

PSGR

Physicians & Scientists for Global Responsibility

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Submission

A1274: Food derived from disease-resistant banana line QCAV-4

Submitted to the:

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FSANZ

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PSGR would welcome an opportunity to speak to this submission.

Physicians and Scientists for Global Responsibility Charitable Trust (PSGR) works to educate the public on issues of science, medicine, technology (SMT). PSGR work to encourage scientists and physicians to engage in debate on issues of SMT, particularly involving genetics and public and environmental health.

Call for Submissions:

A1274: Food derived from disease-resistant banana line QCAV-4.¹

Dear OGTR chair and Committee members,

1. Physicians and Scientists for Global Responsibility New Zealand recommend that FSANZ do not approve of the commercial release of banana plants genetically modified for resistance to *Fusarium* wilt tropical race 4 (TR4), also known as Panama Disease TR4.²

Banana event QCAV-4 (QUT-QCAV4-6) was developed through recombinant DNA techniques, with the genetic engineering event/s mediated by *Agrobacterium tumefaciens*. The Ti plasmid of *A. tumefaciens* was engineered to carry a chimeric mix of plant, bacterial and viral genes (and possibly DNA from other sources) so that DNA conferring disease resistance (R) to the fungal disease *Fusarium* wilt was transferred to Cavendish bananas tropical race 4 (TR4).³

2. Risks are claimed to be negligible for humans and for the environment. *“No potential public health and safety concerns have been identified in the assessment of disease-resistant banana line QCAV-4. On the basis of the data provided in the present application and other available information, food derived from QCAV-4 is considered to be as safe for human consumption as food derived from non-GM banana cultivars”*⁴

PSGR maintains that public health and safety concerns can only be identified with comprehensive and appropriate feeding and environmental studies.

3. We consider that the claim ‘that the risks are negligible... as the introduced proteins are not expected to be toxic or allergenic’ is unable to be substantiated by any observations or research data. An assumption is not a basis on which one can make scientific or safety claims. Assumptions based on “what we already know” does not ensure safety. This equates to saying “it is safe because we said so.”
4. We do not consider that the wider risk presented by the potential scalability product has been accurately portrayed within this application and it is evident that current risk assessment processes used to support the substantial equivalence or ‘generally regarded as safe’ claim, are unfit for purpose.

¹ Call for submissions – Application A1274 Food derived from disease-resistant banana line QCAV-4
https://www.foodstandards.gov.au/code/applications/Documents/02_A1274_CFS.pdf

² FSANZ. 25 September 2023. 263-23. Supporting document 1 Safety assessment – Application A1274 Food derived from disease-resistant banana line QCAV-4

https://www.foodstandards.gov.au/code/applications/Documents/01_A1274_SD1.pdf

³ Queensland University of Technology. Fusarium Wilt Tropical Race 4 Resistant Banana Event QCAV-4 Application for Amendment to Standard 1.5.2 - Food Produced Using Gene Technology. Centre for Agriculture and the Bioeconomy.

<https://www.foodstandards.gov.au/code/applications/Documents/A1274%20Event%20QCAV-4-Executive%20summary%20PD.pdf>

⁴https://www.foodstandards.gov.au/code/applications/Documents/01_A1274_SD1.pdf

5. Generally being propagated from a rhizome, the genetically modified banana crops could potentially scale up quickly. The problem of possible harm combined with the scaling up has not been considered in the regulatory assessment of QCAV-4.
6. There is no consideration of this risk with an expansion of release of this product at scale.
7. There appears to be little consideration by FSANZ about risks or potential downsides of this approval. The role of FSANZ is to identify risks⁵, and this involves keeping pace with the relevant scientific literature. Protection of health entails consideration of the broader risks associated with a product, now and in the future.
8. The FSANZ Act guarantees that consumers have confidence in the safety and quality of the food they buy. This is through adequate information relating to food safety that enables consumers to make a choice. The information and safety must be through an effective, transparent, and accountable regulatory framework (Sect: 3 FSANZ Act 1991).

