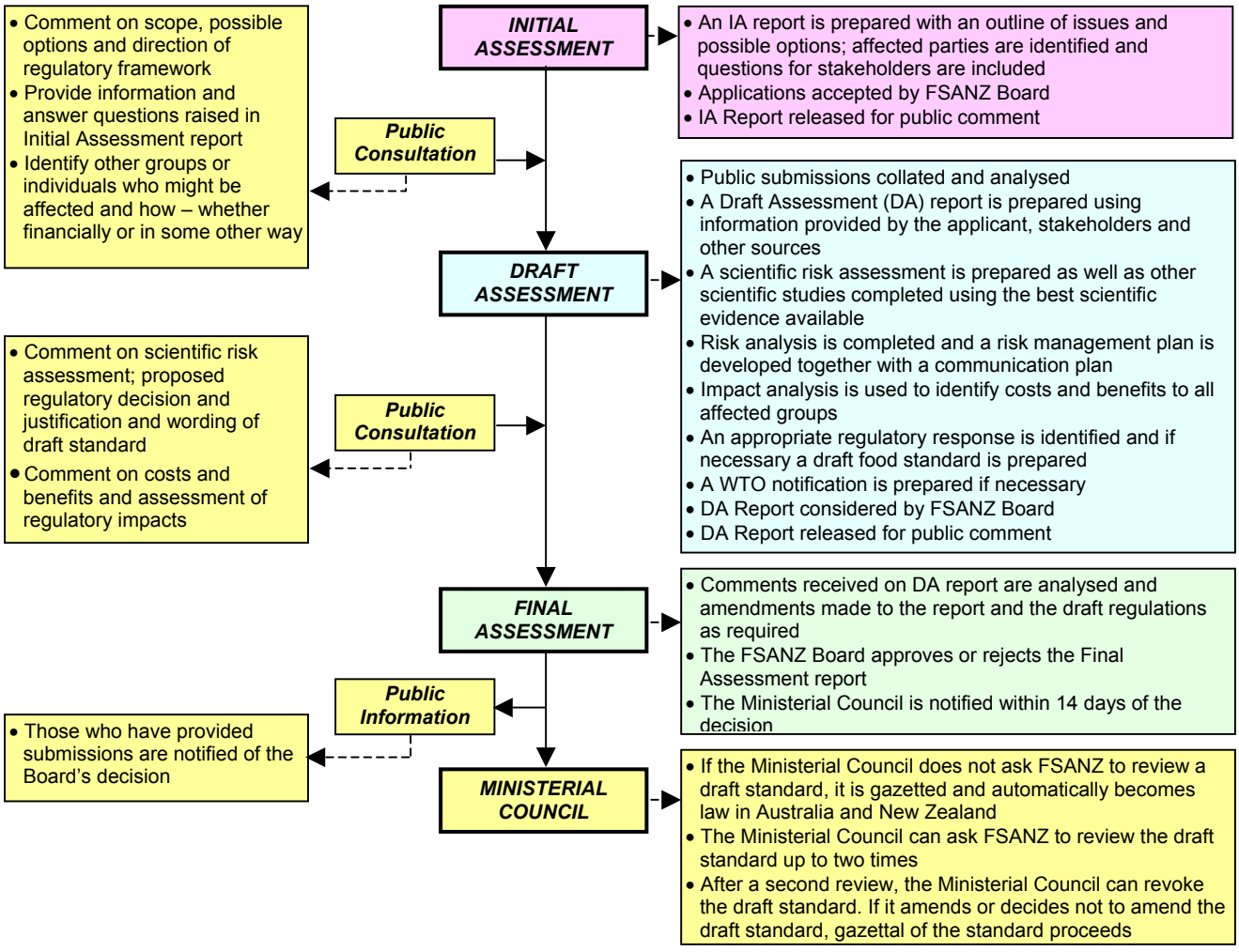
FOOD STANDARDS AUSTRALIA NEW ZEALAND (FSANZ)

FSANZ's role is to protect the health and safety of people in Australia and New Zealand through the maintenance of a safe food supply. FSANZ is a partnership between ten Governments: the Commonwealth; Australian States and Territories; and New Zealand. It is a statutory authority under Commonwealth law and is an independent, expert body.

