



AUSTRALIAN
**FOOD &
GROCERY**
COUNCIL



AFGC SUBMISSION

**A1268 Steviol glycosides produced
by bioconversion using new enzymes
produced by GM *Escherichia coli***

27 July 2023

PREFACE

The Australian Food and Grocery Council (AFGC) is the leading national organisation representing Australia's food, beverage, and grocery manufacturing sector.

With an annual turnover in the 2020-21 financial year of \$133 billion, Australia's food and grocery manufacturing sector makes a substantial contribution to the Australian economy and is vital to the nation's future prosperity.

The diverse and sustainable industry is made up of over 16,000 businesses ranging from some of the largest globally significant multinational companies to small and medium enterprises. Each of these businesses contributed to an industry-wide \$3.2 billion capital investment in 2020-21.

Food, beverage, and grocery manufacturing together forms Australia's largest manufacturing sector, representing over 32 per cent of total manufacturing turnover in Australia. The industry makes a large contribution to rural and regional Australia economies, with almost 40 per cent of its 272,000 employees being in rural and regional Australia.

It is essential to the economic and social development of Australia, and particularly rural and regional Australia, that the magnitude, significance, and contribution of this industry is recognised and factored into the Government's economic, industrial and trade policies.

Throughout the COVID19 pandemic, the food and grocery manufacturing sector proved its essential contribution to Australian life. Over this time, while our supply chains were tested, they remain resilient but fragile.

The industry has a clear view, outlined in *Sustaining Australia: Food and Grocery Manufacturing 2030*, of its role in the post-COVID19 recovery through an expansion of domestic manufacturing, jobs growth, higher exports and enhancing the sovereign capability of the entire sector.

This submission has been prepared by the AFGC and reflects the collective views of the membership.

OVERVIEW

The Australian Food and Grocery Council (AFGC) welcomes this opportunity to comment on Food Standards Australia New Zealand's (FSANZ) call for submissions on *Application A1268 steviol glycosides produced by bioconversion using new enzymes produced by GM Escherichia coli*¹.

The AFGC understands that the applicant, Manus Bio Inc., has applied to FSANZ to amend the Australia New Zealand Food Standards Code (the Code) to permit the use of three new genetically modified (GM) enzymes for the bioconversion production method of two steviol glycosides, rebaudiosides **M** and **I**. The protein engineered enzymes are:

- Uridine triphosphate (UTP)-glucose-1-phosphate uridylyltransferase (EC 2.7.7.9) produced by GM *Escherichia coli* K-12, expressing the gene for UTP-glucose-1-phosphate uridylyltransferase from *Bifidobacterium bifidum*
- Uridine diphosphate (UDP)-Glucosyltransferase produced by GM *Escherichia coli* K-12, expressing the gene for UDP-glucosyltransferase from *Oryza sativa* (rice)
- Sucrose synthase (EC 2.4.1.13) produced by GM *Escherichia coli* K-12, expressing the gene for sucrose synthase from *Glycine max* (soybean).

The AFGC has reviewed both the Application and *Supporting document 1: Risk and technical assessment*². Both documents provide comprehensive, detailed, and convincing scientific evidence that the proposed new enzymes introduced into GM *Escherichia coli*, as processing aids, in the manufacture of steviol glycosides by the bioconversion method of production present no consumer food safety or health implications. FSANZ has conducted an extensive and comprehensive assessment and concluded:

“..that there are no public health and safety concerns from the extension of use of steviol glycosides in fruit drinks at the proposed levels of addition.”

Consequently, the AFGC **supports** *Application A1268 steviol glycosides produced by bioconversion using new enzymes produced by GM Escherichia coli*.

GENERAL COMMENTS

STEVIOLE GLYCOSIDES MEETING A CONSUMER NEED

Steviol glycosides have been used as non-sugar sweeteners in a range of food products for a number of years. Being isolated from plants, albeit with some purification and processing, they have been welcomed by consumers as “natural” and are viewed favourably in comparison to some of the earlier generation chemically synthesised non-sugar sweeteners. The food industry has used them in food and beverage

¹ Call for submissions – Application A1268
<https://www.foodstandards.gov.au/code/applications/Documents/A1268%20CFS.pdf>

² Supporting document 1 Risk and technical assessment – Application A1268:
www.foodstandards.gov.au/code/applications/Documents/A1268%20SD1.pdf

products promoted to consumers on the basis of their reduced sugar and energy content. As such, they assist consumers to construct healthy diets aligned to the Australia and New Zealand Dietary Guidelines with a primary benefit in weight management, when used in place of sugars and as part of a balanced diet and healthy lifestyle.

