

10/03
16 July 2003

DRAFT ASSESSMENT REPORT

APPLICATION A482

PLANT PROTEINS AS WINE PROCESSING AIDS

DEADLINE FOR PUBLIC SUBMISSIONS to the Authority in relation to this matter:
27 August 2003
(See 'Invitation for Public Submissions' for details)

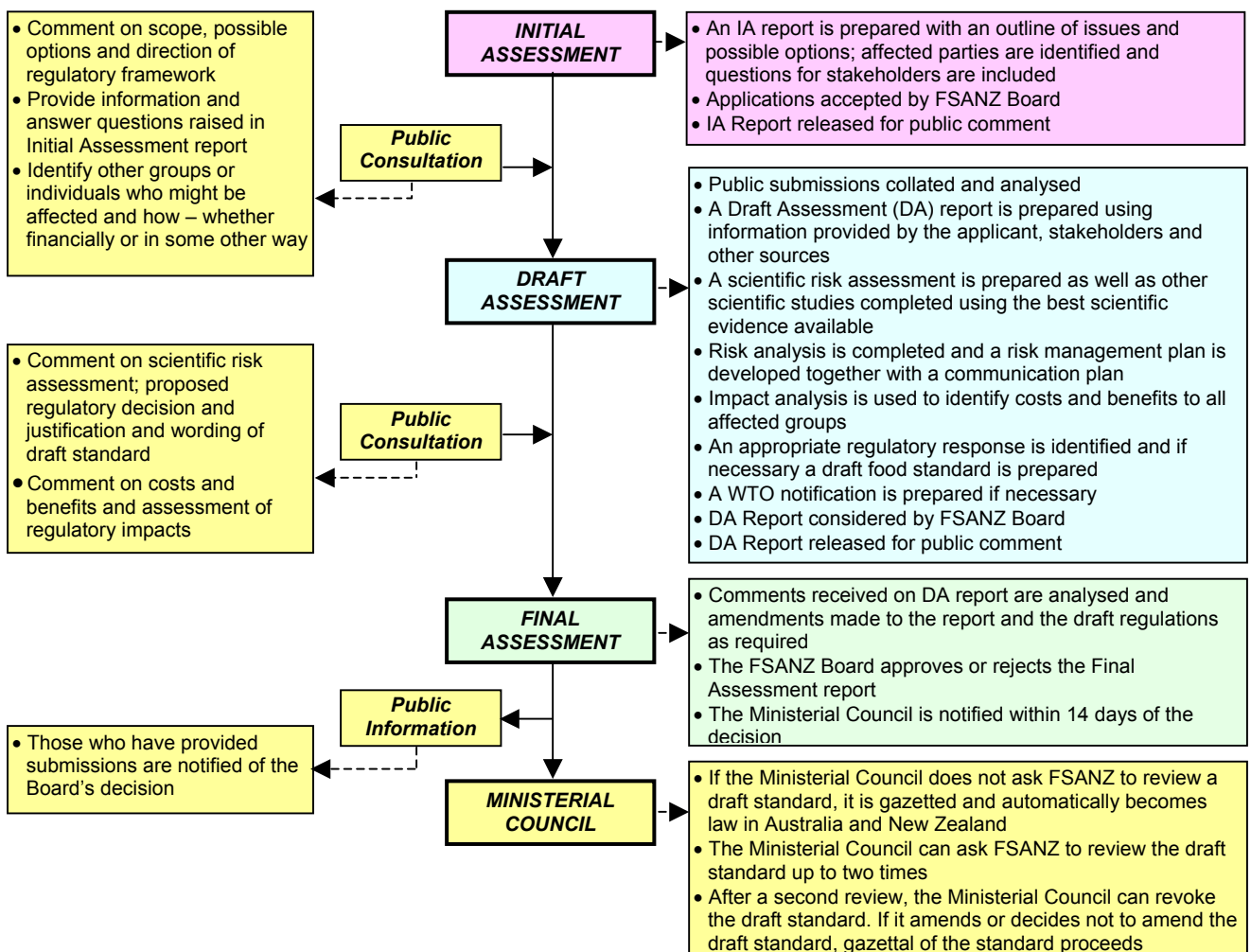
FOOD STANDARDS AUSTRALIA NEW ZEALAND (FSANZ)

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

The Authority has prepared a Draft Assessment Report of Application A482, which includes the identification and discussion of the key issues.