FSANZ is responsible for developing, varying and reviewing standards and for developing codes of conduct with industry for food available in Australia and New Zealand covering labelling, composition and contaminants. In Australia, FSANZ also develops food standards for food safety, maximum residue limits, primary production and processing and a range of other functions including the coordination of national food surveillance and recall systems, conducting research and assessing policies about imported food.

The FSANZ Board approves new standards or variations to food standards in accordance with policy guidelines set by the Australia and New Zealand Food Regulation Ministerial Council (Ministerial Council) made up of Commonwealth, State and Territory and New Zealand Health Ministers as lead Ministers, with representation from other portfolios. Approved standards are then notified to the Ministerial Council. The Ministerial Council may then request that FSANZ review a proposed or existing standard. If the Ministerial Council does not request that FSANZ review the draft standard, or amends a draft standard, the standard is adopted by reference under the food laws of the Commonwealth, States, Territories and New Zealand. The Ministerial Council can, independently of a notification from FSANZ, request that FSANZ review a standard.

The process for amending the *Australia New Zealand Food Standards Code* is prescribed in the *Food Standards Australia New Zealand Act 1991* (FSANZ Act). The diagram below represents the different stages in the process including when periods of public consultation occur. This process varies for matters that are urgent or minor in significance or complexity.



INVITATION FOR PUBLIC SUBMISSIONS

FSANZ has prepared an Initial Assessment Report of Application A501, which includes the identification and discussion of the key issues.

FSANZ invites public comment on this Initial Assessment Report for the purpose of preparing an amendment to the Code for approval by the FSANZ Board.

Written submissions are invited from interested individuals and organisations to assist FSANZ in preparing the Draft Assessment for this application. Submissions should, where possible, address the objectives of FSANZ as set out in section 10 of the FSANZ Act. Information providing details of potential costs and benefits of the proposed change to the Code from stakeholders is highly desirable. Claims made in submissions should be supported wherever possible by referencing or including relevant studies, research findings, trials, surveys etc. Technical information should be in sufficient detail to allow independent scientific assessment.

The processes of FSANZ are open to public scrutiny, and any submissions received will ordinarily be placed on the public register of FSANZ and made available for inspection. If you wish any information contained in a submission to remain confidential to FSANZ, you should clearly identify the sensitive information and provide justification for treating it as commercial-in-confidence. Section 39 of the FSANZ Act requires FSANZ to treat in-confidence, trade secrets relating to food and any other information relating to food, the commercial value of which would be, or could reasonably be expected to be, destroyed or diminished by disclosure.

Submissions must be made in writing and should clearly be marked with the word 'Submission' and quote the correct project number and name. Submissions may be sent to one of the following addresses:

Food Standards Australia New Zealand
PO Box 7186
Canberra BC ACT 2610
AUSTRALIA
Tel (02) 6271 2222
www.foodstandards.gov.au

Food Standards Australia New Zealand
PO Box 10559
The Terrace WELLINGTON 6036
NEW ZEALAND
Tel (04) 473 9942
www.foodstandards.govt.nz

Submissions should be received by FSANZ by **24 September 2003**. Submissions received after this date may not be considered, unless the Project Manager has given prior agreement for an extension. While FSANZ accepts submissions in hard copy to our offices, it is more convenient and quicker to receive submissions electronically through the FSANZ website using the Standards Development tab and then through Documents for Public Comment. Questions relating to making submissions or the application process can be directed to the Standards Liaison Officer at the above address or by emailing slo@foodstandards.gov.au.

Assessment reports are available for viewing and downloading from the FSANZ website. Alternatively, requests for paper copies of reports or other general inquiries can be directed to FSANZ's Information Officer at either of the above addresses or by emailing info@foodstandards.gov.au.

