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An abstract of shortcomings in risk assessment of irradiated food for human consumption.

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- 1) Irradiation of food with high doses of ionizing radiation produces unique radiolytic products and higher concentrations of certain other substances than are present in unirradiated foods (Delincee et al., 2002; Byun et al., 2000; Diehl et al., 1978; Jakubick et al., 1978). These products have not been adequately identified and their adverse effects to human health have not been systematically characterized (Au, 2001, 2003).
- 2) The standard toxicological tests, especially animal bioassays, were not designed to detect adverse effects of low concentrations of radiolytic products in food therefore they have low sensitivity to such test conditions. In addition, the feeding conditions may cause nutritional imbalances that can affect the outcome of the investigations. Consequently, inconsistent results have been extensively reported. Therefore, both positive and negative effects from these studies cannot be used reliably to assess risks for humans.
- 3) The extent of potential adverse effects in humans who consume irradiated food has not been adequately tested: cancer promotion, birth defects, allergy, etc.
- 4) The existence of susceptible populations to potential adverse effects among consumers of irradiated foods has not been considered: especially children and malnourished individuals (Au, 2002; Bhaskaram & Sadasivan, 1975).
- 5) The adverse health effects from consumption of meat that contains 2-ACBs, unique radiolytic products, have not been fully and adequately characterized (Horvatovich et al., 2002). Two 2-ACBs were briefly tested for tumor promoting activities in an experimental colon tumor model and one was active (Raul et al., 2002). In irradiated food for human consumption, the concentration of 2-ACBs is estimated to be low, e.g. 0.5 ug/gram of lipid at 5 kGy (WHO, 1999). However, in a different but well-established tumor promotion animal model, the dose that was needed to promote tumors was lower than 0.5 ug per mouse, delivered two times per week for 25 weeks (Saleem et al., 2001). Another way to consider the dosage situation is that the concentration of tumor promoters is usually hundreds of times less than the cancer inducing chemicals. Therefore, 2-ACB in irradiated food can potentially be hazardous to humans.
- 6) Consumers often will be unaware of their consumption of irradiated food, particularly if the food is multi-ingredient or is served in a restaurant or other public setting or, as is proposed, is served to children in school lunches. Therefore, it will not be possible to associate the development of any adverse

health effects with the irradiated food by the consumers themselves or by public health scientists.

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