Submission to Select Committee on PFAS (per and polyfluoroalkyl substances)

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PFAS Pesticides as Non-tariff Agricultural Trade Barriers

Summary

Recent research by the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) on the quantification and modelling of non-tariff policy measures shows a significant and growing economic impact of non-tariff barriers to global trade (Fell and Creed, 2024). The Department of Foreign Affairs and Trade (DFAT) define a non-tariff barrier as, "… any kind of policy measure, other than tariffs or tariff-rate quotas, that unjustifiably restrict trade." (DFAT, 2024). It is now becoming widely accepted by the special sciences that the use of PFAS chemicals in pesticides can taint agricultural commodities. Protecting Australia's valued agricultural exports from the escalating effects of PFAS tainting therefore will potentially add a considerable non-tariff barrier to trade in the near-term. Consequently, Australia needs to take action to protect its agricultural trade reputation from the taint of PFAS and avoid justified economic barriers to trade. In this submission, we discuss the likely trade impacts imposed by the use of PFAS tainting pesticides, and what can be done to avoid them.

Specific Recommendations

1. **Reevaluate trade-related environmental and health impacts to recognise that most recently approved pesticides (and their decay products) are now classified as Per- and Polyfluoroalkyl Substances (PFASs).**

2. **Identify all currently registered pesticides containing PFAS or PFAS metabolites to determine the level of trade risk posed by increased use of this class of pesticides.**

3. **Use the special sciences to anticipate regulatory challenges associated with PFAS pesticides.**

Introduction: Trade Barriers & Economic Rationality

Under free-trade, countries can produce agricultural goods to supply the food basket of the world, especially in areas where they have a comparative advantage. This leads to increased overall efficiency and wealth creation for all trading partners.

When an importing country introduces a trade related compliance measure, the targeted commodity needs to comply. This means that compliance can reasonably be expected to impose a pecuniary cost on the supply chain of the exporting country.

At the same time, a non-tariff trade measure may boost demand for export goods if, for example, stronger control of agricultural chemicals signals additional information to the buyer, such as increased food commodity safety, improved traceability, and a committed adherence to sustainability principles.

If the additional demand generated by compliance outweighs the adverse effect of increased costs in the supply chain, then improved agricultural chemical management can promote trade. Indeed, Fell and Duver (2024) found many of the trade related commodity safety measures used in the grains sector between the period 2011 to 2018 were trade-promoting.

Importantly, with regard to our submission, a trade-promoting non-tariff measure may become excessively burdensome and prejudice trade if the same outcome can be achieved by an alternative method with lower compliance costs. For example, it may be more efficient and effective to restrict the use of highly hazardous pesticides rather than attempt to control the trade related threats posed by them. The costs of imposing necessary agronomic controls and related quality assurance measures to keep highly hazardous chemicals in circulation can often outweigh the economic benefit[1].

People Want Clean Food

There is a global transition underway that favours a consumer preference for clean food (Hino and Sparks, 2025). This trend is accelerating, driven by the convergence of the economic, technological and global trade forces discussed in this submission.

The international demand for clean food offers Australia an unprecedented trade opportunity as a key global food bowl supplier. To assist Australia to realise its full trade potential, Australian policy-makers need to use foresight and take decisive action to protect Australia's reputation as a supplier of clean food (APVMA, 2025).

Australia stands at a pivotal moment in its agricultural history. We can continue to rely on a food commodity export model that is increasingly vulnerable to growing consumer concerns over the health consequences of harmful chemicals in food, or we can embrace a more sophisticated approach to trade that leverages our natural advantages and agronomic expertise to produce clean food commodities untainted with PFAS.

Tainting

In this submission, we use the term "tainted" rather than "contaminated". Chemical tainting refers to the presence of undesirable chemical substances in edible commodities.

As we shall explain in more detail shortly, when food commodities intended for export are tainted with a chemical, that chemical becomes an integral part of the produce and any trade claims Australia makes about the food cannot be dissociated from the chemicals tainting it. The taint of the chemical stays with the produce.

Our submission does not offer suggestions for making improvements to the use of PFAS tainting chemicals agronomically, for example, via adjustment to withholding periods or alterations to application rates. Rather, we argue that when PFAS is incorporated into a pesticide formulation, this makes the pesticide inherently hazardous, therefore, its use is certain to taint our food exports, and as such, PFAS use should be restricted rather than expanded.