The Authority invites public comment on this Draft Assessment Report for the purpose of preparing an amendment to the *Australia New Zealand Food Standards Code* for approval by the FSANZ Board.

Written submissions are invited from interested individuals and organisations to assist the Authority in preparing the Final Assessment for this application. Submissions should, where possible, address the objectives of the Authority as set out in section 10 of the *Food Standards Australia New Zealand Act 1991* (FSANZ Act). Information providing details of potential costs and benefits of the proposed change to the *Australia New Zealand Food Standards 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 the Authority are open to public scrutiny, and any submissions received will ordinarily be placed on the public register of the Authority and made available for inspection. If you wish any information contained in a submission to remain confidential to the Authority, you should clearly identify the sensitive information and provide justification for treating it as commercial-in-confidence. Section 39 of the FSANZ Act requires the Authority 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 the Authority **by 27 August 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 or alternatively paper copies of reports can be requested from the Authority's Information Officer at either of the above addresses or by emailing info@foodstandards.gov.au including other general enquiries and requests for information.

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Executive Summary and Statement of Reasons

FSANZ received an application on 18 November 2002, from Scorpex Wine Services to amend the *Australia New Zealand Food Standards Code* (the Code) to permit the use of plant proteins as processing aids during production of wine. The application is being progressed as a group 3 (cost-recovered) application. The applicant requested that Standard 4.1.1 – Wine Production Requirements (Australia only) be amended accordingly.

The purpose of the application is to permit the use of plant proteins as alternative wine clarifying agents. The most widely used clarifying agents are sourced from animals. For example, gelatine, which is the most commonly used clarifying agent is sourced from cattle. Interest in clarifying agents from non-animal sources has been stimulated by concerns about the safety of products derived from cattle. Such plant derived products would also be suitable to produce wine that is acceptable for vegan and vegetarian consumers.

The objective of this assessment is to determine whether the Code should be amended to permit the use of plant proteins derived from traditional food sources as processing aids for wine production in Australia.

The application indicates that plant proteins may be produced from wheat, rice, peas, lupins and maize, though this would not be an exclusive or final list. The products are usually obtained as brown or yellow water soluble powders from a variety of processing that includes milling, extraction, toasting, grinding, washing and ultrafiltration.

These plant proteins are foods or food ingredients and meet the Codex Alimentarius Standard 174-89 for Vegetable Protein Products. They are already used in the food industry as an alternative to gelatine in a variety of food products. These plant proteins are considered to be traditional foods and already have approval as processing aids under Standard 1.3.3 – Processing Aids, and can therefore be used to produce wine under Standard 2.7.4 – Wine and Wine Product. However, wine produced in Australia must also comply with the wine production standard, Standard 4.1.1 – Wine Production Requirements (Australia only) which currently does not grant permissions for the use of foods as processing aids.

Clause 4 of Standard 1.2.3 requires the mandatory declaration of certain substances if they are present in food. Plant protein products that may be affected by this Standard are cereals containing gluten, tree nuts and sesame seeds, and peanuts and soybeans.

The Draft Assessment Report concludes that plant proteins derived from traditional food sources can be considered as alternative wine processing aids for clarifying wine. The use of such plant proteins is technologically justified and does not raise any public health and safety concerns.

Submissions are now invited on this report to assist FSANZ to complete the Final Assessment.

Statement of Reasons

The draft variation to Standard 4.1.1 – Wine Production Requirements (Australia only) of the Code to permit plant proteins derived from traditional food sources as processing aids for the production of wine in Australia is recommended for the following reasons.

