

Food Irradiation

Scientific Objections to an Ineffective and Possibly Dangerous Technology

After reviewing about 2 dozen scientific papers and commentaries from proponents and opponents of food irradiation, as well as several official reports of the WHO/IAEA, we would draw the following conclusions about this technology:

- 1) **Research Quality Poor**: much of the research in favour of food irradiation is of poor quality, has not been peer reviewed, and has originated from institutions or organizations with a solid vested interest in promoting food irradiation.
- 2) **Basic Concerns Remain**: the fundamental signal of concern about the safety of food irradiation was contained in the seminal study of Bhaskaram and Sadasivan in 1975¹; this small but critical study of 15 malnourished children showed high levels of worrisome genetic alterations to the children's cells (polyploidy). Despite vigorous attempts to refute the findings and conclusions of this study, we can find no credible evidence that the authors' findings are wrong. Moreover, this is a "real world" study, based in a "Third World" country, where promotion of food irradiation is most vigorous.
- 3) **Unseemly Role of the IAEA**: the relentless drive to promote food irradiation has come primarily from the International Atomic Energy Agency (IAEA). This entity has been granted extraordinary powers through a little known 1959 agreement with the World Health Organization which in essence ceded the responsibility for examining the health effects of food irradiation to the IAEA. The latter organization has published 19 of 29 major international reports on food irradiation since 1962, leading, ultimately, "to the proclamation that any food could safely be irradiated at any dose".² That an organization whose goal is to manage the world's nuclear energy industry should have played the primary role in health assessment is unacceptable.
- 4) **Irradiation is not like Thermal Methodologies**: comparisons are frequently made between resistance to the introduction of pasteurization and canning methods, and resistance to food irradiation. Such comparisons are specious. The use of thermal energy to process food has a history nearly as old as distinguishable human remains; pasteurisation and canning simply represent refinements of this ancient methodology. There is no comparable history of the application of huge doses of ionizing radiation to food. The technology, applied to food, or any other substance, is novel, period.
- 5) **Radiation Effects are not Negligible**: frequent unsubstantiated summary statements are made by proponents of food irradiation concluding that effects of radiation on food quality are small or negligible. In fact, our reading of the literature convinces us that this is not the case. For example, reduction in selected vitamin content of between 17 and 51% does not strike us as inconsequential.³
- 6) **Microbiological Benefits are Transitory**: the most realistic evidence we can find about the benefits of irradiating food in terms of its effect on spoilage and bacterial contamination – the primary reason it is employed – is that it delays these changes, but does not eliminate them. This delay, according to one expert critic, averages about two weeks.⁴ Moreover prions (the

¹ Bhaskaram MD, Sadasivan G: Effects of feeding irradiated wheat to malnourished children. J Clin Nutr 28:130-135, Feb./75

² Worth M: Bad Taste: the disturbing truth about the World Health Organization's endorsement of food irradiation. Public Citizen/GRACE, Oct./2002

³ Venugopal V, Doke SN, Thomas P: Radiation processing to Improve the Quality of Fishery Products. Clin Rev Food Science Nutr 39:391-440, 1999

⁴ Tritsch GL: Food Irradiation. Nutrition 16:698-701, 2000

cause of BSE), viruses (e.g. hepatitis) and Botulinum clostridium toxin are not affected by radiation.

- 7) **Unique Chemicals Are Created**: the statement that no unique chemicals are created by irradiation of food is untrue. In fact, a major controversy currently raging in Europe regarding the expansion of food irradiation hinges on the fact that 2-alkylcyclobutanones are found only in irradiated fat-containing foods, and have been shown to have some degree of toxicity.⁵
- 8) **Carcinogenesis not ruled out**: no study to date has ruled out carcinogenic potentialities for irradiated food, because all have been too brief. As Tritsch has pointed out, commenting on a range of studies on the health effects of irradiated food, “none of the studies cited previously could have demonstrated the carcinogenicity of cigarette smoke”.⁶ In fact studies examining the effect of 2-alkylcyclobutanones, noted above, have only been able to be carried out, for technical reasons, in the last two years.

The scientific problems with food irradiation are clear. But there is also another entirely different aspect to this matter.

The current attempt to expand permitted uses for food irradiation is occurring in a period of substantial reduction in government inspection personnel, and introduction of less hands-on monitoring strategies such as HACCP (Hazard Analysis – Critical Control Point)⁷. Economic concentration within the food industry, especially in meat processing plants, has increased greatly in recent years, and investigative reports revealing shoddy meat-handling practices have appeared in the public media. Concomitantly, in the U.S., there has been a recent resurgence of interest in nuclear power, with \$5-6 billion being set aside by the Federal government for feasibility studies – along with the usual intense lobbying of politicians by the nuclear industry.

Taken together, these trends suggest strongly that food irradiation is coming back to the forefront of government interest as a means of, once again, rehabilitating nuclear waste, and also of allaying public consternation over the rising incidence of food-borne infections stemming from reduced inspection activities. It appears to be driven at this juncture primarily by economic and political motives, not scientific ones.

We do not find ourselves reassured by an invisible assessment process by an anonymous group of Health Canada personnel or consultants, possessed of unknown qualifications.

Overall, we find the introduction of expanded food irradiation practices unjustified, now or in the future.

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⁵ Delincée H et al: Genotoxicity of 2-alkylcyclobutanones, markers for an irradiation treatment in fat-containing food – Part I: cyto- and genotoxic potential of 2-tetradecylcyclobutanone. Radiation Physics Chemistry 63: 431-435, 2002.

⁶ Tritsch H: op cit

⁷ A Health Canada food inspector was interviewed about this and other techniques on CBC Radio. He indicated that in his line of work, HACCP was contemptuously held to stand for “Have a Cup of Coffee and Pray”! He felt it was entirely inadequate as a monitoring strategy.