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Quick Guide to Understanding Food Irradiation

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Food irradiation is the process of using controlled amounts of ionizing radiation to improve the safety and stability of food products[6]. During irradiation, energy waves break bonds inside the genetic material of organisms like pathogens and insects to kill them or stop them from replicating[2].

There are **three main types** of food irradiation[1] are

1. ***Gamma rays*** have high penetration power which is helpful when treating bulk items. Gamma radiation is commonly used to sterilize medical and household products[1,6].
2. ***Electron accelerator*** produce electrons that travel up to the speed of light and instantly inactivate microbes when they contact food surfaces[1,6].
3. ***X-rays*** are the third and least commonly used method to irradiate foods. These rays penetrate deeper than accelerated electrons, but shallower than gamma rays. This technology is similar to the machines doctors use to produce images of internal structures[1,6].

Food irradiation can extend shelf life of food products and destroy pathogens and parasites that are harmful to humans[2,3,6]. Irradiation also effectively slows ripening of fruit and inhibits sprouting of plant products so these foods can last longer in the marketplace to be enjoyed by people everywhere[2,3,6]. Irradiation can be used to sterilize foods that may then be eaten by immunocompromised individuals that need a safe diet[2,7]. Also, many countries have strict restrictions regarding the safety and quality of imported food and often foods must be quarantined to ensure safety prior to arriving in supermarkets[8]. Irradiation can be used to meet these quarantine requirements so that imported food products can reach consumers safely and quickly[2,8].

Army Approved

The Quartermaster Corps of the U.S. Army at the Food and Container Institute in Chicago, Illinois performed much of the early research done to sterilize food because of its need to provide high-quality, shelf-stable field rations for troops[3]. The Army Quartermaster Corps concluded early on that wholesome, economical, shelf-stable field rations could be provided through irradiation[3,7].

Applications of Food Irradiation at Various Doses[3,4,6]		
Irradiation Dose Level	**Effect of Irradiation**	**Examples of Applicable Foods**
Low Dose Disinfection (0.1-1 kGy)	Inhibits growth of sprouts	Potatoes, onions, garlic, onions, carrots, ginger
	Delays ripening	Bananas, mangos, papayas, guavas
	Kills insects and larvae	Wheat, flour, fresh produce, dried vegetables and fruits
	Kills harmful parasites	Fresh pork
Medium Dose Pasteurization (1-10 kGy)	Reduces/eliminates spoilage organisms to extend shelf-life	Dried fish, strawberries, grapes, mushrooms
	Reduces/eliminates pathogens	Raw or frozen poultry and meats, shellfish, spices
High Dose Sterilization (10+ kGy)	Sterilizes food products; Allows for storage of foods at room temperature without spoilage	Hospital diets incorporating meat, poultry and seafood, spices, baked goods, prepared foods, and some vegetables

Food Irradiation Q & A

Does irradiation make food radioactive?

No. It is physically impossible for irradiated food to be radioactive[5,8]. Radiation waves affect unwanted organisms, but are not present in the food after irradiation[5]. Similar to how teeth or bones that have been X-rayed do not become radioactive or retain those energy waves. Irradiated foods do not reflect any difference in radioactivity when compared to foods that have not been irradiated[5,8]. Irradiation is recognized as one of the most reliable and safest methods used in the food industry to preserve food and ensure food safety[6].

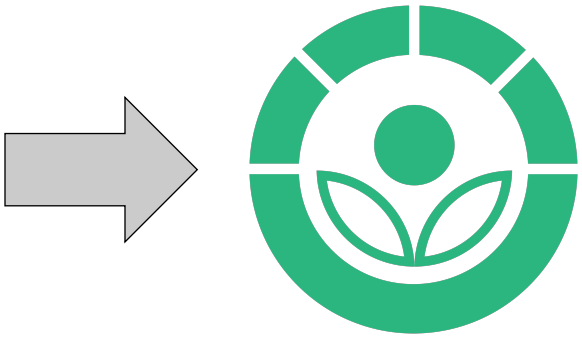
Are there any health risks associated with irradiated foods?

After extensive research by organizations like the Food and Drug Administration (FDA) and the World Health Organization (WHO) irradiated foods have been shown to cause no negative long-term health effects[1,4,5].

Food irradiation has been in use for more than 100 years and specific applications of food irradiation are approved by national legislations in over 55 countries worldwide[6].

How can you identify irradiated food?

In the United States, irradiated foods must possess a "treated with irradiation" or "treated by irradiation" label and the RADURA-logo (pictured right) at the point of sale as required by the Food and Drug Administration (FDA)[1]. Processors may add information explaining why irradiation is used[5]. For example, a processor may add, "treated with irradiation to inhibit spoilage" or "treated with irradiation to protect the environment"[5].



Who regulates irradiated foods?

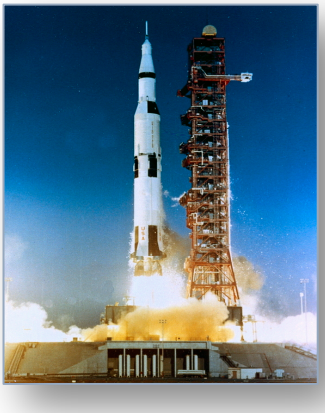
The Food and Drug Administration (FDA) regulates all aspects of irradiation: what products it can be used on, what dose can be used, and how irradiated products are labeled[2]. The U.S. Department of Agriculture (USDA) is responsible for the inspection and monitoring of irradiated meat and poultry products and for the enforcement of FDA regulations concerning irradiated food products[2].

Does irradiation degrade the nutritional quality of food?

No. The nutritional quality of protein, lipid and carbohydrate components do not change during irradiation[3]. Irradiation is no more destructive to vitamins than other food preservation methods like cooking or freezing[2,4,8].

Suitable for Space

Meals eaten by NASA astronauts are irradiated to prevent the astronauts from contracting a foodborne illness during space travel[1,7].



Do irradiated foods taste different than non-irradiated foods?

No. Irradiation preserves most food with minimum effect on the sensory properties of food[8]. Research concludes that irradiated foods are almost identical in taste and texture to their non-irradiated counterparts[5]. However, all foods cannot be irradiated[2]. For example, irradiation causes unwanted flavor changes in dairy products and tissue softening in some fruits, such as peaches[2].

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