Queensland Government

Queensland Health

Enquiries to: Food Safety Standards and Regulation
Health Protection Branch
Telephone: (07) 3328 9310

Standards Management Officer
Food Standards Australia New Zealand
PO Box 5423
KINGSTON ACT 2604

standards.management@foodstandards.gov.au

Dear Sir / Madam

Submission: Proposal P1052 - Primary Production and Processing Requirements for High-risk Horticulture

Thank you for the opportunity to provide a submission for Proposal P1052 Primary Production and Processing Requirements for High-risk Horticulture.

This submission includes comments from Queensland Health and a combined submission from Queensland Department of Agriculture and Fisheries, and Safe Food Production Queensland.

This submission provides technical advice and comments related to this issue. The submission does not represent a Queensland Government position, which will be a matter for the Queensland Government when notification is made by the FSANZ Board to the Australia and New Zealand Ministerial Forum on Food Regulation.

Queensland Health Submission

The following comments on Proposal P1052 are provided from Queensland Health.

Scope of Proposal P1052

According to the Macquarie Dictionary, horticulture is the *commercial cultivation of fruit, vegetables and flowers including berries, grapes, vines and nuts*. Proposal P1052 does not consider edible flowers and nuts to be in-scope. The edible flower sector appears to be an emerging sector with a wide distribution, as they are used as a garnish on a wide variety of meals. Nuts have been implicated in major national outbreaks of food-borne illness in Australia and overseas. Queensland Health is aware that microbiological monitoring by nut producers regularly indicates *Salmonella spp*. contamination, for example, *Salmonella* spp. in macadamia nuts grown in Queensland. These factors suggest significant potential risk of nut-associated foodborne illness. While industry testing programs combined with test-and-hold protocols and thermal treatment appears to have adequately managed this problem in Queensland, the Department is unaware

whether such monitoring and treatment is undertaken by all nut producers in Australia and requires further regulatory controls.

According to the Codex *Code of Hygienic Practice for Fresh Fruit and Vegetables* (COHP FFV) fresh leafy vegetables *include all vegetables of a leafy nature where the leaf is intended to be consumed, including, but not limited to, all lettuce, spinach, cabbage, chicory, endive, radicchio and fresh herbs such as coriander, cilantro, basil, betel leaf, curry leaf, fenugreek leave, Colocasia leaves and parsley.* Microgreens are an emerging salad crop possessing properties of both sprouted seeds, which have been frequently implicated in food-borne illness but are out of Proposal P1052 scope; and leafy vegetables, which are in-scope. Microbiological safety of microgreens has not been studied extensively. When considering proxies for the leafy green sector in Proposal P1052 it will be important to define whether the proxy is for all leafy green vegetables included in COHP FFV or only a subset of them.

In Proposal P1052, berries area considered high-risk because imported berries have been associated with outbreaks of norovirus, Hepatitis A and *E. coli* 0157:H7. It is unclear whether there is a food safety risk associated with Australian-grown berries.

Tomatoes are not considered high-risk horticultural commodities in Proposal P1052. However, they have been implicated in food-borne outbreaks in Australia and overseas and have specific characteristics differentiating them from other horticulture making them more susceptible to internalisation of bacterial pathogens (see below). An understanding of processes leading to internalisation could provide more rigour to the development of Proposal P1052 horticulture processing requirements.

The CoHP FFV defines ready-to-eat fresh fruits and vegetables as *any fruit or vegetable that is normally eaten in its raw state, intended for direct human consumption without any further microbiocidal steps. This may include any fruit or vegetable that has been washed, peeled, cut or otherwise physically altered from its original form but remains in the fresh state.* Minimal processing of fruit and vegetables includes the processes of washing, trimming and packing. If salads are considered ready-to-eat, then the mixing of different types of salad leaf in a mixed leaf salad is also a process that should be included in minimal processing. Each of these processes has the potential to add risk via additional handling.

Cutting and dicing damage plant cells, allowing cell substrate to leach through the damaged cell wall, providing nutrients for microbial growth on the otherwise nutrient-poor, surface of a whole fruit or vegetable. Cell damage also enhances the respiration rate of plant cells, resulting in more rapid deterioration of the fruit or vegetable and a reduction in effectiveness of its antimicrobial defence mechanisms, making it more susceptible to microbial infiltration. Although cut fruit and vegetables remain in a fresh state, they possess an enhanced food safety risk compared to uncut horticultural produce.

Minimally processed horticultural products packed under modified atmospheres, such as salad mixes, constitute an even greater food safety risk. The modified atmosphere packaging (MAP) used is typically slightly higher in CO_2 concentration and lower in O_2

concentration compared to air and will not inhibit pathogen growth - many of which are facultatively anaerobic or microaerophilic. MAP gas mixtures are selected based on their potential to slow down physiological deterioration by slowing plant cells respiration rate.