ALIGNMENT WITH FOFR PRIORITIES

The Food Ministers' Meeting (formerly Forum on Food Regulation) identified as a priority for the food regulation system "*Supporting the public health objectives to reduce chronic disease related to overweight and obesity*". The use of non-sugar sweeteners in food and beverage products is clearly aligned with that objective.

Earlier this year, FSANZ together with the Ministry for Primary Industries in New Zealand conducted a risk assessment for steviol glycosides *Intense sweeteners review - Steviol glycosides risk assessment*³. A review of ingredient databases found that while steviol glycosides were the most frequently used sweetener in non-sugar sweetened foods and beverages in Australia and New Zealand, the estimated dietary exposures to steviol glycosides were well below the Acceptable Daily Intake (ADI) for the Australian and New Zealand populations. This affirms continued demand and safety of steviol glycosides.

SPECIFIC COMMENTS

The AFGC wishes to make key specific comments in relation to the following:

IDENTITY AND PURITY REQUIREMENTS (SECTION 1.3.1.4)

Draft variation to Schedule 3 – Identity and Purity

Section S3—35(1) of Schedule 3 in the Code sets out the specifications for steviol glycosides produced by enzymatic conversion for the following **prescribed rebaudiosides**:

- (a) rebaudioside D;
- (b) rebaudioside M; and
- (c) rebaudioside AM

The AFGC understands that permissions currently exist under subparagraph S3—35(2)(c) for A, D and AM only (interchangeable across all current gene sources and enzymes).

³ Intense sweeteners review Steviol glycosides risk assessment March 2023

https://www.foodstandards.gov.au/consumer/additives/SiteAssets/Pages/Steviol-glycosides-%28960%29-%28intense-sweetener%29%20%28stevia%29/SteviolGlycosideRiskAssessment_April2023.pdf

With the introduction of three new gene sources and enzymes which are approved for M and I only, the AFGC contends that the lack of differentiation in wording under subparagraph **(c)** may prove confusing for users to infer that the gene sources and enzymes are **not** interchangeable across A, D, M, and I.

The AFGC therefore **recommends** FSANZ consider including explicit wording which indicate specific permissions for rebaudiosides M and I.

Although not directly related to this Application, the AFGC notes that as a result of [Proposal P1051 – Code Revision \(2020\)](#), reference to steviol glycoside preparations obtained from the leaves of the *Stevia rebaudiana* Bertoni plant in the then S3—35(2)(a) was removed as this method was captured in the updated Joint FAO/WHO Expert Committee on Food Additives (JECFA) Monographs 22 and 23 added to S3—2(1)(b) under the same Proposal.

For the same reason stated above, AFGC recommends FSANZ consider whether the existing preparation methods currently listed in **S3—35(2)(c) enzymatic conversion method** (i – ii) could be removed in a future Code Maintenance Proposal assuming they are now captured by JECFA Monograph 26 Annex 3.

WORLD TRADE ORGANIZATION (WTO) (SECTION 2.3.2)

The AFGC notes FSANZ's explanation that:

“As members of the World Trade Organization (WTO), Australia and New Zealand are obliged to notify WTO members 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.”

And that in FSANZ's view:

“...notification to the WTO under Australia's and New Zealand's obligations under the WTO Technical Barriers to Trade or Application of Sanitary and Phytosanitary Measures Agreement was not considered necessary.”

The AFGC also notes that there are JECFA specifications (FAO and WHO 2021)⁴ for steviol glycosides produced by different production methods, including by bioconversion. This method of production is well known and regulated, and the enzymes are very comparable to already permitted forms in which the enzymes perform the same function as those listed in JECFA specification.

While the proposed amendments to the Code are 'trade facilitative', given the differences in gene sources and enzymes between those listed in JECFA specifications (Monograph 26) and what is proposed under this Application, the AFGC recommends FSANZ consider submitting a WTO notification for transparency. This would support efforts to harmonise international and national standards.

⁴ FAO and WHO. 2021. Compendium of Food Additive Specifications. Joint FAO/WHO Expert Committee on Food Additives (JECFA), 91st Meeting – Virtual meeting, 1–12 February 2021. FAO JECFA Monographs No. 26. Rome. <https://doi.org/10.4060/cb4737en>

DRAFT VARIATION (SECTION 3)

The AFGC notes that the draft variation amends Schedule 18 by including three new enzymes into the table to subsection S18—9(3), which lists substances permitted to be used as processing aids for specific technological purposes.

The following protein-engineered enzymes would be listed in alphabetical order into column 1 of the table to S18:

- ‘Sucrose synthase, protein engineered variant, (EC 2.4.1.13) sourced from *Escherichia coli* K-12 **containing** the gene for sucrose synthase from *Glycine max*’;
- ‘Uridine diphosphate (UDP) glucosyltransferase, protein engineered variant, sourced from *Escherichia coli* K-12 **containing** the UDP glucosyltransferase gene from *Oryza sativa*’; and
- ‘Uridine triphosphate (UTP)-glucose-1-phosphate uridylyltransferase, protein engineered variant, (EC 2.7.7.9) sourced from *Escherichia coli* K-12, **expressing** the gene for UTP-glucose-1-phosphate uridylyltransferase from *Bifidobacterium bifidum*’.