- There are no public health and safety concerns with using plant proteins derived from traditional food sources.
- Standard 4.1.1 – Wine Production Requirements is an Australia only standard which has been written to ensure Australia's Agreement with the EU on trade in wine is maintained. This Standard contains a separate positive list of approved processing aids which can be used for wine production in Australia. It does not relate to wine produced in New Zealand or wine imported into Australia or New Zealand.
- Plant proteins derived from traditional food sources comply with the Codex Alimentarius Standard 174-89 for Vegetable Protein Products.
- Plant proteins derived from traditional food sources are technologically justified as non-animal replacements for currently used wine clarification processing aids.
- The proposed draft variation of the Code is consistent with the section 10 objectives of the FSANZ Act. FSANZ is protecting public health and safety by ensuring the use of only those plant proteins which are derived from traditional food sources are safe for their proposed use. FSANZ is also ensuring consistency with international wine standards and the promotion of fair trading in wine.

1. Introduction

FSANZ received an application on 18 November 2002, from Scorpex Wine Services to amend the *Australia New Zealand Food Standards Code* (the Code) to permit the use of plant proteins as processing aids during production of wine. The application is being progressed as a Group 3 (cost-recovered) application. The applicant requested that Standard 4.1.1 – Wine Production Requirements (Australia only) be amended accordingly.

The purpose of this application is to permit the use of plant proteins as alternatives to currently used wine clarifying agents that are sourced from animals, such as gelatine (cattle), isinglass (fish), milk and egg white with proteins derived from plant matter. Gelatine is the most widely used clarifying agent. With the recent concerns about the safety of products derived from contaminated cattle due to Bovine Spongiform Encephalopathy (BSE) agent there has been greater interest in developing non-animal derived alternatives to gelatine. Such products would also be available to produce wine that is acceptable for vegan and vegetarian consumers.

2. Regulatory Problem

The regulatory problem is that Standard 4.1.1 does not permit the use of plant proteins as processing aids. However these same plant proteins are currently permitted for use in wine made in accordance with Standard 2.7.4 – Wine and Wine Product because they are considered as traditional foods and thus are generally permitted for use as processing aids as provided by clause 3 to Standard 1.3.3, which states:

The following processing aids may be used in the course of manufacture of any food at a level necessary to achieve a function in the processing of that food –

(a) *foods, including water;*

Standard 2.7.4 was developed during the review as the joint wine standard that applies to wine produced in New Zealand and wine imported into Australia and New Zealand. It is a minimally prescriptive standard which defines wine and wine product and provides permissions for the addition of certain specified foods during the production of wine.

Standard 4.1.1 is an Australia-only standard which was developed in order to underpin Australia's 1994 Agreement with the European Community (EC) on trade in wine. It contains many provisions which are not appropriate in a joint wine standard and the permissions in Standard 1.3.3 do not apply. All wine produced in Australia must comply with Standard 4.1.1. Therefore in order to permit Australian wine producers to use plant proteins, a variation will be required to Standard 4.1.1.

3. Objective

The objective of this assessment is to determine whether it is appropriate to amend the Code to permit the use of plant proteins derived from traditional food sources for use as processing aids during wine production in Australia.

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.

Public health and safety will be protected by ensuring that any plant proteins which are approved for the purpose of wine clarification are safe. The promotion of consistency with international wine standards and the promotion of fair trading in wine will be considered during assessment of this application.

4. Background

A number of proteinaceous materials derived from animal products are permitted by the Code for use to clarify grape juice and wine. These proteinaceous materials irreversibly bind with phenolic structures extracted from grapes to form insoluble precipitates, which are removed by techniques such as filtration. Commonly used proteinaceous clarifying materials include gelatine, milk, isinglass (fish collagen) and egg white.

The most common and widely used clarifying product is gelatine, which is derived from cattle. The emergence of variant Creutzfeldt-Jakob disease (vCJD) has caused worldwide concern about the use of bovine materials from Bovine Spongiform Encephalopathy (BSE) infected animals in the production of food for human consumption. BSE, commonly known as “mad cow disease”, is a chronic degenerative disease affecting the central nervous system of cattle. Recently with the concerns of potential transmission of the BSE agent to humans from contaminated cattle products there has been greater interest in replacing products derived from cattle. This is the case in the wine industry where there have been moves, prompted by consumer concerns, to replace the use of gelatine with a product not derived from cattle (or animals).