It is important to note that the extent of controlled contamination by regulated pesticides is typically assessed by testing the produce for residues of the target chemical and comparing the results against established Maximum Residue Limits (MRLs). However, the food safety risks associated with uncontrolled chemical tainting of edible products by PFAS are more difficult to determine as they are not assessed to the same manner as actives, if indeed they are assessed at all.

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[1] There are also well characterised economic externalities to consider, such as water pollutions and a loss of insect biodiversity. These externalities have been well-covered in other submissions to the Committee.

As a result of the above limitation, regulatory authorities (e.g., APVMA, FSANZ) generally do not classify produce tainted with uncontrolled substances, such as PFAS, as definitively safe, especially in the absence of validated safety data. As a consequence of this oversight, the regulatory status of edible produce that is tainted with uncontrolled PFAS chemicals currently remains largely indeterminate.

The Leading Principle: Ecological Sustainable Development

Under the authority of the *Agricultural and Veterinary Chemicals Act 1994*, the APVMA is required to recognise the principle of ecologically sustainable development (ESD). This was a core intention the legislators who created the Act and passed its underlying principles into law.

The principle of ESD requires a regulatory system designed to ensure that the use of agricultural chemical products at the present time will not impair the prospects of future generations. The APVMA is therefore also required to regulate in order to cultivate a clean production system that will produce valued clean exports for the economic benefit of all Australian states and territories, including future generations.

For science-based reasons to be covered in subsequent sections, we are asking the Committee to require policy-makers at the Department of Agriculture, Fisheries & Forestry (DAFF) to consider whether APVMA decisions that allow PFAS chemicals into our agricultural value chains can be reasonably justified, and if their use are are not justifiable as trade promoting measures, then the use of PFAS pesticides should be restricted.

It is now becoming widely accepted that the use of PFAS chemicals as active constituents for agricultural pesticides unavoidably and irreversibly taints valuable agricultural produce bound for export, and due to this class of chemical's extreme persistence, the PFAS pesticides will do so for generations unless we take remedial action immediately.

Regulatory Headwinds

Australia needs to protect its clean food trading reputation. Clean, sustainable production systems should be considered to be the starting point to ensuring Australia will reap maximum economic advantage from exporting competitive agricultural produce.

The APVMA has acknowledged in its already lodged submission to the Senate Committee that it is aware it is authorising known sources of PFAS commodity tainting (APVMA, 2024).

We accept the above APVMA assessment and the science that went into making it. What we do not accept is that it is reasonable or prudent that APVMA determinations permitting PFAS chemicals into the food-chain should continue, as PFAS tainted produce will be create an unacceptable and enduring trade risk.

The APVMA's current assumption seems to us to be that chemically treated produce is always economically superior to non-chemically treated produce. Authorising the use of agricultural chemicals is, after all, the agency's primary purpose. This core guiding presupposition needs to be carefully modulated, as it is also leading the regulator to overlook the economic risks it is building into our agricultural production systems via endorsing the use of PFAS chemicals that will be certain to taint our most valued agricultural exports.

For science-based reasons to be covered in subsequent sections, we are asking the Committee to consider the trade impacts of the APVMA's willingness to allow PFAS chemicals into our agricultural value chains. This class of chemical will unavoidably and irreversibly taint valuable produce bound for export, and due to this class of chemical's extreme mobility and persistence, decisions made to use it now will negatively affect future generations.

Clean produce is not tainted. Indeed, clean produce attracts a clean premium (DAWE, 2022). The trade risks Australia is being asked to accept via the APVMA's decisions arise and are escalating because modern testing methods are now able to make visible the presence of tainting chemical agents.

These chemical additions to agricultural produce were once invisible to consumers. Today, however, produce tainted with chemicals can be easily detected by our trading partners. Further, the detection of such tainting substance can be used strategically to secure a trade advantage (Fell and Creed, 2024; MacClancy, 2023). Conversely, allowing the use of a chemical that is certain to taint our agricultural exports will unduly damage both our trade reputation and devalue the agricultural produce it taints, both in the present, and into the future.

International Frameworks for Assessing Trade Risk

Australia is a member of the World Trade Organisation (WTO) having joined the organisation upon its founding in 1995. Indeed, Australia holds a longstanding commitment to the multilateral trading system, as Australia was a member of the GATT (the WTO's predecessor) having joined in 1948.