Consequently, Proposal P1052 should clearly differentiate between the terms *ready-to-eat* and *minimally processed*. Proposal P1052 should also consider the control measures required for the high-risk, minimally processed horticulture sector, especially when MAP packed.

Food regulatory measures

Proposal P1052 is a direct result of recent food-borne illness outbreaks involving produce. As cited in the Call for Submissions paper, between 2011 and 2019, over 408 cases of illness and eight deaths were associated with horticultural products, and during 2016 to 2018 horticultural products were the only products implicated in national food incidents. These figures provide evidence of a need to explore regulatory options as the current non-regulated requirements for food safety do not appear to be adequately working to protect public health.

It would be advantageous to determine why externally audited industry food safety programs have been unsuccessful in preventing foodborne horticultural outbreaks. Otherwise there is a risk that a resultant PPP standard will also be ineffective in delivering safe and suitable horticultural commodities.

Atypical conditions are a difficult to control parameter in the horticulture industry. Many industry food safety programs require an increased frequency of irrigation water testing following an extreme rainfall event, which may cause run-off from potentially hazardous sites such as intensive livestock husbandry, which does not normally occur. However, such testing may not be performed when a farmer’s focus is on maintaining supply rather than food safety requirements.

Similarly, drought may cause water to be drawn from the bottom of a nearly stagnant stream or pond near sediments in water bodies with reduced levels and/or flow rate. Although this should also be a trigger for water testing, this may not occur outside the routinely scheduled (typically annual) testing time.

It may be difficult to apply the regulatory requirements of Chapter 3 in the Food Standards Code to horticulture because of the unique properties of produce. Storage, handling and MAP packaging/controlled atmosphere (CA) storage are undertaken with the view of maintaining plant cells in optimal physiological condition, rather than reducing the growth rate of a pathogen. For example, certain fruits and vegetable, e.g. tropical fruit and cucumbers, should be stored at temperatures above 5°C to reduce physiological deterioration rather than pathogen growth. Maintaining a fruit or vegetable in peak physiological condition, using optimal storage temperature, humidity and time, is the best way of protecting it from contamination from both plant and human pathogens, rather than time/temperature controls.

Storage and processing environments are different for horticulture compared with other food businesses. For example, a packing shed, which may also incorporate washing facilities, may not have walls.

One of the options put forward in Proposal P1052 is to amend *primary production* and *food business* definitions so that all activities other than in-field and transport and delivery to a packing shed involved in the production of ready-to-eat and minimally processed high-risk horticulture are captured by the *food business* definition. A potential problem with the proposed amendments to definition for *primary production* and *food business* is that microbiological food safety hazards frequently originate prior to receival by a packing shed via irrigation water, soil amendment, incursion of animals into fields, runoff during severe rain, picker manual handling, and cleanliness of harvesting equipment and bins, and the general packing shed environment. Information regarding whether produce is affected by a hazard during growing, harvest and transportation to a packing shed, may permit additional control measures post-harvest e.g. double sanitation of produce from a section of field affected by wildlife incursion. That is, the proposed separation of *primary production* and *food business* activities will not permit the farm-to-fork continuum.

Proxy approach

Proposal P1052 proposes the use of proxies within the berry, leafy vegetables and melon sectors. However, it is important that proxies truly represent the other commodities within a sector. Some general considerations include:

- The adhesion characteristics of a fruit/vegetable and a bacterial pathogen influence biofilm formation, which in turn influences pathogen survival on the surface of a fruit or vegetable. A biofilm provides a source of nutrients and protects internal bacterial cells from desiccation and sanitising agents.
- The surface characteristics of a fruit or vegetable will affect the effectiveness of a sanitiser. The netted peel of a rockmelon is more difficult to sanitise than the waxy smooth skin of a watermelon, which may also have a lower microbiological load at harvest because its waxy surface may repel contaminated irrigation water.
- If leafy greens are defined according to COHP FFV, then there will be differences in microbiological hazard between an iceberg lettuce grown in a field, and a microgreen grown hydroponically in a greenhouse. Baby leaf varieties are more fragile than the more robust iceberg and cos lettuce, and hence require a gentler washing/sanitation process to prevent leaf damage. Pathogen survival of on the leaf surface may be greater in a greenhouse under conditions of high humidity compared to field grown produce.
- The morphology of a plant influences food safety risk. A plant's canopy likely prevents many underlying fruits from exposure to irrigation water, as with cucumbers.
- As discussed above, many horticultural commodities are subject to chilling injury, with recommended storage temperatures sometimes exceeding 10°C. For example, cucumbers require storage at temperatures between 7 and 12°C to keep optimum quality while refrigerated storage is recommended only for up to 3 days to prevent chill injury.
- Internalisation of bacterial pathogens into fruit may occur because of commodity-specific properties. For example, in vining plants such as rockmelons, tomatoes and

