IRRADIATED FRUITS AND VEGETABLES

Irradiation is the only phytosanitary treatment scientifically shown to pose no nutritional risk to consumers

Summary

1. Phytosanitary irradiation of fresh fruits and vegetables poses no nutritional risk to consumers according to Food Standards Australia New Zealand (FSANZ).

2. Irradiation is one of several treatment options for phytosanitary measures designed to eliminate the threat of plant pests that could be transferred from an exporting state or country to an importing state or country.

3. FSANZ recently carried out a comprehensive review of the effects of irradiation on a wide range of fruits and vegetables including pome fruits, stonefruits, berries, citrus, tropical fruits, grapes and other fruits and vegetables of interest. The review focussed on vitamin C and carotene (a pre-cursor to vitamin A), as they are radiation sensitive and a significant percentage of our daily requirement comes from fruits and vegetables.

4. The data showed wide variations in measured vitamin concentrations due to cultivar (variety), growing conditions, season, ripeness, storage conditions and processing. Phytosanitary doses (up to 1 kGy) had no effect on carotene concentrations in fruits and vegetables. There was no effect on vitamin C concentrations in the majority of fresh fruits and vegetables.

5. When any possible loss of vitamin C was compared to its dietary consumption, the study showed that any loss was unlikely to impact on vitamin C intakes.

6. Other options for physical phytosanitary treatments include various methods using heat and cold storage. All these physical treatments are known to have the potential to reduce vitamin content. Irradiation is the only treatment for which there is sufficient data available for a comprehensive scientific study such as that carried out by FSANZ. Irradiation is the only phytosanitary treatment scientifically shown to pose no nutritional risk to consumers.

What have Food Safety Authorities concluded?


8. The FSANZ conclusion reinforces earlier conclusions made by the World Health Organisation, the UN Food and Agriculture Organisation, the European Food Safety Authority, the American Dietetic Association and many other expert agencies in food safety that irradiated foods are not only safe but do not compromise the nutritional requirements of our diet.

9. The FSANZ review is important because it is recent, comprehensive and focussed on the irradiation use that is of most importance to Australians and New Zealanders, its use as a phytosanitary measure. Phytosanitary measures are used to eliminate the risk of transferring harmful pests that may be present on fresh fruits and vegetables from one state or country to another.

The FSANZ study

10. FSANZ reviewed in detail the data from over 30 scientific papers and recent unpublished studies that examined the effect of radiation doses used in phytosanitary treatments (less than 1 kGy) on the nutrients in fresh fruits and vegetables. Data from studies that looked at higher doses or used dried fruits were also checked.

11. The fruits included pome fruits, stonefruits, berries, citrus, tropical fruits and other fruits of interest such as grapes, melon varieties, persimmons and kiwifruit. The vegetables included cucurbits (zucchini, carrots) and fruiting vegetables (tomatoes, capsicum, com).

12. The vitamins of importance were identified as vitamin C and carotene since they are among the more radiation-sensitive vitamins and a significant percentage of our dietary intake of these vitamins comes from fresh fruits and vegetables.

13. The data showed large variations in the concentrations of vitamin A and carotene even in the same type of fruit or vegetable. The variations were mainly due to the fruit or vegetable variety (cultivar), growing conditions, season and ripeness. Post-harvest storage conditions and processing also affect vitamin content.

14. Phytosanitary doses (up to 1 kGy) had no effect on carotene concentrations in fruits and vegetables. There was no effect on vitamin C concentrations in the majority of fresh fruits and vegetables.

15. Where a decrease in vitamin C was identified, the vitamin C content was found to be in the natural variations.
16. The findings of the FZANZ study were also consistent with earlier studies that established that irradiation does not affect the composition of carbohydrates, proteins and fats in food, nor did it reduce mineral content. It was also found that irradiation had little effect on non-vitamin bioactive compounds in food such as flavonoids (e.g. anthocyanin in cherries) and carotenoids (e.g. lycopene in tomatoes).

17. When any possible loss of vitamin C was compared to its dietary consumption, the study showed that any loss was unlikely to impact on vitamin C intakes.

What does this mean for consumers?

18. Consumers can be sure that the nutritional value of fresh fruits and vegetables that have been irradiated has not been compromised by the irradiation process.

19. It is often claimed that phytosanitary irradiation destroys vitamin content. Doses much greater than used for phytosanitary treatments can reduce the concentrations of some vitamins significantly. However, the FSANZ study showed that the low doses used in phytosanitary treatments generally do not affect vitamin levels and will not reduce the dietary intakes of vitamins below Recommended Daily Intakes.

20. Several types of heat and cold storage treatments are also options for use as phytosanitary measures. Vitamin losses from raised temperatures and long term cold storage treatments are well documented. However, unlike irradiation, there is little data on the effects of the phytosanitary use of heat or cold storage on vitamin concentrations and an assessment of potential vitamin loss and consequent nutritional risk has not been done.

21. Consumers are also provided with information when commodities have been treated with radiation, information that is not made available for other phytosanitary treatments. By law, the information must be provided as a label on or near the irradiated fruit or vegetable at the point of sale.

What does this mean for the horticulture industry?

22. The ability of horticulturists to export and sell their produce to other Australian States and overseas is dependent on a range of phytosanitary treatment options. Irradiation has recently become an option, joining the traditional treatments such as chemical fumigation, hot water dips, hot air exposure and extended cold storage with or without a modified atmosphere.

23. However, physical treatments all have the potential to reduce vitamin content and consumers are very conscious of the contribution fresh produce makes to vitamins in their diet. Industry should take confidence from the fact that irradiation is the only method that has been scientifically proven to have no significant effect on dietary intake and to pose no nutritional risk to consumers.

24. Unlike chemical treatments there are no residues from physical treatments such as irradiation. Consumers are increasingly wary of treatments involving chemicals and bans on some insecticide uses are coming into force. The adverse effects associated with methyl bromide treatments on the environment, produce quality and workplace safety are well-established.

25. Phytosanitary irradiation is also the only phytosanitary option that is classed as a generic treatment for fruit flies by the International Plant Protection Convention. It is the most effective, broad spectrum, simple and rapid treatment for insect pests generally. Most fresh commodities are suitable for treatment and pre-treatment quality is usually better maintained following irradiation than other physical treatment options.

26. Approximately 1400 tonnes of irradiated mangoes, litchi, tomatoes and capsicums were exported from Queensland to New Zealand in their 2012-13 growing season. Mangoes and capsicums have been sent to some other Australian states after treatment in Queensland under a protocol (ICA-55) that is recognised Australia-wide.

27. There is increasing interest in the irradiation from plant protection agencies in the US and Asia and cross-border trade in irradiated fresh commodities now involves nine countries and total about 20,000 tonnes per year.

28. The FSANZ confirmation that phytosanitary irradiation is both safe and does not compromise fresh produce nutritionally will provide a further boost to its growing acceptance and use.