Australia actively participates in WTO committees and negotiations to promote open and fair global trade. Under WTO rules, and as confirmed by WTO jurisprudence, members can adopt trade-related measures aimed at protecting the environment and public health, subject to certain specified conditions. Chief amongst those conditions is the stipulation that trade related measures intended to protect environment and health be justified by sound science.

In addition, Australia is aligned with WTO rules, the World Health Organisation (WHO), the Food and Agriculture Organisation (FAO), the Codex Alimentarius, and the International Organisation for Standardisation.

The Inherent Hazard of PFAS Molecules in Pesticides: The Case of Tiafenacil

Modern pesticide development, while aiming for specificity, has often resulted in chemicals that persist in the environment and are more toxic to non-target species and humans than originally intended (CSIRO, 2021). This is the case with PFAS pesticides.

Halogen atoms have been increasingly introduced into herbicides to improve their performance. Since 2010, around 81 per cent of the newly launched agrochemicals on the market contain halogen atoms (Jeschke, 2022). Of special concern from a trade perspective is the increased use of halogens of the trifluoromethyl group in pesticides[2].

In its response to the PFAS Senate Committee, the APVMA has stated that assessments prior to permitted use also include considerations that include timeframes for environmental breakdown and potential for bioaccumulation of pesticide components in food chains (APVMA, 2024). The APVMA acknowledges the regulation of halogenated agriculture chemicals presents an ongoing challenge to satisfying statutory criteria in accordance with the *Agricultural and Veterinary Chemicals Code Act 1994 (Cth).* The Act specifically requires consideration of environmental persistence and environmental toxicology.

The APVMA has recently approved Tiafenacil as a pesticide active ingredient for use on Australia's most economically important food exports. Tiafenacil includes a trifluoromethyl molecule ($-CF_3$) which is a functional group composed of three fluorine atoms bonded to a carbon atom. As Novás and Matos (2025) have explained, this particular trifluoromethyl component was likely included in the herbicide for three very specific reasons:

- **It enhances target binding affinity**: The high electronegativity of fluorine atoms makes the trifluoromethyl group a strong electron-withdrawing substituent, which can improve hydrogen bonding and electrostatic interactions with biological targets. Additionally, this group is larger than the methyl group, thus increases target affinity and selectivity through enhanced hydrophobic interactions.
- **It gives improved metabolic stability**: The strength of the C–F bonds contributes to increased resistance to metabolic degradation, thereby prolonging the pesticides half-life, making it toxic to the target organism for a longer period of time.
- **It modulates lipophilicity and permeability**: The trifluoromethoxy group combines the lipophilicity of the moiety with the polarity of the oxygen atom, allowing fine-tuning of logP values to optimise plant membrane permeability and bioavailability.

In other words, the rationale behind the inclusion of a trifluoromethyl molecule in the design of a herbicide such as Tiafenacil is that it makes the herbicide more effective in killing unwanted vegetation.

However, as the APVMA authorised label for Tiafenacil states, even the above enhanced lethal capacity is highly uncertain. The APVMA-approved label explains how resistance develops in weeds, potentially rendering Tiafenacil ineffective. The label goes on to state that this resistance arises from the repeated use of this class of herbicide which selects for naturally occurring weed populations capable of resisting its herbicidal effect. The product label therefore explicitly disclaims liability for crop losses resulting from the breakout of resistant weeds.

Due to the inclusion of a trifluoromethyl molecule in Tiafenacil, the chemical is also inherently hazardous. The trifluoromethyl molecule is toxic, mobile and persistent. What is therefore only conditionally considered an 'effective herbicide' may also only conditionally be considered to be a 'safe herbicide' for pre-planting weed control. When used as a herbicide in food production crops,

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[2] Representative chemicals with trifluoromethyl are: Tiafenacil - CAS No. 1220411-29-9 (APVMA Approval No. 86287), Cyclobutrifluram - CAS No. 1460292-16-3 (APVMA Approval No. 91435), Bifenthrin - CAS No. 82657-04-3 (APVMA Approval No. 94133), Fipronil - CAS No. 120068-37-3 (APVMA Approval No. 91330), Indoxacarb - CAS No. 173584-44-6 (APVMA Approval No. 95326), Tetraniliprole - CAS No. 1229654-66-3 (APVMA Approval No. 86755), Fomesafen - CAS No. 72178-02-0 (APVMA Approval No. 88508).

the molecule taints the resulting food product, creating the now widely recognised, uncontrolled and avoidable hazard from a trade standpoint.