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Executive Summary

FSANZ received an application on 12 May 2003, from Genencor International to amend Standard 1.3.3 – Processing Aids of the *Australia New Zealand Food Standards Code* (the Code) to approve the use of a new enzyme, phospholipase A_2 (Enzyme Commission number EC number 3.1.1.4) sourced from *Streptomyces violaceoruber*, as a processing aid. The enzyme is not sourced from a genetically modified organism. Work commenced on this cost recovered application on 9 July 2003.

This Initial Assessment Report is not a detailed assessment of Application A501 but rather an assessment of whether the application should undergo further consideration. The report is based mainly on information provided by the applicant and has been written to assist in identifying the affected parties and to outline expected relevant issues to complete the assessment. The information needed to complete the assessment will include information received from public submissions.

Processing aids are required to undergo a pre-market safety assessment before approval for use in Australia and New Zealand. There is currently approval for the use of phospholipase A_2 derived from porcine pancreas in the Code. The objective of this assessment is to determine whether the Code should be amended to permit the use of phospholipase A_2 sourced from *S. violaceoruber*.

Phospholipase A_2 is used to hydrolyse lecithin to produce lysolecithin, which has improved emulsifying properties.

S. violaceoruber is the source of the enzyme and does not have a long history of safe use in the production of food enzymes. The applicant claims *S. violaceoruber* is non-pathogenic and non-toxigenic.

Phospholipase A_2 preparations meet both the current Food Chemical Codex (FCC) specifications and JECFA compendium of specifications for food grade enzyme preparations.

This application has been assessed against the requirements of section 13 of the *Food Standards Australia New Zealand Act 1991* (the Act). Accordingly, it is recommended that this application be accepted and progressed to Draft Assessment subject to the payment of fees assessed pursuant to section 66 of the Act and the *Food Standards Australia New Zealand Regulations 1994* (the Regulations). Submissions are invited to assist in assessing this application, the proposed Regulatory options and the Report as a whole.

1. Introduction

FSANZ received an application on 12 May 2003, from Genencor International to amend Standard 1.3.3 – Processing Aids of the *Australia New Zealand Food Standards Code* (the Code) to approve the use of a enzyme, phospholipase A_2 (EC number 3.1.1.4), produced from a new source, as a processing aid. Work commenced on this cost recovered application on 9 July 2003.

Phospholipase A_2 is sourced from *Streptomyces violaceoruber*. The source organism does not have a history of safe use in the production of food enzymes. The organism has not been genetically modified.

The main function that phospholipase A_2 has in food manufacturing is as a processing aid to hydrolyse lecithin, producing a modified lecithin with improved emulsifying power. The modified lecithin produced performs as an emulsifier in non-fat based systems, such as aqueous systems, unlike unmodified lecithin. Such modified lecithin can be used in the baking, confectionery, dairy fats and beverage industries but is not limited to these products. Currently porcine pancreas is the only permitted source of phospholipase A_2. It is anticipated by the applicant that the use of this enzyme derived from a microbial source will lead to Kosher acceptable foods that use enzyme modified lecithin as an ingredient.

2. Regulatory Problem

2.1 Current Standard

Under Standard 1.3.3 of the Code, processing aids are required to undergo a pre-market safety assessment before approval for use in Australia and New Zealand. A processing aid is a substance used in the processing of raw materials, foods or ingredients, to fulfil a technological purpose relating to treatment or processing, but does not perform a technological function in the final food.

There is currently no approval for the use of phospholipase A_2 sourced from *S. violaceoruber* in the Code. Phospholipase A_2 is not listed in the Table to clause 17 of Standard 1.3.3 – Processing Aids, for permitted enzymes of microbial origin.

The source organism *S. violaceoruber* is not listed as an approved source for any other permitted enzymes listed in the Table to clause 17 of Standard 1.3.3.

3. Objective

In developing or varying a food standard, FSANZ is required by its legislation to meet three primary objectives, which are set out in section 10 of the FSANZ Act. These are:

- the protection of public health and safety;
- the provision of adequate information relating to food to enable consumers to make informed choices; and
- the prevention of misleading or deceptive conduct.

