

Does irradiation destroy all bacteria, resulting in a sterile product?

No. Irradiation pasteurizes food by using energy, just as milk is pasteurized by using heat. In fact, some groups refer to irradiation as “electronic pasteurization.” The level of irradiation used will destroy most harmful bacteria. Surviving bacteria could start to multiply if irradiated food was mishandled—if it was stored at an inappropriate temperature, for instance. As with any food, consumers must take appropriate precautions, such as refrigeration and proper handling, preventing cross-contamination, and cooking to make sure that potentially harmful organisms do not present a problem. Irradiation is not effective for foods that already contain toxins or viruses. Food processors will not be adopting food irradiation to cover up badly contaminated or unwholesome food in the food supply.

Should irradiated foods be refrigerated?

Yes. Levels of irradiation approved for poultry and meat can reduce numbers of pathogenic and spoilage bacteria, but irradiation does not sterilize the products. Poultry and meat products will continue to require proper refrigeration and handling by retailers and consumers to prevent surviving spoilage organisms and later contaminants from multiplying. Irradiation complements proper food handling practices, including refrigerated storage. It does not replacement them.

Who will be using irradiation for meat products?

Many of the nation’s largest meat and poultry processors have indicated they will soon begin to irradiate products using electron beam technology. Electron-beam treated ground beef and poultry probably will be in supermarkets by late spring 2000.

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Q & A

Questions
and
Answers
About

Irradiation of Meats

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The Radura logo

What is irradiation?

Irradiation is a process of exposing foods to very high-energy electrons, which are similar to light waves or microwaves. This process is sometimes referred to as ionizing radiation, electron beam pasteurization, or e-beam sterilization. The radiation energy causes changes in molecules by breaking chemical bonds. At small doses, irradiation inhibits or modifies food spoilage problems, such as sprouting and ripening. Medium doses will kill or genetically alter microorganisms so they can't reproduce, which means they can no longer cause spoilage or human illness. High doses will sterilize foods and are commonly used to decontaminate herbs and spices.

What are the sources of radiation?

Three types of energy can be used for food irradiation: X-rays, electron beams, and gamma rays. Machines called electron accelerators produce energy for X-ray and electron beams, which are delivered in rapid doses and can be focused in a small area. Electron beam facilities do not use any type of radioactive isotope and operate from a normal electrical power system. Gamma rays are produced by radioactive substances (Cobalt-60 or Cesium-137) that continuously emit high-energy gamma rays. While gamma rays can penetrate deep into food, electron beams are only able to penetrate 1 to 2 inches.

How are foods irradiated?

The food irradiation process typically involves moving prepackaged foods on a conveyor into a thick-walled room and exposing it to the radiation source. Depending on the nature of the food, it will be exposed to gamma rays for 15 to 45 minutes, or to an electron beam for several seconds up to several minutes. Either the food or the source of irradiation can be moved and rotated during exposure to ensure that the radiation evenly penetrates the food. When the gamma ray irradiation process is complete, the rods of radioactive material are retracted into a pool of water, which acts as a radiation barrier. When the electron beam irradiation process is complete, the electrical source is turned off.

How does irradiation contribute to food safety?

Ionizing radiation will reduce, or even eliminate, pathogenic microorganisms such as *Salmonella*; *E. coli* O157:H7; *Clostridium perfringens*; *Staphylococcus aureus*; *Listeria monocytogenes*; *Campylobacter jejuni*; and the protozoan parasite *Toxoplasma gondii* on meat and poultry. Irradiation does not replace sanitation systems; it is an additional tool to ensure safe, wholesome food products.

What are the labeling requirements for irradiated meats?

Regulations require that all treated products be labeled with wording ("treated with radiation" or "treated by irradiation") and an international symbol called the "radura logo" at the packing/wholesale and retail levels.

Are irradiated foods still nutritious?

Yes, irradiated foods are wholesome and nutritious. Irradiation produces virtually no heat within food, and most people cannot detect any changes in flavor or texture. Losses of proteins, carbohydrates, and fats are still small at very large doses. No trace minerals are lost at any irradiation dose. A small percentage of vitamins may be lost; however, the losses are about the same as or less than those resulting from other processes, such as cooking, canning, or freezing.

Does eating irradiated food present health risks?

No. Scientists from the U.S. Food and Drug Administration, the U.S. Department of Agriculture, the U.S. Department of Energy, and universities reviewed several hundred studies on the effects of food irradiation before determining its safety. Scientific committees in Denmark, Sweden, the United Kingdom, Canada, and the World Health Organization also have endorsed food irradiation. Food irradiation has been approved in 37 countries for more than 40 products. At no time does radioactive material enter the food, and food is not radioactive after treatment.