cucumbers, pollen is transferred form male flowers to female flowers, leading to fertilisation of ovaries and subsequent development of the fruit. This method of fertilisation is of concern owing to documented internalisation of *Salmonella* into tomato fruit after blossoms have been inoculated with the pathogen. The stem scar caused when a tomato is detached from the vine, is also known to be a portal by which pathogens enter the fruit.

Traceability - through-chain from paddock to plate, or one step forward - one step back?

One-step-forward, one-step-back traceability may not provide enough information in cases of a food-borne outbreak involving horticulture. This is due to the complexity and fluidity of the horticulture supply chain, involving networks of wholesalers and distributors, many of which distribute nationally.

As a case in point, a catering establishment outside a capital city may obtain produce from a local wholesaler, who in turn may obtain it from another wholesaler. This wholesaler may be located at a capital city produce market, and may have their own growers, and may obtain part-supply from another wholesaler, who may source from the same or different growers. The whole situation is very fluid, with supply - at least in Queensland - appearing to fluctuate between local and Victorian salad bowl areas depending on season and prevailing weather conditions.

Information on through-chain microbiological data (e.g. level, frequency and type of microbiological contamination at different production and processing stages or critical control points)

Detection of bacterial pathogens on horticultural produce can be hit-and-miss, because pathogen numbers can differ widely on an item of produce (e.g. between inner and outer leaves on a lettuce plant) and between items of produce, even when harvested at the same time and from the same field. Sometimes it can be useful to use swabbing of *pinch points* to verify the absence of pathogens. During minimal processing activities, such *pinch points* could include knife blades, conveyor belts and internal components of gas flushing apparatus. These sites should be swabbed at the beginning and end of processing, to rule out improper equipment sanitisation as a reason for a positive pathogen detection.

Testing for viruses may be problematic, depending on the cost, accuracy and availability of laboratory testing. Industry Codes of Practice provide guidance on the control of bacterial pathogens. Although there is an assumption these control measure and associated indicator bacteria used for process verification would be effective with viral loads, the correlation between bacterial indicators and viral loads has long been controversial.

Submission for Department of Agriculture and Fisheries and Safe Food Production Queensland

The following comments on Proposal P1052 are provided from the Queensland Department of Agriculture and Fisheries (DAF) and Safe Food Production Queensland (Safe Food).

Scope of the proposal

DAF and Safe Food note that the scope of high-risk produce included in the proposal has been limited to leafy vegetables, berries and melons, and that ready-to-eat minimally processed fruit and vegetables are not included while seed sprouts are already covered in the Food Standards Code, Chapter 4. The proposal focuses on microbiological risks, as chemical risks are considered well managed (section 1.4.2). However, as the suitability of inputs forms a key part of primary production and processing standards, chemical and physical risks and contaminants should also be explored in the proposal.
The risk assessment could be broadened beyond foodborne illnesses, incidents and recalls to consider other factors such as changing consumer practices, for example increased consumption of raw or minimally processed foods, and possibly reputational risk (where the hazard is loss of trust and therefore reduced market access).

Options

DAF and Safe Food agree that the status quo (Option 1) is inadequate to effectively manage food safety risks in high-risk horticulture commodities.

DAF and Safe Food consider that some food regulatory measures (Option 2) are required. We consider that a combination of regulatory and non-regulatory measures should be explored that will assist in:

- supporting a through-chain approach to food safety management, from the farm to the consumer;
- enabling industry and government to effectively respond to food safety incidents relating to horticultural produce; and
- maintaining Australia's reputation, both domestically and overseas, as a producer of safe fresh produce.

Regulatory measures

If regulatory measures are introduced for high risk horticulture, Safe Food will aim to implement these measures in a manner that recognises the dynamic commercial and consumer environments in which businesses operate, in line with its regulatory philosophy. Consideration would be given to applying a range of monitoring methods which provide businesses with greater flexibility in how they demonstrate compliance and achieve food safety outcomes.

Amendment of State and Territory Food Acts (Option 2.A) and variations to Code definitions (Option 2.B.1) will likely result in the application of regulatory food safety requirements to a wider range of horticultural produce and activities than those defined as 'high-risk' for the purposes of this proposal. Such changes will need to be developed and implemented in a manner that is proportional to risk and draws on information available through existing industry schemes and data collected by businesses, to verify compliance with requirements.