In developing and varying standards, FSANZ must also have regard to:

- the need for standards to be based on risk analysis using the best available scientific evidence;
- the promotion of consistency between domestic and international food standards;
- the desirability of an efficient and internationally competitive food industry;
- the promotion of fair trading in food; and
- any written policy guidelines formulated by the Ministerial Council.

The objective of this assessment is to determine whether the Code should be amended to permit the use of phospholipase A_2 derived from *S. violaceoruber*. The specific objectives of A501 are:

- the protection of public health and safety;
- the need for standards to be based on risk analysis using the best available scientific evidence;
- the desirability of an efficient and internationally competitive food industry.

4. Background

4.1 Historical Background

Phospholipase A_2 was the first phospholipase to be recognised. The enzyme is ubiquitous in nature and occurs in virtually all types of cells that have been examined. Phospholipase A_2 is a component of many animal and plant derived foods and thus has always been consumed by humans.

The *S. violaceoruber* sourced phospholipase A_2 is similar to the porcine pancreatic phospholipase A_2, which is a currently permitted enzyme of animal origin in the table to clause 15 of Standard 1.3.3 of the Code.

5. Relevant Issues

5.1 Nature of the enzyme

The common name of the enzyme is phospholipase A_2. Other alternative names include lipase, lecithinase, lecithinase A, phosphatidase, phosphatidolipase, and phospholipase A, while the systematic name is phosphatidylcholine 2-acylhydrolase.

The Enzyme Commission number is EC 3.1.1.4 and the CAS registry number is 9001-84-7. The molecular weight of the enzyme is approximately 10-12 kDa.

The enzyme is characterised by its ability to catalyse the reaction:

phosphatidylcholine + H_2O = 1 – acylglycerophosphocholine + carboxylate.

The products of lecithin hydrolysis are normal constituents of food and there are no known unintended reaction products formed by either enzymatic or chemical reaction of the components of the enzyme preparation with food.

5.2 Efficacy and technological justification

Phospholipase A_2 is used as a processing aid for the hydrolysis of lecithin, which results in the production of a modified lecithin with improved emulsifying power. Commercial lecithin is a naturally occurring mixture of phosphatides of choline, ethanolamine, and inositol, with smaller amounts of other lipids and is widely used in many categories of foods. The benefits of lecithin as an emulsifier in food processing are well known; however, the functionality of "unmodified" lecithin is limited to fat-based systems. In aqueous systems, i.e., baked goods, lecithin must be structurally altered, either chemically or enzymatically, to exhibit good emulsifying properties. Chemical modification can be costly and non-specific, generating undesired hydrolysis products. Phospholipase A_2 hydrolyses the ester bond between glycerol and the fatty acid at the number 2 position of the glycerol backbone of lecithin, producing one molecule of lysolecithin and one molecule of fatty acid from one molecule of lecithin. The resulting lysolecithin product is a compound with emulsifying capabilities in many foods that are superior to that of the unmodified lecithin. According to the applicant, using phospholipase A_2 derived from a bacterial source allows Kosher certification for foods produced using this enzyme.

There are unlikely to be any nutritional implications with this application since phospholipase A_2 is used as a processing aid and is added in low doses to food. Pasteurisation and drying steps (if required) will inactivate the enzyme. The enzyme is to be used as a processing aid only and any residue would be in the form of inactivated enzyme, which would be metabolised like any other protein.

The technological justification will be investigated more fully in a Food Technology Report which will be included as part of the Draft Assessment Report.

5.3 Safety assessment

S. violaceoruber is the source of this enzyme. This organism does not have a history of use in the production of food enzymes.

The applicant provided the following studies:

1. Acute oral toxicity in the rat.
2. Salmonella/Mammalian-Microsome Reverse Mutation Assay (Ames test).
3. Mutagenicity test (Mouse lymphoma forward mutation assay).
4. Genotoxicity test on rat liver primary cell cultures (unscheduled DNA synthesis).
5. Pathogenicity of *S violaceoruber* on mice.

These studies will be assessed as part of a Safety Assessment Report prepared for the Draft Assessment Report. A three month semi-chronic study is currently being done and the results of this study will be available to FSANZ when the study is complete, anticipated in November 2003.

