

Food Irradiation

Irradiation improves food safety and maintains quality by slowing down deterioration. Irradiated food keeps longer and stays fresher. That reduces food waste. The incidence of foodborne illness can be reduced when food is irradiated. Also, fewer agricultural chemicals may be needed for insect control if crops will be irradiated.

French scientists first discovered that irradiation preserved food in the 1920s. It's now a technology that's used worldwide. Irradiated foods are commercially available in 28 countries.

How are foods irradiated?

Irradiation is like pasteurization of milk and fruit juice, except that the food isn't heated. Food is treated with ionizing radiation energy from X-rays or with gamma rays from cobalt or cesium. The process varies from facility to facility.

Why are foods irradiated?

Depending on the dose, irradiation can rid food of a few unwanted insects or preserve it for an indefinite period of time. Low to medium doses of radiation energy reduce spoilage of fruit and kill insects and bacteria in other foods. Higher doses sterilize foods for a variety of uses. For example, irradiated food is eaten by astronauts during space flight and by hospital patients with weak immunity who need bacteria-free food.

What foods can be irradiated?

The U.S. Army pioneered use of irradiation in the 1940s. It wasn't until 1963, however, that it was first approved for use in the U.S. Since that time, the U.S. Food and Drug Administration (FDA) has approved irradiation of several foods.

Most recently, USDA approved use of low doses of irradiation for fresh and frozen red meat (including beef, lamb and pork) to kill most of the harmful bacteria such as E. coli O157:H7 and Salmonella.

Date of approval	Food	Purpose
1963	Wheat, wheat flour	Kills insects
1964	White potatoes	Inhibits sprouting
1985	Pork	Controls parasite
1986	Enzymes (dehydrated)	Controls microorganisms
1986	Fruit	Kills insects; delays ripening
1986	Vegetables, fresh	Kills insects
1986	Herbs	Controls microorganisms
1986	Spices	Controls microorganisms
1986	Vegetable seasonings	Controls microorganisms
1990	Poultry, fresh/frozen	Controls microorganisms
1995	Meat, frozen, packaged for space flight	Sterilization
1995	Animal feed and pet food	Controls Salmonella
1999	Red meat, uncooked, chilled	Controls microorganisms
1999	Red meat, uncooked, frozen	Controls microorganisms

What foods are currently being irradiated in the U.S.?

Until recently, only bulk dried spices were irradiated in the U.S. Since 1992, however, irradiated produce has begun to appear. Only four retail stores in the U.S. have sold irradiated foods continuously. Products have not yet been marketed in Oregon.

Consumers have responded positively to small-scale test marketing. Irradiated mangoes, papayas, strawberries, and other produce have been well accepted. Superior quality and safety have promoted sales.

If consumers support irradiation, companies will face the challenge of fitting this capital-intensive technology into their plants. Many will need to transport their food products in bulk to the large, concrete irradiation structures that are now used.

How are irradiated foods labeled?

Irradiated foods are labeled "treated with radiation" or "treated by irradiation". The international logo must also appear. Recent legislation directed FDA to revise the labeling rule so that the disclosure statement is not more prominent than the declaration of ingredients.

Labeling requirements apply only to whole foods that have been radiated. Foods containing irradiated ingredients are exempted. (For example, irradiated strawberries would be labeled, but not yogurt containing irradiated strawberries.)

Will irradiation increase the cost of food?

It's been estimated that irradiation may increase the cost of food about 5 to 10 cents per pound. However, the reduction in spoilage (and waste) will help make up for the difference.

Does irradiated food require special handling?

Irradiation does not take the place of safe food handling practices by producers, processors, or consumers. For example, irradiated meat must be kept refrigerated because all harmful bacteria won't be killed at the irradiation dose that is used. Ground meat must still be cooked thoroughly because the few remaining E. coli O157:H7 bacteria could cause illness.

Irradiation does not destroy bacterial toxins or viruses which can be killed with thorough cooking.

Does irradiation harm food quality?

Because irradiation is a "cold" treatment, it minimizes changes in texture, color and flavor of the food. Some changes in quality do occur, however. For example, some irradiated produce can soften, ripen unevenly or rot. Although medium doses of irradiation may create off-odors in raw meat, cooking appears to minimize these changes.

Does irradiation destroy the nutrient content of food?

Irradiation can minimally affect some sensitive vitamins (such as vitamin B-1 in pork). Other preservation methods can also affect nutrients.

Will irradiation be used to make filthy food clean?

Irradiation can't reverse spoilage and make bad food good. If food already looks, tastes or smells bad, those signs of spoilage will remain. Irradiation will not cover them up.

How is use of irradiation regulated?

Use of irradiation requires FDA approval to ensure that the food will be safe to eat. There is a lengthy scientific review of research studies to assess radiological safety (e.g., will radioactivity be induced in the food?), toxicological safety (e.g., is there evidence of adverse toxicological effects?), microbiological safety (e.g., will harmful bacteria be able to grow?), and nutritional adequacy (e.g., does irradiation result in a significant loss of any nutrient in food?).

Are irradiated foods safe to eat?

On the basis of 50 years of research, the World Health Organization, the Atomic Energy Commission, and the Food and Agriculture Organization concluded that irradiated foods are safe and wholesome at any radiation dose.

Although chemicals are formed during irradiation, they are similar to those formed when food is cooked. Animal and human testing indicates no harmful effect.

Human feeding studies haven't supported claims that genetic defects can result when irradiated food is eaten.

Does irradiation make foods radioactive?

Radiation energy passes through food without leaving any residue. The food doesn't become radioactive.

Will food irradiation harm the environment?

Radioactive material has been transported for more than 40 years. Containers and irradiation facilities must meet specific safety standards.

Will consumers accept food irradiation?

Surveys have shown that consumers are less concerned about irradiation than about food additives, pesticide residues, animal drug residues, growth hormones, and bacteria. It appears that more consumers have identified irradiation as a necessity for meat and poultry products than for fruits and vegetables.

Consumer support is needed to encourage the food industry to adopt this technology to reduce the risk of foodborne illness.

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