Trifluoroacetic Acid

In addition to the parent Tiafenacil having a trifluoromethyl molecule attached, several of the molecules Tiafenacil breaks down into also contain a trifluoromethyl molecule. Tiafenacil has been shown to undergo hydrolysis and degradation in soil and water, with trifluoroacetic acid being identified as one of its main breakdown products (Zhou *et al.,* 2024).

Trifluoroacetic acid is classified as an ultrashort-chain perfluoroalkyl acid (PFAA), which is a specific subclass of per- and polyfluoroalkyl substances (PFAS). Trifluoromethyl groups (CF_3) are now widely considered to be components of per- and polyfluoroalkyl substances (PFAS).

The European Chemicals Agency (ECHA) has published a dossier of German authorities that have assessed the multiple hazards of trifluoroacetic acid[3]. The dossier recommends classifying trifluoroacetic acid as toxic to reproduction (category 1B) as well as persistent, mobile and toxic (PMT) and very persistent and very mobile (vPvM).

The German dossier makes these hazard warning recommendations because trifluoroacetic acid has been found to negatively affect healthy pregnancies and children's subsequent development. Its extreme environmental persistence and its growing presence in water resources is of concern world-wide (Arp *et al.*, 2024).

While the presence of this persistent chemical as a metabolite of the herbicide Tiafenacil raises significant environmental and health concerns, both internationally and domestically, we focus here on the trade risks inherent to use of this chemical.

First, under European Directive 98/24/EC, the risks of trifluoroacetic acid exposure include corrosion of skin, eyes, and the respiratory tract, potential lung oedema from fume inhalation, irritation of the respiratory tract, leading to symptoms like coughing and choking, and possible long-term effects like liver damage and reproductive toxicity. The directive also implicitly covers the risk of trifluoroacetic acid's strong corrosive nature, requiring measures to prevent its physical harm, such as burn.

Second, European regulatory agencies are already setting tolerable intake levels and drinking water guidelines for trifluoroacetic acid. The European Food Safety Authority established a human acceptable intake level of 0.05 mg trifluoroacetic acid/kg body weight/day in 2014. In 2020, the German Federal Environment Agency set a drinking water health guidance value for trifluoroacetic acid as 60 μg/L and in 2023, the Netherlands derived an indicative drinking water value for trifluoroacetic acid at 2.2 μg/L (Dekant and Dekant, 2023; Arp *et al.*, 2024).

Australia ought not to be increasing its use of PFAS chemicals to produce commodities we trade in internationally.

[3] The dossier is only available in German, however, the key points are summarised in English by the German Federal Institute for Risk Assessment here: https://www.bfr.bund.de/en/press-release/trifluoroacetic-acid-tfa-assessment-for-classification-in-new-hazard-classes-submitted/

Regulatory Oversight of PFAS Pesticides is Lacking.

The Industrial Chemicals Environmental Management Standard (IChEMS) has established a nationally consistent framework for managing industrial chemicals in Australia. IChEMS has been introduced to reduce the impact of industrial chemicals on the environment. This aim is achieved through scheduling decisions; industrial chemicals are categorised in one of seven schedules, based on their level of risk to the environment.

Importantly for our purpose, pesticides have been legislatively exempted from the IChEMS framework, despite many pesticides being used in industrial quantities across Australia.

Schedule 7 of the *Industrial Chemicals Environmental Management (Register) Instrument 2022* (an instrument authorised under the *Industrial Chemicals Environmental Management (Register) Act 2021*) now regulates the PFAS classed industrial chemicals likely to cause, "serious or irreversible environmental harm".

The emergence of the above regulatory oversight with regards to industrial chemicals (but not pesticides) underscores the failure of a broader regulatory principle — persistent, bio-accumulative, and toxic chemicals must be proactively identified, assessed, and controlled to safeguard food safety and ensure the continuity of trade in edible commodities. This is a matter of the highest importance to protecting Australia national interest with respect to trade.

Until the identity, toxicological profile, and acceptable residue limits of all potentially hazardous PFAS pesticides and their transformation products (such as the presently uncontrolled metabolites of Tiafenacil discussed earlier) are fully characterised and regulated, the trade risk of chemical tainting of export produce remains significant. We outline the trade related risks more fully in the following sections.