5.4 Other international regulatory standards

The applicant states that the phospholipase A_2 preparations comply with specifications for enzyme preparations set forth in the *Food Chemical Codex* (FCC), 4th edition (National Academy of Sciences, 1996) and by the FAO/WHO Joint Expert Committee on Food

Additives (JECFA, 2001, General specifications and considerations for enzyme preparations used in food processing; FAO Food and Nutrition Paper 52, Add. 9. pp. 37-39).

A GRAS notification to the US Food and Drug Administration has been submitted. An application has also been made to Health Canada.

5.5 Other relevant matters

This application has been placed in Group 3 of the FSANZ standards development Workplan, as a cost-recovered application. In making an initial assessment of an application FSANZ is required by its legislation to have regard to the category of assessment that will be required if the application proceeds to draft assessment and whether the development or variation of a standard would confer an exclusive, capturable commercial benefit on the applicant.

This application has been provisionally assessed as complexity Category 2 if it proceeds to draft assessment. The reasons for deciding that the application is a Category 2 classification is that it involves a moderately simple application to approve an enzyme derived from a novel source as a processing aid. It will involve a relatively simple assessment of safety and technological justification.

The requested variation to Standard 1.3.3 – Processing Aids, to approve the use of the enzyme phospholipase A_2, from a novel source as a processing aid would not confer an exclusive, capturable commercial benefit on the applicant.

Further details about categories of assessment and the Workplan are available in *Information for Applicants* at http://www.foodstandards.gov.au.

6. Regulatory Options

FSANZ is required to consider the impact of various regulatory (and non-regulatory) options on all sectors of the community, which includes consumers, food industries and governments in Australia and New Zealand. The benefits and costs associated with the proposed amendment to the Code will be analysed using regulatory impact principles.

The following two regulatory options are available for this application:

Option 1. Not approve the use of phospholipase A_2 sourced from *Streptomyces violaceoruber* as a food processing aid.

Option 2. Approve the use of phospholipase A_2 sourced from *Streptomyces violaceoruber* as a food processing aid.

7. Impact Analysis

7.1 Affected Parties

The affected parties to this application include those listed below:

1. those sectors of the food industry wishing to produce and market food products produced using phospholipase A_2 as a processing aid;

2. consumers; and

3. Commonwealth, State, Territory and New Zealand Government enforcement agencies that enforce food regulations.

The impact of the proposed change to the regulation will be determined at the Draft Assessment.

8. Consultation

8.1 Public consultation

FSANZ is seeking public comment in order to assist in assessing this application. There will also be a further round of public comment after the Draft Assessment Report is completed.

Comments on the following topics would be useful:

- technological justification;
- safety considerations;
- other scientific aspects; and
- costs and benefits.

8.2 World Trade Organization (WTO)

As members of the World Trade Organization (WTO), Australia and New Zealand are obligated to notify WTO member nations where proposed mandatory regulatory measures are inconsistent with any existing or imminent international standards and the proposed measure may have a significant effect on trade.

Amending the Code to approve phospholipase A_2 as a processing aid is unlikely to have a significant effect on trade. The enzyme preparations are also consistent with the international specifications for food enzymes of Food Chemicals Codex (4^{th} Edition, 1996) and JEFCA so there does not appear to be a need to notify the WTO. This issue will be fully considered at Draft Assessment and, if necessary, notification will be recommended to the agencies responsible in accordance with Australia and New Zealand's obligations under the WTO Technical Barrier to Trade (TBT) or Sanitary and Phytosanitary Measure (SPS) Agreements. This will enable other WTO member countries to comment on proposed changes to standards where they may have a significant impact on them.

9. Conclusion and Recommendation

This Initial Assessment Report is based mainly on information provided by the applicant and discusses relevant issues in relation to approving the use of phospholipase A_2 as a processing aid. Submissions are invited on these issues, the regulatory options and the Report as a whole

Subject to further payment by the applicant to progress the application as a cost recovered application, responses to this Initial Assessment Report will be used in the preparation of a Draft Assessment Report and a draft amendment to the Code.