EXECUTIVE SUMMARY

- APPLICATION TO FSANZ

Application to amend Standard 1.5.3 irradiation of Food of the Food Standards Code to include Raspberry (*Rubus idaeus)* and Blueberry (*Vaccinium corymbosum, Vaccinium strigosus, Vaccinium angustifolium, Vaccinium virgatum* v *ashei)*

Date submitted: 5 June 2015

This application seeks a variation to the Food Standards Code, Standard 1.5.3 Irradiation of Food, by adding

- Raspberry (*Rubus idaeus*)
- Blueberry (*Vaccinium corymbosum, Vaccinium strigosus, Vaccinium angustifolium, Vaccinium virgatum* v *ashei)*

to the Table of Clause 4 under the same dose and usage conditions presently prescribed for tropical fruits, tomato and capsicum, currently approved in the Australia New Zealand Food Standards Code. No other variation to Standard 1.5.3 is sought. The purpose of irradiation will be for a phytosanitary objective and the minimum and maximum doses allowed will be 150 Gy and 1 kGy respectively.

Applicant

This application is submitted by NSW Department of Primary Industries (NSW DPI), a division of NSW Department of Trade and Investment, Regional Infrastructure and Services. Biosecurity NSW has the vision that government, industry and the people of NSW will work together to protect the economy, environment and community from the negative impacts of animal and plant pests, diseases and weeds for the benefit of all people in NSW.

Purpose

Raspberry and blueberry are potential hosts to fruit flies and other regulated pests, and are subject by regulation to phytosanitary treatments against specified pests as a condition of entry into many plant quarantine jurisdictions. This applies to both domestic and international markets.

Queensland fruit fly (Qff) is considered to be one of the world's worst pests of fruiting crops and is listed as a pest requiring treatment by most international and interstate markets trading in the movement of fresh fruit.

Irradiation at levels between 150 Gray (Gy) and 1 kGy is effective at killing or sterilising regulated insect pests, such as fruit fly, without posing a risk to human health or significantly affecting product quality (WHO 1977).

Food Standards Australia and New Zealand (FSANZ) previously stated "Decades of research worldwide has shown that irradiation of food is a safe and effective way to kill bacteria in foods, extend its shelf life and reduce insect infestation."

Irradiation is potentially a valuable tool to help the raspberry and blueberry trade ensure biosecurity and phytosanitary requirements are met by controlling insects.

The need for irradiation

Several approved options exist for phytosanitary treatments of raspberry and blueberry. Among the most commonly used are pre and postharvest treatments with insecticides. Following the review of dimethoate and fenthion use by the Australian Pesticides and Veterinary Medicines Authority (APVMA), many phytosanitary uses of these insecticides were lost or restricted severely (APVMA 2011).

NSW DPI and the horticulture industry consider trade in these fruits at risk of market disruption. The Gross Value of Production (GVP) for raspberry was $40 million (PHA 2014) and for blueberry $120 million for 2013/14 (HAL 2014a). Production areas for blueberry can be found in all States and Territories of Australia except Northern Territory. In 2013/14, 6100 tonnes of blueberries were produced with 84% came from NSW, 6% from Tasmania, 5% from Queensland, 4% from Victoria, 0.5% from South Australia and 0.5% from Western Australia (HAL 2014b). Northeast NSW centred on Coffs Harbour grows 88% of national production. Smaller production areas can be found in southern Queensland, southern NSW, Victoria and Tasmania with minor areas in Western Australia and South Australia. Production areas in northern Queensland are being developed.

In 2013/14, total raspberry production in Australia was 1452 tonnes (DSG 2014). In 2011/12 41% were produced in Victoria, 30% in Tasmania, 22% in Queensland, 6% in NSW and 1% in Western Australia (PHA 2014). The expansion of the growing area into northern NSW and southern Queensland is driven by the need to extend the seasonal availability of raspberry. The majority of blueberries (90%) and raspberries (81%) are sold fresh on the domestic market. As raspberries and blueberries are sold interstate, access to interstate markets is vital to the industry's ongoing economic viability and regional health.

In addition to increased regulatory restrictions on the use of dimethoate and fenthion, there is growing awareness within the horticulture sector of the need for alternative treatments to insecticides due to consumer concerns about chemical residues and the potential occupational health and safety issues associated with the use of chemicals in the supply chain.

