Facts about Food Irradiation

Q: A:

1 Can irradiation of food increase the risk of botulism?

1 Irradiation at internationally recommended levels of up to 10 kilogray does not increase the risk from botulism any more so than other "sub-sterilizing" food processes, such as pasteurization. Food treated by these methods must be handled, packaged, and stored following good manufacturing practices (GMPs). Doing so prevents the growth and toxin production of *Clostridium botulinum*. Alternatively, high-dose irradiation (30-60 kilogray) can be used to destroy any *Clostridium botulinum* organisms present in the food.

Microbiological Safety of Irradiated Food

Some types of *Clostridia* cause more concern than others. *Clostridium*

Irradiation is an effective method to ensure the microbiological safety of food, especially those of animal origin. Nham (fermented pork sausage) is routinely irradiated and marketed in Thailand for this purpose.

ICGFI is an international group of experts designated by Governments to evaluate and advise on global activities of food irradiation. It was established under the aegis of the Food and Agriculture Organization of the United Nations, World Health Organization, and International Atomic Energy Agency.

botulinum Type E, for example, is found at low levels in fish and seafood caught in some areas. It can grow and produce toxin even when the food is refrigerated at temperatures as low as 4° C. Thus, fish and seafood, including products treated by any of the sub-sterilizing processes including irradiation, must be kept at 3° C or below at all times during marketing. Most other types of *Clostridium botulinum* cannot grow and produce toxin at temperatures below 10°C. GMPs require that raw foods such as fish, meat, and chicken are stored at a specific temperature, whether irradiated or not, to prevent the growth of *Clostridium botulinum*. ■

2 Can irradiation of food lead to increased microbiological hazards?

2 No. The microbiological safety of irradiated foods has been investigated by international scientific bodies. One area that scientists have specifically looked at is the reduction of microorganisms that cause spoilage. These microorganisms warn consumers, through off odours or discoloration, that the food may be bad, or unsafe, to eat. Even if irradiation suppressed microorganisms in spoiled food, it cannot suppress the outward signs of spoilage and thus cannot be used to cover up spoiled food. In addition, scientific evidence indicates that proper irradiation can neither increase virulence of pathogenic microorganisms nor their ability to "grow better" in irradiated food.

In 1982, at the request of the Food and Agriculture Organization (FAO) of the United Nations and the World Health Organization (WHO), the Board of the International Committee on Food Microbiology and Hygiene considered the evidence for the microbiological safety of food irradiation. It concluded that modern food handling technology was adequate to control potential problems created by the suppression of

spoilage microorganisms and that food irradiation does not present any increased microbiological hazards to health. Independent national expert committees in Denmark, Sweden, United Kingdom, USA, and Canada have since reaffirmed these conclusions. They essentially endorse the findings of the Joint Expert Committee on the Wholesomeness of Irradiated Foods convened in 1980 by the FAO, WHO, and International Atomic Energy Agency.

Important to note is that irradiation is not the only food processing technique which suppresses microorganisms signalling spoilage. Heat pasteurization, chemical treatments, and certain packaging methods have the same effect. Food processed by pasteurization-type methods must be properly packaged, handled, and stored to ensure safety.

3 Are foods in which microbial toxin or viruses are already formed suitable for irradiation?

3 No, only foods of good hygienic quality should be irradiated. In this respect, irradiation does not differ from heat pasteurization, freezing, or other food processes. While these processes can destroy bacteria, they may not totally destroy preformed toxins and viruses already in the food. It is very important that foods intended for processing — by whatever method — are of good quality and handled and prepared according to good manufacturing practices (GMPs) established by national or international authorities. In some cases, strict regulations prohibit distribution of some foods. Many countries, for example, do not permit oysters to be harvested from areas known to be contaminated with raw sewage because of the danger of hepatitis viruses. No food processing methods should be used to substitute for GMPs in food production and handling. ■

Raw and frozen poultry products are almost always contaminated with pathogenic microorganisms such as *Salmonella*. Irradiation is a highly effective method to ensure the hygienic quality of these products.

Scientific and Technical References:

The Microbiological Safety of Irradiated Food Codex Alimentarius Commission. CX/FH/83/9. Rome (1983).

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