Alternative clarifying products, sourced from plants, could also be used to produce wine suitable for vegan and vegetarian consumers.

Trials have been carried out in Europe evaluating the efficacy of using plant proteins as an alternative for gelatine during wine production. Initial results have been promising and form the basis for this application. It is the hope of the applicant that these plant proteins can be used as alternatives for animal-derived clarifying agents.

5. Relevant Issues

5.1 Nature of the Products

The plant proteins proposed for use are foods or food ingredients. They are composed of hydrolysed protein derived from cereals, corn and legumes. The plant proteins proposed for use comply with the Codex Alimentarius Standard 174-89 for Vegetable Protein Products. Such products are prepared by various separation techniques from vegetable sources. The Codex Standard applies to products that are used during food manufacturing of foods that require further processing.

The sources of the plant proteins which have been evaluated in trials by the wine industry and which have potential for commercial use include cereals (rice, wheat, barley, sesame, maize), legumes (peas, soya, lupin, haricot), oilseeds (rape, sunflower), tubers (potato, beetroot) and foliage crops (lucerne). The final products can undergo a variety of processing including, milling, extraction, concentration, toasting, grinding, washing and ultrafiltration. Such plant proteins may be flours, concentrates, isolates, protein isolates or enzymatic or chemical hydrolysates. They are usually dried powders of a brown or yellow colour, which are soluble in water. The production of plant proteins is explained in more detail in the Food Technology Report (Attachment 2).

Based on these trials, the products having the best potential for development as commercial products have been obtained from wheat, rice, peas, lupin and maize, though this is not an exclusive list.

5.2 Technological Justification

Wine makers in several countries have initiated production trials to evaluate the effectiveness of the plant proteins as alternatives to gelatine for the clarification of wine and musts. Results to date from such trials, included in the application, have been positive indicating that different products and different treatments can be used to give similar performance compared to gelatine. From the information in the application it would seem that individual wine makers would need to evaluate the performance of the products for their individual wines to determine the optimal treatment required.

Industry support for this application is shown by letters from two major Australian wine producers included in the application. Both these companies expressed support to have an alternative to animal products for wine clarification and phenolic adjustment to their wines. They have indicated interest in trialling such products on their wines.

It would appear there are no dietary or nutritional implications of using plant proteins as wine processing aids since the proteinaceous materials added as clarifying agents react with components in the wine to form insoluble precipitates which are subsequently removed by filtration, racking or centrifugation.

5.3 Safety Assessment

A safety assessment has not been conducted on the plant proteins proposed to be used since they derived from traditional foods. The plant proteins also meet the Codex Alimentarius Standard 174-89 for Vegetable Protein Products.

Such plant proteins are currently used in the food industry as an alternative to gelatine in cherry candies and fruit chews, in products derived from meat or fish, in soups and sauces, dietary products and children's foodstuffs.

In order to ensure the safety of plant proteins used as wine processing aids, it is necessary to specify which plants will be used as a source of proteins. To that end FSANZ has written the proposed draft variation to Standard 4.1.1 to allow only those plant proteins that are derived from traditional food sources to be approved as processing aids for wine production. This has been done by linking the permission back to the relevant subclause (subclause 3(a) of Standard 1.3.3) that allows foods to be considered generally permitted processing aids. The proposed draft variation is listed in Attachment 1.

5.4 International Regulatory Standards

Plant proteins are not currently used as processing aids for wine in other countries. The applicant has provided two documents from the OIV showing trials are underway to evaluate the use of plant proteins for wine through the OIV process. The applicant believes that approval from the OIV is likely in 2003. An application to allow the use of plant proteins as wine clarifying agents has also been made to the EU and the applicant believes permission may be granted in the northern harvest in 2003.

The Italian government has authorised the Asti Istituto Sperimentale di Enologia to conduct plant trials where over 500,000 litres of grape juice, and white and red wine has been treated with plant proteins.