Methyl bromide is approved for use in all states and territories within Australia however it can result in inferior product quality and does not address consumer concerns regarding chemical treatments. The lack of harmonisation on the use of systems approaches (pre-harvest cover sprays and postharvest inspection) within Australia could mean that the only option for entry into several Australian markets may be methyl bromide fumigation.

Irradiation is already an approved phytosanitary treatment for many tropical fruit and vegetables. The treatment would provide an alternative phytosanitary treatment for the raspberry and blueberry industries. It is anticipated that industry can commercially incorporate irradiation treatment into their supply chain with minimal impact on efficiency and profitability of the supply chain.

Irradiation as a quarantine measure

The International Plant Protection Convention (IPPC) has several International Standards for Phytosanitary Measures (ISPM) relating to the use of irradiation for phytosanitary purposes. ISPM 18, "*Guidelines for the Use of Irradiation as Phytosanitary Measure*" provides technical guidance on the specific procedures for the application of ionising radiation that countries should adopt when trading in irradiated fresh fruit and vegetables. ISPM 28 "*Phytosanitary Treatments for Regulated Pests*" sets out minimum doses for a range of pests.

In this application the minimum dose requested is 150 Gy which is a generic treatment for fruit fly species of economic importance. The proposed treatment range of 150 Gy minimum dose to 1 kGy maximum dose will comply with ISPM 18 and 28 requirements and is identical to the current levels approved in Standard 1.5.3. A 'generic' irradiation treatment at 150 Gy minimum absorbed dose will prevent the emergence of adults of fruit flies for all fruits.

Irradiation treatment is suitable for fruits and vegetables as the minimum effective dose for a phytosanitary purpose is lower than the radiation tolerance level of the fresh produce.

Studies on the effect of low dose irradiation on the fruits raspberry and blueberry (Golding *et al.* 2014a, Golding *et al.* 2014b) and previous studies (Part 3.1) show that the nutritional value of irradiated fruits were not significantly affected.

The Codex Recommended Code of Practice for Radiation Facilities for Processing of Food and the ASTM International Standards provide internationally accepted guidance on the establishment and routine operation of irradiation facilities, including detailed advice on dosimetry and record-keeping.

Exports of irradiated Australian mango, papaya and litchi have been approved by Biosecurity New Zealand for several years and trade in irradiated fruits and vegetables, particularly in the US are increasing, with imports of irradiated fruits from many developing countries.

In 2011, the use of irradiation for phytosanitary purposes for domestic trade was approved and accepted by all states and territories in Australia. This treatment is available to businesses under the national Interstate Certification Assurance Scheme as Operational Procedure number 55 (ICA 55). It applies to all insects, excluding only Lepidoptera that pupate internally, and to all fruits for which FSANZ has approved the use of irradiation. Gamma-radiation is a proven and sound technique for insect disinfestation in a range of tropical fruits (Moy 1985, Moy and Wong 2002, Moy 2005).

Safety

The safety of food irradiation has been thoroughly studied and evaluated comprehensively over the past 60 years. No food technology has ever been as extensively studied with respect to food safety as food irradiation. Panels of experts have systematically evaluated data from animal feeding tests and multi-generation tests in animals and in 1980, the Joint FAO/IEAE/WHO Expert Committee on the Wholesomeness of Irradiated Food (WHO 1977, JECFI 1981) affirmed that "Irradiation of any food commodity up to an overall average dose of 10 kGy introduces no toxicological hazard; hence toxicological testing of food so treated is no longer required". The JECFI also stated that irradiation of food up to a dose of 10 kGy introduces no special microbiological or nutritional problems. Investigations since 1981 have continued to support the JECFI's conclusions.

Codex Alimentarius issued a general Standard for Irradiated Foods (CODEX 2003b), that

any food irradiated up to an overall dose of 10 kGy is safe and wholesome. Irradiation for a phytosanitary purpose has a maximum dose of 1 kGy. The evidence that irradiated food is toxicologically safe, and presents no special nutritional problems is overwhelming. The Food Irradiation Clearances Database (IAEA 2012b) shows over 60 countries have at least one use of food irradiation, 30 countries have approved irradiation as a disinfestation treatment (includes approvals for delayed ripening and inhibition of sprouting), about 23 countries have approved irradiation up to 1 kGy for all fruit and vegetables and, 12 countries for specified fruits and vegetables (including Australia and New Zealand through FSANZ 1.5.3).