3 Object of Act

- a. The object of this Act is to protect the health and safety of people, and to protect the environment, by identifying risks posed by or as a result of gene technology, and by managing those risks through regulating certain dealings with GMOs.
9. PSGR are concerned that the evidence discussed in the application may undermine confidence in FSANZ processes. The absence of consideration also includes a failure to include any discussion on why precaution might be warranted. This is surprising, given the absence of important food and environmental safety data in this application.
10. Plants modified for resistance to *Fusarium* wilt tropical race 4 (TR4) may benefit the patent holder, the Queensland University of Technology (QUT),⁶ but are unlikely to benefit the Australian or developing New Zealand banana industry over the long term (i.e. a longer than 3 year period).
11. The problem of scalability is not a consideration by regulators, but we concur with Heinemann *et al.*, that this cannot be overlooked.⁷
12. As Heinemann et al (2023)⁸ explain:

‘Gene technology is composed of member techniques that have three characteristics⁹ 1) They allow people to cause more harm faster, even if it also creates benefits. 2) The potential for harm increases with more use of the technique, but safety does not. 3) Regulations can control harm scaling.’

⁵ <https://www.legislation.gov.au/Details/C2016C00792>

⁶ FSANZ 12 May 2023. Administrative Assessment Report –Application A1274
<https://www.foodstandards.gov.au/code/applications/Documents/A1274%20AA%20report.pdf>

⁷ Heinemann JA, Clark K, Hiscox TC, McCabe AW and Agapito-Tenfen SZ (2023), Are null segregants new combinations of heritable material and should they be regulated? *Front. Genome Ed.* 4:1064103. doi: 10.3389/fgeed.2022.1064103

⁸ Heinemann JA, Clark K, Hiscox TC, McCabe AW and Agapito-Tenfen SZ (2023), Are null segregants new combinations of heritable material and should they be regulated? *Front. Genome Ed.* 4:1064103. doi: 10.3389/fgeed.2022.1064103

⁹ Heinemann JA, Clark K, Hiscox TC, McCabe AW and Agapito-Tenfen SZ (2023), Are null segregants new combinations of heritable material and should they be regulated? *Front. Genome Ed.* 4:1064103. doi: 10.3389/fgeed.2022.1064103

‘The generic value of gene technology is its scale gearing. This gearing increases with newer techniques. Overriding obligations to protect the health of the public should always be a priority over assumed claims of safety... That is a property that makes it possible to deliver the benefits it promises at commercial time and production scales. The source of inseparable potential for harm is this same property that creates hazards at scale.’

13. Like other plant pathogens, *Fusarium* species are known to mutate rapidly. Therefore, the resistance of the GM banana line, an *Agrobacterium*-mediated event will subside or even disappear, as the fungus mutates. The risk of the fungus undergoing mutations in a second and subsequent cropping cycles is likely. This has already occurred and continues to occur with aggressive weeds that are now resistant to glyphosate and/or other weedkillers repeatedly sprayed on GM corn, soy, canola and other GM commodity crops. The possible short-lived resistance of the GM banana QCAV-4 to *Fusarium* does not appear to have been addressed by the FSANZ.
14. Of particular concern is the expression of seven novel proteins, i.e., the seven new open reading frames (spans of DNA sequence) larger than 30 amino acids that were identified.
15. The application notes that bananas have a history of safe use. Consumers consider bananas a safe and healthy food and a good source of vitamins, minerals etc. Bananas are often the first food that babies eat when transitioning to solids, and they may in fact be the only solid food that some babies are eating at the 4-6 months old stage. GM bananas could be harmful to their gut or immune system, or result in allergies to bananas developing at a young age, because of sensitisation.
16. It is widely understood that consumers avoid genetically modified products. Increasing rates of chronic disease have resulted in an increased awareness globally of uncertain health risk associated with food that has been altered by technology. Many consumers view genetically modified food as of uncertain health risk.
17. Families *trust* bananas as a safe food choice for children. The public increasingly recognise that the ‘generally regarded as safe’ rhetoric may be misleading. Allergies and intolerances in younger people are at substantially higher levels than in previous generations. This has led to the common practice of dietary exclusion of various food types.
18. Substantial equivalence claims are insufficient for a crop that is a staple food crop and current approaches are unfit for purpose. The narrow scope of what may be considered in risk assessment leaves ample room for a type II error. Unknown toxins and anti-nutrients are unable to be detected.
19. Current approaches to allergens are inadequate as they cannot understand nor predict overall sensitisation:
 - a. This is because, contrary to other safety assessment areas, such as the toxicity assessment for which well-validated animal models have been in place for years (e.g. OECD protocols for small molecules), no single test or parameter is currently available which provides sufficient evidence to predict *de novo* sensitisation. Moreover, the methods included in the current weight-of-evidence approach for the allergenicity assessment were designed for the assessment of individual proteins and are not easily applicable to foods developed by introducing traits of many different

newly expressed proteins (EFSA GMO Panel, 2022a,b) or to complex mixtures of proteins that often make up whole foods (e.g. insects).¹⁰