5.5 Labelling Issues – Cereals Containing Gluten

Part of the preparation of the plant proteins is composed of hydrolysed gluten. The presence of gluten-containing cereals and their products in the final wine will evoke mandatory labelling requirements (clause 4 of Standard 1.2.3 – Mandatory Warning and Advisory Statements and Declarations).

Clause 4 of Standard 1.2.3 requires mandatory declaration of certain substances (more than just cereals containing gluten) if they are present in food. These substances require mandatory declarations because they may cause severe adverse reactions in susceptible individuals. Wine containing plant proteins may require these declarations if they are sourced from the following: gluten-containing cereals and their products, tree nuts and sesame seeds and their products, and peanuts and soybeans and their products. Labelling would be required whenever use of these plant proteins results in the presence of these substances in wine.

6. Regulatory Options

Plant proteins which are foods or food ingredients already have approval as general processing aids and so can be used during wine manufacture under Standard 2.7.4 – Wine and Wine Product (but not for wine produced in Australia).

The two regulatory options available for this situation are:

1. Not approve the use of plant proteins derived from traditional food sources as processing aids for wine production in Australia under Standard 4.1.1;

2. Approve the use of plant proteins derived from traditional food sources for wine production in Australia under Standard 4.1.1, which duplicates their current approval for use in wine made in accordance with Standard 2.7.4.

Plant proteins not derived from traditional food sources would not be considered to be foods. They would need to be assessed as novel foods under Standard 1.5.1 – Novel Foods.

7. Impact Analysis

The affected parties to this application are:

1. wine producers and suppliers to wine producers in Australia;
2. consumers of Australian wine; and
3. Commonwealth, State and Territory regulatory departments that enforce food regulations in Australia. There should be no impact in New Zealand since the proposed amendment is an Australia only standard.

Option 1

There are no perceived benefits to the Australian wine industry, consumers or government agencies if this option is taken.

There are disadvantages to the Australian wine industry if this option is taken since they would have less choice in which clarifying agent they can use. They would not have access to a non-animal derived clarifying agent. This limits the ability of Australian wine-makers to produce wine for vegan and vegetarian consumers, as well as consumers that have a concern about the use of gelatine.

It also puts Australian wine producers at a disadvantage because wine produced overseas using plant proteins as clarifying agents could be sold in Australia since they would meet Standard 2.7.4, but Australian wine producers could not use plant proteins.

Option 2

There are advantages to the Australian wine industry, giving them a choice of using a non-animal derived clarifying agent that they can use to appeal to a broader range of wine consumers.

There are benefits for wine consumers who are vegan and vegetarian and so do not wish to purchase wine made using animal derived products. Also it would satisfy consumers who have health concerns about using gelatine (derived from cattle) in wine manufacture.

There should be no or minimal costs to such changes to wine producers. One possible cost for wine producers would be new labelling if there is the presence of any of the substances that require mandatory declarations covered in clause 4 of Standard 1.2.3 in the final wine, caused by the use of plant proteins.

There should be no added costs or concerns for food regulators.

The applicant states that the EU currently does not allow the use of plant proteins for use in winemaking but it is probable that they will provide regulations for plant proteins in wine in 2003.

Representatives of the Australian Wine and Brandy Corporation, Winemakers' Federation of Australia, and the Department of Agriculture, Fisheries and Forestry - Australia have advised the applicant that they consider the proposed permission for the use of plant protein processing aids in Standard 4.1.1 will have no impact on the Australia EU wine Agreement.

There should also be no issues with trade with other signatories to the Mutual Acceptance Agreement on Oenological Practices (including New Zealand, USA, Canada and Chile) since there are believed to be no consumer health or deception issues.

8. Consultation

8.1 Public consultation

FSANZ is seeking public comment on this Draft Assessment Report in order to assist in assessing this application and to complete the Final Assessment.

FSANZ would appreciate comments on the following topics:

- technological justification for the use of plant proteins;
- safety of plant proteins;
- legal drafting options to restrict approval for plant proteins derived from traditional food sources; 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.

Plant proteins comply with the Codex Alimentarius General Standard for Vegetable Protein Products Codex Stan 174-1989 for use as foods and food ingredients. This Codex standard does not provide specific approval for use in wine however we understand approval is being sought through the OIV.

