

Submission on application A1193

In the context of application A1193's stated purpose of dealing with "pest infestation", FSANZ's assessment that "Irradiation as a phytosanitary measure is not a substitute for good hygienic, manufacturing or agricultural practices" [1] is an important one.

"GOOD" AGRICULTURAL PRACTICE: INSECTICIDE USE

In relation to FSANZ's mandate to protect consumer health, what it is that constitutes "good" agricultural practice must take full account of comparative nutritional value and toxicity. From that perspective, chemical insecticides are superior to ionising irradiation in that, although they result in poorly uncharacterised toxicity, they do not — as FSANZ has acknowledged irradiation does — compromise the product's nutritional value.

BETTER AGRICULTURAL PRACTICES

Of course, taking this mandate seriously entails contrasting the proposed irradiation with other agricultural practices dealing with pest infestation. These must include organic agriculture, biodynamic agriculture, and permaculture. *Organic agriculture* replaces synthetic and other toxic and hazardous insecticides with naturally occurring alternatives free of the known and unknown hazards of novel chemicals and gene experimentation; and *biodynamic agriculture* is organic agriculture that employs further nutritive and dynamic inputs that result in extending the resultant foods' nutritive value and shelf life. *Permaculture* approaches agriculture from a perspective of ecological integration to use natural biological controls on pests. And these approaches are not mutually exclusive; their benefits are in fact synergistic.

Both the F.A.O. and the U.N.'s special rapporteur on food have reported that these intensive methods, which he gives the umbrella term *agroecology*, results in foods that — as well as removing all chemical toxicity beyond that resulting from chemical and genetic contamination by neighbouring farms' inferior agricultural methods — also deliver nutrition superior to that obtainable via either conventional or genetically modified methods [2]. Their nutritional superiority over conventional and GM crops results partly from confining use of "fertiliser" to biologically active products that build soil health rather than swell a crop's volume with nutritionally empty additives.

The multiple benefits of permaculture are well known and well understood: aside from carbon negativity (which it shares with organic and biodynamic agriculture), it reduces unnecessary labour, multiplies incidental microecological benefits, creates suitable habitat for threatened species, spares animal cruelty, and, in stark contrast to conventional and GM agriculture, builds topsoil and soil health, crop robusticity, and food nutrition by making clever use of every aspect of the environment in relatively closed life cycles with no dependence upon toxic inputs.

One further incidental benefit of wholesale adoption of organic, biodynamic, or permaculture methods of agriculture or any combination of them is cessation of the promotion through chemical sprays of evolutionary selection of “superweed” genes as has occurred in the vicinity of many GM crops, whose heavier loads of glyphosate have accelerated superweed development via horizontal gene transfer [3,4]. To view anthropocentrically the multiple benefits of refraining from chemically fostering herbicide resistance, food grown on organic, biodynamic, permaculture, or even conventional agricultural principles will offer lower toxicity due to herbicides.

NO SUBSTITUTE

Even conventional agriculture deals with insect infestation adequately, and that the applicant has demonstrated no urgent and compelling need replace conventional methods with ionising irradiation and its consequent nutritional degradation and potential toxicity* of foodstuffs. From this and FSANZ’s recognition that “Irradiation as a phytosanitary measure is not a substitute for good hygienic, manufacturing or agricultural practices” follows inexorably the conclusion that x- and gamma irradiation must not be used as a substitute for available hygienic, manufacturing, or agricultural techniques, which are clearly superior to it in every conceivable way.

FOOTNOTES

* Uncontested basic science shows that ionising radiation powerfully oxidises a wide range of substances in foodstuffs and results in a cascade of oxidation effects resulting from formation of nitric oxide, including direct formation of the persistent radical oxidant nitrogen dioxide (known to trigger lipid auto-oxidation, leading to cell-membrane damage) and of peroxynitrite (leading to inflammatory stress and carcinogenesis).[5]

The damage that these and other oxidation reactions cause in microbes and in plant gametes mirrors the damage they cause in the humans who consume the reaction byproducts, which include several highly reactive oxygen species and the oxidants

that they form. Neither necessity nor ignorance can excuse the recklessness that would use ionising irradiation of foodstuffs or animal feed to transform otherwise healthy food into an oxidative timebomb.

† On page i of the “supporting document” [1] also appears the principle that “the maximum absorbed dose should not compromise the properties of the food”. FSANZ itself states [6] that irradiation decreases vitamin levels. Not to mince words, any decrease in a food’s micronutrients — including retinol, vitamin C, vitamin E, thiamin, and β -carotene — compromises its properties. By FSANZ’s own evidence, the proposed doses violate FSANZ’s principles. Moreover, the applicant has provided no evidence that ionising irradiation will not result in catastrophic degradation of thiamin and vitamin E.

REFERENCES

- [1] FSANZ, *Supporting document 1: Risk and technical assessment report – Application A1193: Irradiation as a phytosanitary measure for all fresh fruit and vegetables*, page i, <<https://www.foodstandards.gov.au/code/applications/Documents/A1193%20SD1.pdf>>
- [2] Olivier de Schutter, Report submitted by the Special Rapporteur on the Right to Food, *Agroecology and the Right to Food*, United Nations: 2010, <<http://www.srfood.org/en/report-agroecology-and-the-right-to-food>>
- [3] Paul Brown, “GM crops created superweed, say scientists”, *The Guardian* 25 July 2005, <<https://www.theguardian.com/science/2005/jul/25/gm.food>>
- [4] Brandon Keim, “New GM crops could make superweeds even stronger”, WIRED 1 May 2012, <<https://www.wired.com/2012/05/new-superweed-evolution>>
- [5] Ronald L. Prior, “Oxygen radical absorbance capacity (ORAC): New horizons in relating dietary antioxidants/bioactives and health benefits”, *Journal of Functional Foods* 2015 October;18(B):797–810, <<https://dx.doi.org/10.1016/j.jff.2014.12.018>>
- [6] FSANZ, *ibid*, page ii.