Various studies on toxicology and chemistry of irradiated foods and food components have been reviewed, particularly of alkylcyclobutanones. These substances also exist in non-irradiated foods and in foods processed by more conventional processes such as cooking. While minute amounts of such alkylcyclobutanones were detected in foods that contained high levels of total lipid and palmitic acid, such as chicken and beef, the amounts as a result of irradiation at doses up to 1 kGy would be minute and insignificant, and therefore would not pose a toxicological problem and is safe to eat. The lipid content of these fresh fruits is nil or very low compared to the 5–25% in meat products. No evidence of a hazard has been found on examination of radiolytic products produced.

The American Council on Science and Health (ACSH) and the Centres for Disease Control and Prevention in the US support food irradiation as a science-based technology that has been proven to be safe and effective (Loaharanu 2003). The use of irradiation provides consumers with a wider choice of safe, high-quality food. The most important public health benefit is its ability to destroy pathogenic organisms in food. The application in this submission is for a phytosanitary purpose, for a maximum dose 1 kGy.

FSANZ has previously assessed the toxicological hazard and nutritional adequacy of various irradiated tropical fruits (breadfruit, carambola, custard apple, litchi, longan, mango, mangosteen, papaya, persimmon and rambutan), vegetables (tomato and capsicum) and other specified fruit (apple, apricot, cherry, honeydew, nectarine, peach, plum, rockmelon, strawberry, table grape, zucchini and scallopini / summer squash) and concluded that there are no public health and safety issues associated with their consumption when irradiated up to a maximum dose of 1 kGy.

At doses at <1 kGy carbohydrates, proteins, dietary fibre and levels of minerals or trace elements in fruits and vegetables largely were not affected. Overall vitamin changes were minimal or non-significant between treated and untreated fresh produce, and after storage. The impact of storage rather than irradiation generally impacted fruit nutritional status and postharvest quality (Golding *et al.* 2014a, Golding *et al.* 2014b). More importantly, irradiated food will be consumed as part of a mixed diet, and the process therefore will have little impact on the total intake of specific nutrients.

Irradiation of fresh produce for a pest disinfestation purpose has no microbiological implications and the maximum absorbed dose allowed (1 kGy) is one-tenth of the general maximum permitted under the Codex Standard.

Other implications

Irradiation at low doses is an effective alternative phytosanitary treatment that is safe to use. The treatment method overall does not significantly impact on the nutritional and postharvest quality of fruit. The approval for its use for a phytosanitary purpose will ensure continued access for fresh produce within Australia and overseas. Literature and NSW DPI data show this to be the case for many fresh fruits and vegetables. The data indicated that the irradiated fruits treated under the same conditions for a phytosanitary purpose, would not

present any nutritional concerns and postharvest quality is not severely impacted.

Packaging materials used for packing raspberry and blueberry are suitable for irradiation treatment and comply with regulated articles both domestically and overseas, and approved for use in food irradiation by the US Food and Drug Administration. The irradiation treatment does not impair package integrity nor deposit toxic radiation reaction products or additives on the produce.

Packages containing treated produce will be labelled in accordance with the labelling requirement as stated in FSANZ Code Standard 1.5.3 (FSANZ 2014b). Labelling identifies that the fruit was treated by irradiation and ensures that all parties are informed, thus providing choice for consumers. Interestingly, foods that are chemically treated do not have to be labelled.

The irradiation facility carrying out the treatment will be a licensed and regulated radiation facility, and abides by requirements of good manufacturing practice and acts in accordance with the Codex Alimentarius General Standard for Irradiated Foods (CODEX 2003d) and its associated Code of Practice for the Operation of Irradiation Facilities Used for the Treatment of Foods (CODEX 1983a). Proper dosimetry systems and compliance by the approved irradiation facility with accurate records allow tracking of the irradiated produce from receiving through shipping.

Australia has very strict food safety standards that apply to retail, wholesale, exporting and processing. These standards are developed jointly be leading Australian retailers and Food Standards Australia New Zealand (FSANZ). All reputable Australian and New Zealand fruit and vegetable producers operate an independently audited HACCP-based food safety system. These systems cover all facets of production and include periodic testing of fruit to ensure it complies with maximum residue level (MRL) requirements in proposed destination markets.

Conclusion

The approval of irradiation of raspberry and blueberry for a phytosanitary purpose will provide a safe and effective option to maintain market access throughout Australia and New Zealand for those berries grown in areas with endemic fruit fly populations and other regulated pests. Consumers will benefit from the continued availability, choice and price stability of these fresh produce. The harmonisation of phytosanitary irradiation treatments for regulated pests could mean access to new markets for Australian fresh blueberries and raspberries, particularly with production generally counter-seasonal.