Tainting of Plant and Meat Exports

(a) Plant Material

We have thus far argued that PFAS pesticides can easily taint important food trade commodities. In the following, we shall keep our focus on Tiafenacil as a representative example and explain in more detail how the trade risk arises.

We begin by acknowledging that identifying the breakdown products of Tiafenacil in plant tissues is a technically demanding and costly process. The degradation pathways of all pesticides are influenced by multiple environmental and biological factors, resulting in highly complex and context-dependent transformation processes.

The above is important to bear in mind because as Tiafenacil degrades, the chemical undergoes multiple transformation steps generating a range of intermediate metabolites before ultimately forming trifluoroacetic acid. These largely uncharacterised PFAS breakdown products may differ in persistence, mobility, and toxicity from the parent compound. It is therefore essential to distinguish between the parent active ingredient and its metabolites when determining trade risk.

It is also important to bear in mind that the uptake of trifluoromethyl molecules ($-CF_3$) by plants depends on carbon-chain length, with the smaller molecules being more easily absorbed. Thus, being the shortest chain perfluoroalkyl carboxylic acid, trifluoroacetic acid accumulation in plants has been found to be substantial (Freeling et al., 2022; Wang et al., 2020; Baygildiev et al., 2025).

Perhaps of most concern with regards to trade risk, wheat plant material has been shown to readily uptake trifluoromethyl molecules, including trifluoroacetic acid (Zhou *et al.,* 2019). Wheat is Australia's second most important agricultural trade commodity. Only red-meat exports are more economically significant (meat commodities are also threatened by PFAS tainting, which we cover in the next section).

The above bioaccumulation in the edible parts of valued commodity plants helps explain the high concentrations of chemical residues reported in Australia's crop commodities, including those concentrations already well documented by the APVMA (see, for example, the APVMA's most recent trade notice for Tiafenacil[4]).

The absorption and bioaccumulation of currently uncharacterised and poorly regulated metabolites of Tiafenacil in trade valued edible plant tissues raises legitimate concerns about potential tainting of the human food chain and the potential impact on trade via use of this pesticide.

We submit that the persistence of novel herbicide residues in grains and other tradable plant commodities will continue to pose a significant trade risk until the residues are adequately characterised and controlled within the food standards and chemical safety frameworks.

The controlled contamination of food from regulated chemicals is currently assessed by comparing residue levels to established MRLs. The uncontrolled chemical tainting of food produce occurs because some substances are not subjected to the same level of scrutiny, or overlooked entirely.

In the absence of validated safety data, regulatory authorities (such as APVMA and FSANZ) will remain unable to classify tainted produce as definitively safe. Consequently, the regulatory status of food commodities tainted with unregulated and uncontrolled chemical substances (such as PFAS) is a trade risk.

The above risk is rapidly evolving and increasing. Indeterminate food tainting by PFAS can now be detected using advanced instrumental methods of chemical analyses. The detections of unregulated PFAS tainting therefore has the potential to undermine market confidence in Australian produce, trigger import/export restrictions, and can pose a scientifically justified and costly barrier to trade. This will remain the case until the identity, toxicological profile, and acceptable levels of PFAS substances in pesticides are adequately characterised, assessed and controlled, if economically beneficial to do so, otherwise restrictions are required to protect trade.

(b) Animal Products

Short-chain PFASs have also been detected in blood in animals, demonstrating that these short-chain and ultra short-chain substances have relatively high affinities toward the cell components of blood (Dewapriya, 2023; Đelmaš *et al.*, 2025). Further, as the PFAS molecules circulate around the body of animals, the chemicals accumulate in organs, such as the liver and kidney, but also in muscle and fat tissues (Houben *et al.,* 2025).

Laboratory techniques and enhanced regulatory oversight of PFAS tainting in meat and dairy products is rapidly evolving in line with the alarming global increase in internationally traded food produce containing these molecules. By failing to adequately regulate these substances in food

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[4] Cf. https://www.apvma.gov.au/news-and-publications/public-consultations/tiafenacil-in-the-product-terrador-herbicide

commodities, Australia is adding a considerable trade risk to the livestock export as well as the meat and dairy export sectors of agriculture.

Another concern is that failing to act now adds a future regulatory trade burden. For example, the oversight and management of trifluoromethyl tainted produce will soon need to be covered under procedures for the signing of a Livestock Production Assurance (LPA) and National Vendor Declarations (NVDs), which are both trade-relevant regulatory burdens for the Australian livestock producer.