Additionally, it is not expected that permitting the use of plant proteins for wine production in Australia and/or New Zealand would have any significant effect on international trade. This is since the overall market for wine clarification agents (gelatine) is relatively small (100 tonnes at AUD \$1.2M per annum). Approval would only provide wine producers with an optional alternative to gelatine and displacement of this market is not expected to be rapid or significant.

Any amendment to Standard 4.1.1 – Wine Production Requirements applies only to wine produced in Australia. For the above reasons it is not FSANZ's intention to recommend relevant agencies notify the World Trade Organization (WTO).

9. Conclusion and Recommendation

The Draft Assessment Report concludes that plant proteins derived from traditional food sources can be considered wine processing aids as alternatives for clarifying wine. These products have a technological justification and do not raise any public health and safety concerns.

The draft variation to Standard 4.1.1 – Wine Production Requirements (Australia only) giving approval for use of plant proteins as processing aids for wine is recommended for the following reasons.

- There are no public health and safety concerns with using plant proteins derived from traditional food sources.
- Standard 4.1.1 – Wine Production Requirements is an Australia only standard which has been written to ensure Australia's Agreement with the EU on trade in wine is maintained. This Standard contains a separate positive list of approved processing aids which can be used for wine production in Australia. It does not relate to wine produced in New Zealand or wine imported into Australia or New Zealand.
- Plant proteins derived from traditional food sources comply with the Codex Alimentarius Standard 174-89 for Vegetable Protein Products.
- Plant proteins derived from traditional food sources are technologically justified as non-animal replacements for currently used wine clarification processing aids.
- The proposed draft variation of the Code is consistent with the section 10 objectives of the FSANZ Act. FSANZ is protecting public health and safety by ensuring the use of only those plant proteins which are derived from traditional food sources are safe for their proposed use. FSANZ is also ensuring consistency with international wine standards and the promotion of fair trading in wine.

ATTACHMENTS

1. Draft variation to the *Australia New Zealand Food Standards Code*
2. Food Technology Report

ATTACHMENT 1

Draft variation to the *Australia New Zealand Food Standard Code*

To commence: on gazettal

[1] *Standard 4.1.1 of the Australia New Zealand Food Standards Code is varied by inserting in the Table to clause 4*

Plant proteins permitted as processing aids under clause 3(a) to Standard 1.3.3

<p>Editorial note:</p>

<p>Clause 3(a) to Standard 1.3.3 permits the use of foods, including water as processing aids. Therefore, plant proteins that are foods are permitted under that Standard, and would also be permitted under this Standard.</p>

Food Technology Report

A482 – Plant Proteins as Wine Processing Aids

Introduction

An application has been received from Scorpex Wine Services (acting on behalf of Esseco S.p.A., Italy) to amend the *Australia New Zealand Food Standards Code* to allow the use of certain plant proteins to be used as approved processing aids for the production of wine in Australia.

These products would be used as alternative non-animal derived products for currently used wine clarifying agents derived from animal sources, such as gelatine (cattle), isinglass (fish), milk protein and egg albumin.

The applicant requests to have their products added to the approved positive list of processing aids within Standard 4.1.1 – Wine Processing Requirements (Australia only).

Discussion of the products, how produced

The products covered by this application for use by the wine industry comply with the Codex Alimentarius General Standard for Vegetable Protein Products (Codex Stan 174-1989). The scope of that Standard states:

This standard applies to vegetable protein products (VPP) intended for use in foods, which are prepared by various separation and extraction processes from proteins from vegetable sources other than single cell protein.

These products are currently used as ingredients in the food industry, due to their rheological properties where they are used as food integrators or emulsifying agents. They have been used as gelatine replacements in cherry candies and fruit chews, in products derived from meat or fish, in soups and sauces, dietary products and children's foodstuffs.

The products this application refers to have been sourced from wheat, rice, peas, lupin and maize but would not be limited to just these plants. The applicant states that other possible sources could be barley, sesame, soya, haricot, rape seeds, sunflower seeds, potato, beetroot and lucerne. A wide range of products sourced from different materials have been investigated for possible use as wine clarifying agents. It would be anticipated in the future that new plant proteins would also be evaluated for their effectiveness.

