Food irradiation: a technology ripe for a production boom

by Marjorie Mazel Hecht

A long-awaited revision in the U.S. Food and Drug Administration regulations is soon expected to launch a booming new industry here—food irradiation.

The benefits of food irradiation are astounding. Food processed with gamma irradiation eliminates insect infestation, retards spoilage, prolongs shelf life, ensures purity, and permits shipping and storage of meats without refrigeration. Once the new FDA regulation is in effect, Americans can expect to have available:

- fish and shellfish that stay fresh in the refrigerator for up to three weeks;
- chicken and other meats that are sealed, treated, and shipped to stay fresh for months without refrigeration;
- pork products guaranteed to be without trichinosis-causing microorganisms;
- onions and potatoes that won't sprout for months;
- mushrooms, strawberries, and other produce that stays fresh when refrigerated for three or more weeks;
- citrus and other fruits disinfested of fruit flies and other insects at the point of production so that the produce can be shipped insect-free; and
- grain stores that are preserved insect-free for human and animal consumption rather than for bugs.

Above all, the technology of food irradiation brings the promise of nearly *doubling* the food available for consumption in the world, not by producing more food, but by ensuring that current food supplies are not lost to insects, rodents, or fungi. At present, an estimated 50-60% of the food shipped to or produced in much of the developing sector never reaches the intended consumer because of insect infestation and spoilage. In terms of grain alone, the amount lost to insects, rats, and fungi yearly is 33 million tons—the equivalent of the agricultural production of 12 million acres of land, or enough to feed the U.S. population for a year. The National Academy of Sciences estimated 1985 food losses of at least 107 million tons at a value of $11.5 billion.

Food irradiation is also cheap, when compared to present methods of food preservation, like canning and chemical treatment. Initial cost estimates put the cost as low as one-third that of conventional methods.

A proven technology

The technology of food irradiation is not new, although it has not yet been commercialized in the United States. Scientists began investigating the usefulness of nuclear irradiation right after World War II, and it has undergone nearly 40 years of rigorous testing for safety and wholesomeness, coming out with a clean bill of health. As the U.S. Atomic Energy Agency put it in 1970, food irradiation has been "more thoroughly tested than any other method of food preservation."

Given these outstanding benefits, the obvious question is: What has prevented this technology from being commercialized in the United States, the country that led the world in civilian nuclear development?

The answer is one that even veterans in the nuclear technology field puzzle over. In the early 1950s, in the spirit of President Eisenhower's Atoms for Peace program, the United States was gearing up to commercialize food irradiation under joint government and private management, at first for use by the U.S. Army to produce food for the troops. But just as construction was confirmed for what the Department of Defense called "the first and most comprehensive pilot production-size food radiation facility in the world," in Stockton, California, Congress killed the emerging technology outright by classifying irradiation as a "food additive," instead of a process. The 1958 Food Additives Amendment to the Food, Drug, and Cosmetic Act classified as a food additive "any substance and any source of radiation intended for use in producing, manufacturing, packing, processing, preparing,

treating, packaging, transporting, or holding food." Further, the law stipulated that "A food shall be deemed to be adulterated . . . if it has been intentionally subjected to radiation, unless the use of the radiation was in conformity with a regulation or exemption in effect."

This classification stopped commercialization of food irradiation, putting those interested in promoting the technology in the position of applying for clearance to the FDA product by product, with extensive testing to prove safety and wholesomeness. According to one authority, this required spending at least $250,000 for each item to conduct three years of tests in which the three to five generations of animals eat the particular food under consideration for 30-40% of their daily diet. The FDA procedure resulted in an enormous amount of excellent research on all aspects of food irradiation, but in 26 years, the only products that the United States has permitted to be irradiated are potatoes to prevent sprouting, grain to prevent infestation, and, most recently (July 1983), spices. Petitions to permit irradiation of many other foods were turned down by the FDA, despite extensive government and industry testing that showed safety and wholesomeness.

