

02/12/2020

Re: A1193 - Irradiation as a phytosanitary measure for all fresh fruit and vegetables

Dear FSANZ,

I oppose the irradiation of any fruit or vegetable. I, therefore, call on you to reject Application A1193 for the irradiation of all “fresh” fruit and vegetables.

Fruit and vegetables are valued for their phytochemicals and high nutritional levels. They contain high levels of Vitamin C and other antioxidants. Irradiation causes physical-chemical and biochemical changes that may affect this nutritional value. The chemical changes also result in radiolytic products (Grolichová, Dvořák, & Musilová, 2004). Application A1193 would see fruit and vegetables exposed to ionising radiation at doses ranging from 150 Gray (Gy) – 1 kGy. This is equivalent to exposing them to approximately 1.5 million – 10 million chest X-rays (calculated at the low end of chest X-ray exposure)! Some studies have explored the impact this dose of radiation has on plants. Marcu, Damian, Cosma, & Cristea (2013) found that corn derived from seeds exposed to  $\leq 0.5$  kGy irradiation did not survive more than ten days. Radiation-induced free radicals were also found. Wi et al. (2007) similarly explored the effects of irradiation on morphological changes and biological responses in plants such as pumpkin. The growth of plants irradiated with 50 Gy, which is less than the amount being put forth in application A1193, was significantly inhibited. These studies add to my concern about the practice of irradiation. What is irradiation doing to our food when even 50 Gy can stunt plant growth? The European Union Irradiation has shared my concerns about the safety of irradiated food which led them to rule out further irradiation approvals in 2003. The Australian Senate followed suit with a call for approvals to be stopped until further research has been conducted. Then in 2008-2010 approx 90 Australian cats developed neurological disorders from eating irradiated cat food. The irradiation of cat food was then banned. The European Food Safety Authority acknowledges that the risk to humans cannot be ruled out. I am particularly concerned about the long term consumption of an irradiated diet which there has been no research on. I am also concerned the maximum level of radiation permitted may be increased in the future. An increase will bring greater loss of nutritional value and an increase in radiolytic products. This was found by Calucci et al. (2003) who looked at the impact of 10 kGy irradiation on the content of free radicals and some nutrients in spices and herbs. Irradiation resulted in an increase in free radical content and significant losses in Vitamin C and carotenoids.

Application A1193 doesn't need to be approved as alternatives exist which are both radiation-free and chemical-free. Some of these are listed below:

- Good production practices which remove the need for the food to be decontaminated
- Washing
- Heat / steam vapour treatment

- Cold treatment
- Exclusion zones
- Modified atmospheres
- Vacuum packs
- Correct maturity bands and host testing to show non-host status

Some other alternatives are:

- Hot water dips
- Ultra high pressure processing
- Picking unripe fruit to avoid its infestation with pests, and unbroken skin

A novel alternative was creative by Andre Leu, Organic Federation of Australia Chairman and export representative for the Australian Lychee Growers Association. First, after harvesting, the fruit is washed. It is then coated with edible oil to seal it against contamination and pests. Australian lychees are now being exported to Japan using this method.

Once irradiated, our fruits and vegetables prized for their natural goodness can no longer be considered “fresh” – they will appear fresh, but in fact be processed.

I call on you to reject Application A1193 as it is not in the public interest. I also would like to see you rescind all previous irradiation approvals. If irradiation is to continue, it must be better labelled. Irradiated food and their packages should be individually labelled “treated with radiation” or “irradiated”. I have never seen a label; I am not sure whether this means there are no irradiated products in the stores, or whether the state government is not monitoring and enforcing label laws.

I look forward to your response and to working with you to keep our food nutritious, healthy and safe for all Australians and New Zealanders.

Thank you,

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#### References-

Calucci, L., Pinzino, C., Zandomenoghi, M., Capocchi, A., Ghiringhelli, S., Saviozzi, F., Tozzi, S., & Galleschi, L. (2003). Effects of  $\gamma$ -Irradiation on the free radical and antioxidant contents in nine aromatic herbs and spices. *Journal of Agricultural and Food Chemistry*, 51(4), p. 927-934.

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Marcu, D., Damian, G., Cosma, C., & Cristea, V. (2013). Gamma radiation effects on seed germination, growth and pigment content, and ESR study of induced free radicals in maize (*Zea mays*). *Journal of Biological Physics*, 39, p. 625-634.

Wi, S. G., Chung, B. Y., Kim, J-S., Kim, J-H, Kim, Baek, M-H., Lee, J-W., & Kim, Y. S. (2007). Effects of gamma irradiation on morphological changes and biological responses in plants. *Micron*, 38(6), p. 553-564.