The plant proteins would have undergone a range of processing steps including milling, extraction, concentration, toasting, grinding, washing and ultrafiltration. The products may be flours, concentrates, isolates, protein isolates, or enzymatic or chemical hydrolysates. They are usually cream, brown or yellow water-soluble powders.

Fig. 1 contains a schematic for the production of the plant proteins.

Specifications

The specifications for the products are listed in Table I and II.

Table I**Specifications of the plant proteins from the Application**

SPECIFICATIONS	DETAILS
CHEMICAL FEATURES	
Dried substance	94 % min
Proteins	70 % min
Fat materials	5 % min
Carbohydrates	10 % max
Ash	3 % max
Sodium	0.4 % max
Calcium	0.15 % max
Phosphorus	0.5 % max
Magnesium	0.2 % max
Potassium	0.5 % max
PHYSICAL FEATURES	
pH (10% solution)	6-8
Colour	powder cream
Odour	neutral
Taste	neutral
MICROBIOLOGY	
Total flora	<10,000/g
Yeasts and moulds	<200/g
Coliforms	<20/g
Pathogenic germs and salmonella	absent in 25 g

Table II**Extra Specifications from the Office International de la Vigne et du Vin (OIV) for Plant Proteins**

SPECIFICATIONS	DETAILS
CHEMICAL	
Loss on drying	≤12 %
Total nitrogen	>10 % of dried powder (corresponds to approx. 65 % protein)
Ash	<8 %
Iron	<150 ppm
Chromium	<10 ppm
Copper	<40 ppm
Zinc	<100 ppm
Heavy metals	<10 ppm
MICROBIOLOGY	
Total viable micro-organism	<5 x 10 ⁵ cfu/g
Escherichia coli	absent in 1 g
Salmonella	absent in 25 g
Coliforms	<100/g

MYCOTOXINS AND PESTICIDES	
Aflatoxins B1 and B2	<4 ppb
Aflatoxin G1	<1 ppb
Aflatoxin G2	<1 ppb
Ochratoxin	<5 ppb
Organophosphorus residues	<10 ppm
Organochlorine residues	<0.1 ppm

Action of plant proteins as clarifying agents

Wine and musts (grape juice before fermentation is completed) contain naturally occurring insoluble material which can not always be removed by filtration or can form hazes at a later time after filtration. Such insoluble material is mainly protein and polyphenol (tannins) compounds present in grape products, and enzymes and yeasts responsible for fermentation. Often these insoluble materials are very fine flocculants which have similar particle densities to the liquid and do not readily settle. Also electrical repulsion forces between the charged particles as well as diffusion phenomena results in very slow settling and clarification of wines. Hazes can form at a later date after initial clarification by filtration.

To improve the wine quality wine producers have historically used a variety of different products to assist in clarifying wines more rapidly. These are commonly called fining agents. The most commonly used fining agent in wine production is gelatine. Other commonly used wine fining agents are bentonites, tannins extracted from chestnuts, egg albumin, casein and silica gels. Isinglass, derived from fish swim bladders, is the most common fining agent use in beer production.

The primary reaction of protein finings is to form a complex between polyphenols in the wine and the added protein to produce larger particles which are less soluble and big enough to settle out of solution. The larger complexes between polyphenols and proteins are usually formed by hydrogen bonding between OH groups on polyphenol groups and keto-imide {C(O)NH} groups on the proteins.

There can also be protein–protein complexes formed to yield insoluble particles. For such reactions to form, the two different types of proteins need to have different charges so they can form ionic bonds.

Formation of insoluble particles, which settle out, improves the clarity of the wine. They tend to settle out at the bottom of tanks to form wine lees. The subsequent semi-clarified wine is subsequently filtered (or racked or centrifuged). Finings also remove some of the problem compounds which can flocculate with ageing of the produced wine therefore improving the quality of the bottled wine.

Fig. 1
PLANT PROTEIN PRODUCTION SCHEMATIC