The extent to which the requirements in Chapter 3 of the Code, particularly Standard 3.2.3, can be applied in facilities such as packing sheds, will be informed by FSANZ's risk assessment. If Option 2.A and/or 2.B.1 are to be adopted, the risk assessment should also be extended beyond 'high-risk' horticulture, as all packing sheds on farm will be considered 'food businesses' under the Code and/or Model Food Provisions. As part of the risk assessment, consideration should be given to what interventions (including minimal microbiocidal interventions) need to be applied to packing sheds that handle produce with a similar risk profile to berries, melons and leafy vegetables.

Through-chain traceability, from paddock to plate, is the preferred approach. However, a similar but less efficient approach could be achieved if all supply chain participants are identifiable and they are traceable one step forward and one step back.

As part of a through-chain approach, the most appropriate points along the supply chain for regulatory interventions will also be informed by risk assessments. It is anticipated that interventions will need to focus on washing/packing (to reduce microbial prevalence and concentration) and on points in the supply chain where products from different sources may be comingled. As part of a through-chain approach to food safety management, the practices that occur on farm and in processing/packing sheds should ideally take into account how food handlers and consumers 'down the supply chain' are likely to deal with the produce e.g. wash, peel, cooking properly. For example, rockmelons may be washed before supply, but they do not need to be sterile/pathogen free as it is expected that consumers and food businesses will store, handle and prepare the fruit so as to mitigate against the risk. It is reasonable to expect that vulnerable populations will be advised not to consume them.

Non-regulatory measures

As discussed in the supporting documents, there are various horticulture industry schemes which include food safety components. However, Safe Food's experience is that while these schemes are generally beneficial in principle, there are instances where implementation has not been effective. This may be due to poor risk awareness on behalf of the businesses, or incomplete risk assessment approaches taken by auditors. In addition, while auditors may note a production and processing system failure, the business may not be provided suitable support or information about how to resolve the identified issue or risk because this may not be within scope of the auditor's role.

Safe Food and DAF consider that it will be important to draw on the strengths of industry schemes with food safety provisions, while also identifying where there are risks or

shortcomings. Steps will need to be taken to address weak points in these industry systems and their implementation, including potential regulatory measures. Valuable lessons can also be learned from recent work to improve on- farm food safety systems, such as the document "*Melon food safety – A best practice guide for rockmelons and speciality melons*" (S.P. Sukhvinder Pal, New South Wales Department of Primary Industries.)

FSANZ's paper for P1052 limits discussion on non-regulatory measures to industry food safety schemes, without sufficiently considering other non-regulatory measures that can be applied by industry to improve food safety practices and businesses culture. The use of non-regulatory measures, such as consumer education on the appropriate handling and storage of produce, should also be considered as part of a suite of through-chain non-regulatory and regulatory measures. This is especially relevant given Australia's growing aged (vulnerable) population and the increased consumption of raw high-risk horticultural produce which does not undergo cooking to eliminate pathogen related risks.

A further non-regulatory action could be the establishment of a government and horticulture industry food safety advisory group to drive improvements in food safety management across the horticulture sectors and their related activities. Such a group could provide a national forum for risk assessment, sharing information on the use of technology and industry schemes to support traceability. The group could also provide valuable feedback from those deeply invested and experienced in the existing systems of this sector and improve skills, knowledge, culture and trust. Discussions between Safe Food and growers have already identified that some feel that they are lacking practical guidance when attempting to meet requirements of commercial schemes.

Recalls and incidents

The information provided in FSANZ's proposal on recalls and incidents cites the two recent berry recalls that were linked to Hepatitis A in frozen imported products. While such products are currently excluded from the scope of the proposal (frozen and imported), information on how Australian production and processing practices - including health and hygiene conditions - compare against that of overseas production systems would be valuable in informing discussions. Benchmarking against other countries could assist FSANZ's risk assessment work and help build a better understanding of overseas production practices. For example, where such practices have resulted in Australia receiving Hepatitis A infected fruit.

In addition, Supporting Document 1 notes that between January 2001 and June 2011, there were 93 produce-associated food-borne illness outbreaks in Australia. A better understanding of the 'confirmed' and 'suspected' outbreaks would assist in informing discussions on appropriate interventions and measures; noting that for 'possible outbreaks' there was no particular evidence that the primary produce ingredient was the source of contamination.

Questions posed by FSANZ in the 1st Call for Submissions paper

DAF and Safe Food do not have any specific information to add in relation to the various questions and requests for information in the 1st Call for Submissions paper.

Food Safety Standards and Regulation Unit
Health Protection Branch
Department of Health
Queensland Government

18 March 2020