The AFGC highlights the usage of the word ‘containing’ for the first two enzymes versus the word ‘expressing’ for the third UTP enzyme. The AFGC wishes to seek further clarity on the intent of using these different words and if they serve a specific purpose.

CONCLUSION

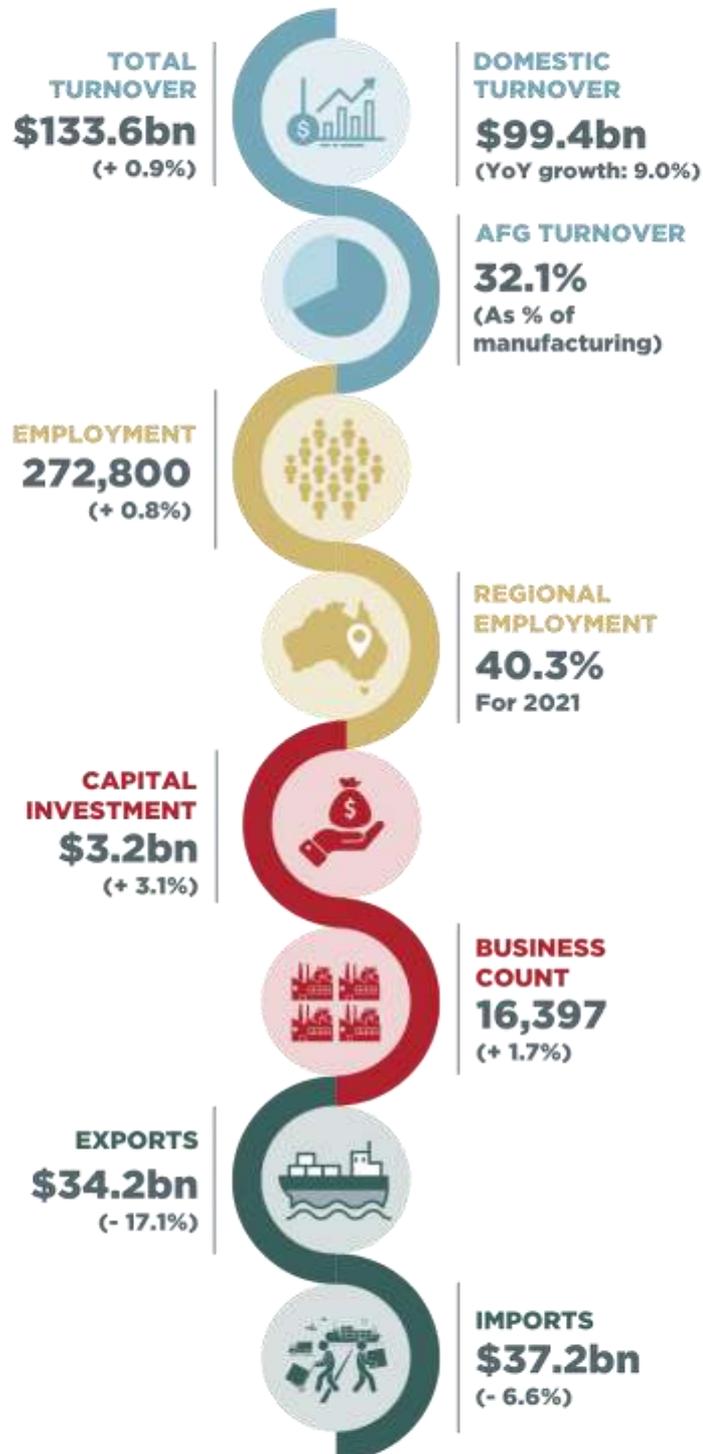
Given that there are no identified safety concerns, and that its use is technologically justified, AFGC recommends that the application of steviol glycosides produced by bioconversion using new enzymes produced by GM *Escherichia coli* be **supported** on the basis of providing industry with the necessary flexibility and opportunity for product innovation and development.

Additionally, the AFGC recommends that FSANZ consider including explicit wording which indicate specific permissions for rebaudiosides M and I.

For further information about the contents of this submission contact:

State of Industry 2020-21

AUSTRALIAN FOOD & GROCERY COUNCIL



The figures on this page exclude the fresh food sector and are based on 2020-21 ABS data.

1. This is total number of employees, head count basis and does not include seasonal employees.

2. Gross fixed capital formation for food, beverage and tobacco manufacturing subsector is taken as indicator of capital investment.