20. Case by base approaches require a much more comprehensive and holistic approach to identifying dietary risk.¹¹
21. Searches on an allergen and (separately) a toxin database are insufficient as a declaration of non-allergenicity for the purposes of a crop that could expand at scale.
22. The application claiming that also relies on very few studies which review the potential allergenicity of r-proteins.
23. The MamRGA2 protein is in a group of proteins conferring resistance to some pathogen (R-protein). The application itself notes how few feeding studies there are to demonstrate safety. The application (supporting document) cites a 2006 ((McHale et al 2006) paper to state that:

‘R-proteins exist in most plants including food crops (McHale et al. 2006) and to date have not been associated with adverse effects in humans or livestock after consumption of food or feed.’

This quote does not address the fact that insertional mutagenesis is always inevitable in any genetically engineered crop, regardless of which technique is used for the insertion of new genetic constructs. The genetic construct must be inserted somewhere in the plant DNA to be expressed and whether that region is a coding or non-coding region, there will be a disruption to the intricately controlled metabolic processes carried out under the plant’s DNA instructions.

24. There are many potential reasons why a GM crop could be producing toxic, allergenic or even carcinogenic metabolites. An increase in any of these three types of compounds, over and above a background level, or as a result of altered metabolic processes, is one way that genetic modification might promote allergies/illnesses.

When a single gene from the brazil nut was engineered into soybeans to create an optimal protein spectrum (largely for animal feed), the odds of this protein being allergenic were regarded as incredibly low – just as they are by the applicant of A1274. However, when three separate tests demonstrated that the soy did cause reactions in people allergic to Brazil nuts. “In trying to build a better soybean,” reported the *Washington Post*, “the company [PioneerHi-bred] had made a potentially deadly one.” The research, one of few studies looking for the harm from an engineered food or crop was published in the *New England Journal of Medicine*.⁹

25. This application deals with a crop engineered using the methodology and constructs that were being used in the 1990s. Therefore, the results, as documented with the soybeans engineered with a brazil nut protein, are also relevant to these GM bananas. A protein perceived to be harmless, may cause problems because of insertional mutation events that alter the function of the cell’s metabolism following DNA disruption in the GM process.

¹⁰ EFSA (2022) Scientific Opinion on development needs for the allergenicity and protein safety assessment of food and feed products derived from biotechnology. EFSA Journal. 20(1):e07044

¹¹ Benevenuto, R.F., Zanatta, C.B., Waßmann, F. et al. Integration of omics analyses into GMO risk assessment in Europe: a case study from soybean field trials. *Environ Sci Eur* 35, 14 (2023). <https://doi.org/10.1186/s12302-023-00715-6>

⁹ Nordlee, J.D. et al. Identification of a brazil nut allergen in transgenic soybeans. *New England J. Medicine* 334 (11): 726 (1996)

26. It is claimed that ‘the evidence to date indicates that feeding studies using target livestock or other animal species will add little to the safety assessment’. How then will you assess the safety of GM bananas as a food?
26. The literature is expanding rapidly and FSANZ have a duty to understand the current basis of knowledge with regards to consumer safety and biotechnology.
27. If the mutations occur faster than expected, there may be rootstock of unwanted or volunteer species that continue to promote resistance in new stock that is introduced.
28. We are not aware of studies that show that microorganisms on the modified rootstock of TR4 have also been screened for accidental modification. Experience of other modified organisms demonstrate that modifications may not only impact the selected organism but other concomitant species.
29. Industry claims of safety without regulatory checks to verify and challenge industry assertions fail to assuage consumer uncertainty, indeed, these processes add to the doubt and scepticism of the public.
30. The FSANZ as a regulator must navigate the political-economic environment as well as the scientific evidence, however, in order to sustain public trust, at least some regulatory scepticism might be permitted to be demonstrated.
31. FSANZ has a duty to consider the wider implications and beyond the laboratory-based conclusions that reflect the scientific and political approach of the patent-holder.
32. A large part of the conundrum faced by growers which drive industrial approaches and degraded soils is the price competition on global markets. Premium global markets are very sensitive and the messaging that the Australian banana market, viewed as healthy and safe, is based on genetically modified stock may reduce consumer trust in that market.

Summary:

The responsibility of FSANZ is to ensure consumer safety in the approval of foods into our food chain. This application has not included the scientific data necessary for such an assessment. Because the scientific safety information required for consumer health protection has not been provided, consumers cannot be assured that the QCAV-4 is safe. For this and the aforementioned reasons, we cannot support this application.