FOOD IRRADIATION*

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* Review article of **Comments on Proposed Regulations on Irradiation in the Production, Processing, and Handling of Food, FDA Docket No. 81N-0004** by Kathleen M. Tucker and Robert Alvarez. (Health and Energy Institute and Environmental/Policy Institute, Washington D.C., May 16, 1984) pp.45.

This well referenced U.S. document opens with a sobering statement:

> Despite over twenty-five years of research and tens of millions of tax dollars spent on developing food irradiation as a preservative, there are disturbing scientific findings and major uncertainties relative to food safety.

Food irradiation is a process method of food preservation whereby food is exposed to a beam of ionizing radiation from radioactive gamma sources such as Cobalt-60 or Caesium-137, or machines that generate electron or X-ray beams.

Tucker and Alvarez comment on proposed U.S. Food and Drug Administration (FDA) regulatons in connection with food irradiation. One FDA proposal is for the elimination of the requirement that irradiated food be so labelled. The paper is highly critical of this proposal and as a prelude to such criticism, builds a strong case against the concept of food irradiation. While the 'pro' — food irradiation literature tends to focus narrowly on the potential commercial benefits of this method of food preservation, this critical and careful commentary provides a broadly based, thorough consideration of the likely or potential economic costs to the community of adopting this technology. These include costs associated with:

1. The safety of irradiated food — impact of aflatoxins and radiolytic products in food due to irradiation.
2. The impact of increased circulation of radioactive material to be used in food irradiation facilities, including transport and ultimate disposal.
3. Potential impact on bacteria and viruses in food and the environment, including mutant strains.
4. Regulatory and corporate capacity to assure the safe functioning of food irradiation facilities and to assure accupational safety.
5. Proper labelling to guarantee consumer choice.

The paper proposes that before the FDA proceeds with proposed food irradiation regulation, a comprehensive environmental impact study be undertaken to evaluate the issues listed above. That such a

study still needs to be done is highlighted by the paper's discussion of each of these issues.

Although much of the literature in support of food irradiation is arrogantly certain that irradiated food is safe and wholesome, Tucker and Alvarez raise strong doubts. Their main concerns are about the production of carcinogenic aflatoxins in irradiated grains and vegetables, as well as the production of free radicals creating radiolytic products[1] in irradiated food generally. The latter may induce genetic defects, or be associated with the incidence of cancer. There is also a possibility that food irradiation may lead to the appearance of radioactive-resistant strains of bacteria and viruses. Finally, normal human error in the form of improperly monitored and calibrated machines could induce radioactivity in irradiated foods.

The authors' critical evaluation of research into the safety of irradiated foods revealed a can of worms. Most of these studies were done for or by the US Army. Few of these studies meet FDA's criteria for acceptable reseach. Many of the studies were carried out by a private company recently convicted of performing fraudulent research (p.8). Basically, the research needed to determine whether or not a diet of irradiated food will increase the frequency of cancer and genetic injuries or have other long term adverse or beneficial effects on humans still has not been done.

Impacts on society of the increased circulation of radioactive materials could have major implications for public health and social costs generally. If food irradiation technology became widely adopted as a method of food preservation there would be a quantum jump in volumes of highly dangerous radioactive byproducts moving on transportation networks for use near population centres and food growing areas. This aspect alone is particularly worrying when the past US record of keeping track of medical and research radiation sources is examined. Radiation sources have been lost, accidently mixed with scrap metal, or left lying about. There have been incidents where offsite contamination from radiation byproduct facilities led to widespread contamination. The trouble with radioactive sources like Cobalt-60 and Caesium-137 is they emit gamma radiation continuously. They cannot be switched off. Even the lowest levels of radiation used for foods would cause a person's death in one minute.[2] There is no room for 'She'll be right' with this technology. Its monitoring requires a human perfection that is unattainable — even at great expense — as the nuclear power industry has recently illustrated. Accident potentials at food irradiation plants are a further factor to be considered. An explosion in a grain elevator adjacent to an irradiater could cause a breach in the containment of that irradiator.

Occupational hazards are another risk associated with this technology. This includes not only workers in food irradiation plants,

but workers in the transport sector generally. The authors' point to several US incidents of overexposures involving radiation sources such as these proposed to be used for food irradiation. They go on to point out that "abnormally high cancer mortality now being observed among federal radiation workers suggests that current standards are inadequate to protect workers" (pp.3-4).

After reading this document, one is left wondering who, indeed, would be pushing for the adoption of this dangerous, potentially disastrous, technology. Tucker and Alvarez point out that the main promoters in the US context have been the US Army, the US Atomic Energy Commission, the US Department of Energy, (DOE) and the International Atomic Energy Agency (IAEA). As already mentioned, the US Army has funded much of the research into the 'safety' of irradiated food. The Department of Energy is seeking to profit out of their huge volumes of radioactive wastes. "With the biggest stake in food irradiation, the DOE is spending about $15.6 million in FY 1985 directly and several million indirectly to get their radioactive wastes out into the commercial sector" (pp.21-22). Finally, the mandate of IAEA is the promotion of radiation technology. As the authors point out, the IAEA does not have a mandate for the protection of the environment or the promotion of public health.

Overall this document should prove a valuable input to the current Australian debate on food irradiation. The current push to introduce food irradiation in Australia appears to be coming from the Queensland government,[3] although the NSW Health Department is also reported as backing the idea.[4] Proposals to construct a food irradiation plant in Queensland are afoot.[5] Currently there is a Federal Inquiry into food irradiation being undertaken by the House of Representatives Environment and Conservation Committee.[6] At the very least, one would hope that the Inquiry will reach conclusions similar to those in the Tucker and Alvarez paper; that is, a comprehensive, independent, environmental impact study or technology assessment, to evaluate fully the potential economic costs of this technology, be required before any further consideration be given to adopting food irradiation in Australia.[7]

NOTES AND REFERENCES

1. These are new substances that are not found in unirradiated food.
2. J. Mountwinter, 'Food irradiation — don't nuke the cake', *Simply Living*, 2, 14, undated, pp.22-29.
3. E.g. see Jan Taylor, 'Does noise level equal public concern' Queensland Government Consumer Affairs Bureau; G.E. Mitchell (Queensland Department of Primary Industries) 'Prospects for food irradiation in Queensland', *Food*

Technology in Australia, 38, 11, November 1986, pp.472-474; G.E. Mitchell, 'Food irradiation', *Queensland Agricultural Journal,* Jan-Feb, 1986, pp.17-21.

4. 'Irradiation viable here, inquiry told', *Courier Mail,* 5 March, 1987, p.10.
5. 'MLA attacks irradiation plan for fruit and vege markets', *Courier Mail,* 9 August, 1986, p.11.
6. 'Irradiation viable here, inquiry told', *Courier Mail,* 5 March, 1987, p.10.
7. A similar conclusion has been suggested in the New Zealand context. See L.R.B. Mann and K.E. Tait, 'Food irradiation: known harm, unanswered questions and procedures for technology assessment', paper presented to the 56th ANZAAS Congress, New Zealand, January, 1987.