The LPA/NVD programs are Australian livestock industry's on-farm quality assurance programs covering food safety, animal welfare and biosecurity[5]. LPA/NVD declarations are key documents protecting Australia's reputation as a reliable supplier of safe meat commodities to international markets.

Trifluoromethyl tainting of meat products is already emerging internationally as an area of high consumer concern. Importing countries will need to be assured that Australian meat products are free of chemical taint.

Recommendations

The emerging weight of scientific evidence we have discussed in this submission is indicating that the trade in agricultural products tainted with chemical molecules not adequately controlled within Australia will soon unduly prejudice our trade in economically significant agricultural commodities.

Importing countries monitor compliance with their import conditions, food standards, and food safety requirements through various inspection and monitoring schemes. Like Australia’s own import controls, all trading nations use non-tariff measures such as health and safety certifications and biosecurity compliance to regulate imported goods.

Australia's trading partners can legitimately protect themselves from tainted imported agricultural produce through measures like health and safety certifications, biosecurity compliance, and phytosanitary standards. Indeed, as we have shown, Australia’s trading partners are already taking action to protect themselves from importing PFAS tainted agricultural produce.

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[5] In the National Vendor Declaration for the export of cattle, farmers play a pivotal role in managing sources of potential chemical contamination and produce tainting. They are required to ensure the integrity of the supply chain by completing a form for each animal. This declaration serves as documentation of food safety information. It is key to the traceability of the livestock. Amongst other questions, the farmer is required to answer the following:
• In the past 60 days, have any of these cattle been fed by-product stockfeed?
• In the past 6 months, have any of these animals been on a property listed on the Enterprise Residue Program (ERP) database or placed under any restrictions by DAFF or state agencies because of chemical residues?
• Are any of the cattle in this consignment still within a Withholding Period (WHP) or Export Slaughter Interval (ESI) following treatment with any veterinary drug or chemical?
• In the past 60 days, have any of the cattle in this consignment consumed any material that was still within a withholding period when harvested, collected, or first grazed?
• In the past 42 days, were any of these cattle:
a) grazed in a spray risk area, or
b) fed fodders cut from a spray drift risk area?
[Ref: National Vendor Declaration (Cattle) and Waybill, https://mbfp.mla.com.au/herd-health-and-welfare/tool-6.04lpa-nvd-and-waybill]

Furthermore, the above emerging trade protection measures will be capable of being robustly justified on scientific grounds, and as such, would not be deemed a restriction to free trade under current WTO regulations, guidance and jurisprudence.

We urge the Committee to recommend a review of pesticides known to degrade into uncontrolled molecules that will taint commercially important agricultural trade commodities, such as wheat, barley and red meat. The present submission has highlighted the necessity for a more comprehensive understanding of the safety of PFAS pesticides and their trifluoromethyl metabolites.

Our more specific recommendations are:

1. **Reevaluate trade-related environmental and health impacts to recognise that most recently approved pesticides (and their decay products) are now classified as Per- and Polyfluoroalkyl Substances (PFASs).** PFASs are known for their high environmental persistence due to stable fluorine-carbon bonds. Trading in agricultural produce tainted with PFAS pesticides is an avoidable trade-related risk.

2. **Identify all currently registered pesticides containing PFAS or PFAS metabolites to determine the level of trade risk posed by increased use of this class of pesticides.** This in turn will enable the APVMA to take action to manage the trade-related risks arising from authorisations for this class of pesticides. The emergence of these chemically tainting (persistent, bio-accumulative, and toxic) substances in agricultural and food must be proactively identified, assessed, and controlled to safeguard food safety and the continuity of trade in edible commodities as a matter of national interest.

3. **Use the special sciences to anticipate regulatory challenges associated with PFAS pesticides.** Foresight is needed to protect Australia's trade reputation and ensure continued access to international commodity markets.

References

APVMA (2024). Submission to the Senate Select Committee on PFAS (per and polyluoroalkyl substances). Submission 80, Australian Pesticides and Veterinary Medicines Authority, Canberra, December 2024.

APVMA (2025). *Strategic Plan 2025–30,* Australian Pesticides and Veterinary Medicines Authority, Canberra, September.

Arp, H., Gredelj, A., Juliane Glüge, J., Scheringer, M. & Cousins, I. (2024). The global threat from the irreversible accumulation of trifluoroacetic acid (TFA). *Environmental Science & Technology.* 58 (45), 19925-19935.