What prompted this strange amendment in 1958? One noted old-timer blames the Jane Fonda of her day, actress Gloria Swanson, a food faddist who lobbied for elimination of all potentially "cancer-causing" additives to food.

In the years of plentiful energy and booming agricultural productivity, there was little pressure to change this situation. However, for the developing sector—countries where often the majority of a postharvest crop is lost to pests or fungi—the effect of this U.S. slowdown in research and development was measured in terms of starvation and death. As A. Sreenivasan, a scientist at the Bhabha Atomic Research Center in Trombay, India, told a 1973 conference on food irradiation in Vienna sponsored by the International Atomic Energy Agency: "Perhaps the greatest negative input that can be singled out for its adverse impact on food irradiation programs around the world has been the action of the U.S. Food and Drug Administration in withholding clearance for radiation-sterilized ham and in revoking that given earlier to radiation-sterilized bacon. . . . The action of the U.S. FDA has resulted in a misunderstanding in some quarters over the safety of irradiation procedures for food preservation as a whole."

At present, the FDA is expected any day now to finally grant clearance for the irradiation of food up to 100 kilorads (a rad is a measurement of radiation energy absorbed)
any further toxicological evaluation. This low level of radiation is sufficient to inhibit sprouting in onions and potatoes; to eliminate parasites and insects in meat, grains, and soft fruits; and to delay ripening of perishible foods. But it is far less than 1980 regulations set by the Joint Expert Committee on Food Irradiation, an international project involving 25 countries, sponsored by the Food and Agriculture Organization, the World Health Organization, and the International Atomic Energy Agency. This committee established that any food irradiated to a dose of up to 1,000 kilorads was toxicologically safe for human consumption. A year later, in 1981, the Codex Alimentarius Commission of FAO and WHO supplemented this with a list of recommended international standards for individual irradiated foods.

Reportedly, the FDA has under consideration the international recommendation of 1,000 kilorads, but the action expected shortly concerns the 100 kilorad level. This has been under review at the FDA for three years—since March 1981—and according to a spokesman for the Health and Human Services agency, which is participating in the review process, final approval has been delayed while a compromise is worked out on the question of labeling the irradiated products. Most experts believe that since the process is so safe, so thoroughly tested, and leaves absolutely no radiation in the product, such labeling is unnecessary and would simply provide a target for anti-nuclear environmentalists. The flavor of such environmentalist opposition can be seen in the remarks of the director of the energy project of the Ralph-Nader-connected antinuclear group Critical Mass, who told the author of a May 1983 *Baltimore Sun* feature on food irradiation: "We haven't had time yet to fully research the issue of irradiated food, but I have an instinctive negative reaction. . . . We oppose on principle the commercialization of nuclear material—whether it's Three Mile Island or smoke detectors. And I basically see this as a way of further legitimizing the weapons business."

Used in 28 countries

The rest of the world has not stood still while the United States reviewed and researched the technology of food irradiation. Most countries have worked out their own regulations, many in line with the international recommendations cited above. More than 40 different food products have been cleared by 28 countries, with some countries, such as the Netherlands, approving 20 foods and Japan, a nation that has pioneered in nuclear technology, irradiating everything from seafood and seaweed to spices. In addition, Canada is aggressively pursuing the lead in exporting food irradiation technology, having built 60 of the 100 or so facilities now in use worldwide for food irradiation and supplying 90% of the radiation source, cobalt-60, worldwide, including that used by the American firms to sterilize medical supplies. (About 30% of all medical supplies are sterilized by this irradiation method.)

Ironically, when the FDA regulations are finally announced, the United States may be in a position of importing food irradiation technology. This was the conclusion of Rep. George Brown (D-Calif.)
nology facilities in India, the developing sector nation that has pursued high-level research and implementation to increase its food supply and the wholesomeness of food products.

(A future article will explain how irradiation works.)