Baygildiev, T. M., Gutenev, K. S., Karnaeva, A.E., Vokuev, M. F. & Tsizin G. I. (2025). LC-HRMS analysis of ultrashort- and short-chain PFAS on porous graphitic carbon column and study of accumulation in plants. *Analytical and Bioanalytical Chemistry*. Epub ahead of print.

CSIRO (2021). A short history of agricultural chemical usage and development. https://www.csiro.au/en/news/all/articles/2021/may/history-of-agricultural-chemicals. Accessed 28 September 2025.

DAWE (2022). *Delivering Ag2030.* Department of Agriculture, Water and the Environment, Canberra, February.

Đelmaš, A. D., Šeba, T., Gligorijević, N., Pavlović, M., Gruden, M., Nikolić, M., Milcic, K. & Milčić, M. (2025). Perfluoroalkyl acids interact with major human blood protein fibrinogen: Experimental and computation study. *International Journal of Biological Macromolecules*, 306(1).

Dekant, W. & Dekant, R. (2023). Mammalian toxicity of trifluoroacetate and assessment of human health risks due to environmental exposures. *Archives of Toxicology,* 97:1069–1077.

Dewapriya, P., Nilsson, S., Ghorbani Gorji, S., O'Brien, J. W., et al. (2023). Novel per- and polyfluoroalkyl substances discovered in cattle exposed to AFFF-impacted groundwater. *Environmental Science & Technolog*y, 57(36), 13635-13645.

DFAT (2024). Addressing Non-tariff Trade Barriers. Department of Foreign Affairs and Trade, Canberra. Accessed 24 September 2025.

EPA-US (2020). Tiafenacil: Ecological Risk Assessment for Use of the New Herbicide Tiafenacil on Corn, Cotton, Soybeans, Wheat, Grapes, Fallow, and Non-Cropped Areas. Environment Protection Agency, USA.

European Chemicals Agency (2023). ECHA publishes PFAS restriction proposal. https://echa.europa.eu/da/-/echa-publishes-pfas-restriction-proposal. Accessed 21 September 2025.

Fell, J., & Creed, C. (2024). Non-tariff barriers: A billion dollar burden. ABARES Research Report 24.19, Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra, December.

Fell, J. & Duver, A. (2023). Non-tariff measures: A methodology for the quantification of bilateral trade effects of policy measures at a product level. *Applied Economics*, 56(36), 4374-4388.

Freeling, F., Scheurer, M., Koschorreck, J., *et al.* (2022). Levels and temporal trends of trifluoroacetate (TFA) in archived plants: Evidence for increasing emissions of gaseous TFA precursors over the last decades. *Environmental Science Technology Letters*, 9:400–5.

Hino, H. & Sparks, L. (2025). Clean food consumerism: Scale development and validation. *Food Quality and Preference*, Volume 132.

Houben, K., Poveda, O., Saegerman, C., *et al.* (2025). Correlation between the PFAS levels in bovine blood and the levels in the meat and offal of these animals. *Food Risk Assess Europe*, 3(3).

Jeschke, P. (2022). Manufacturing approaches of new halogenated agrochemicals. *European Journal of Organic Chemistry,* 22(12).

MacClancy, J. (2023). "The Impurities of Purity". In Paul Collinson and Helen Macbeth (Eds.) *Pure Foods: Theoretical and Cross Cultural Perspectives*, Berghahn, London.

Novás, M., & Matos, M. J. (2025). The role of trifluoromethyl and trifluoromethoxy groups in medicinal chemistry: Implications for drug design. *Molecules*, *30*(14), 3009.

Wang, W., Rhodes, G., Ge, J., Yu, X. & Li, H. (2020). Uptake and accumulation of per- and polyfluoroalkyl substances in plants. *Chemosphere*, 261:127584.

Zhang, L., Sun, H., Wang, Q., Chen, H., Yao, Y., Zhao, Z. & Alder, A. C. (2017). Uptake mechanisms of perfluoroalkyl acids with different carbon chain lengths (C2-C8) by wheat (*Triticum acstivnm L.*). *Science of The Total Environment*, Volume 654.

Zhou, W., Yan, A, Zhang , S., Peng, D. & Li, J. (2024). Concurrent analysis of Tiafenacil and its transformation products in soil by using newly developed UHPLC-QTOF-MS/MS-based approaches. *International Journal of Molecular Sciences,* 25(15):8367.