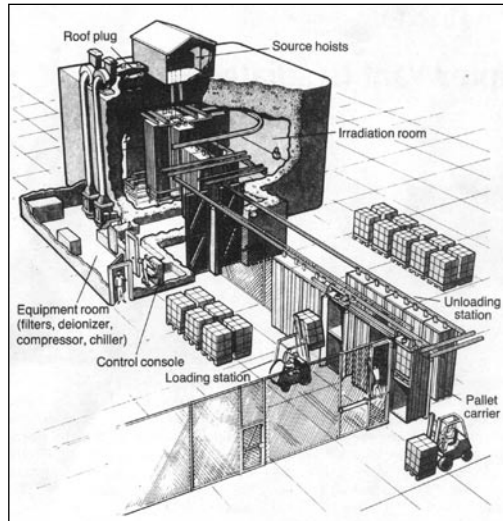


How Food Irradiation Works

Food irradiation uses the ionizing radiation (or ionizing energy) from a decaying radioactive isotope like cobalt-60 as its radiation source. Electron beams and X-rays can also be used as a source. Gamma rays are able to penetrate more than 24 inches of product, while electron beams can penetrate only about 3.5 inches (in both cases, irradiating both sides of the food product).

The very short wavelength radiation penetrates inside solid particles and kills microorganisms by breaking down their cell walls or destroying the metabolic pathways of the organism so that the cell dies. At higher doses, all microorganisms are killed, sterilizing the processed food.

There is no radioactivity induced in the processed food. The chemical reactions caused by the ionizing radiation do not involve the atomic nuclei of the food, and therefore the atomic structures in the molecules are not changed. Of course, some natural radiation, called background radiation, is present in all foods, but irradiation processing does not add to this.



A Canadian design for a standard pallet irradiator with a cobalt-60 source. The boxed product remains on the same pallet from the completion of packaging, irradiation, and delivery to the customer. For a virtual tour of a similar plant, see www.isomedix.com/JS10000_Tour/Index.html

One of the bugaboos of food irradiation has been the claim that ionizing radiation would change the chemical structure of the food, producing unique radiolytic products (chemicals) that might prove harmful. All the years of testing, however, have determined that of the radiolytic products produced, 90 percent are the same as those in nonirradiated food. The remaining 10 percent are chemically similar to natural food components and constitute only 3 parts per million of the processed food.

The Food and Drug Administration which is responsible for assessing the safety of food irradiation, concluded that the difference between irradiated and nonirradiated foods is so small as to make the foods indistinguishable in respect to safety.

Food irradiation is a “cold” process; that is, it produces no significant temperature increase in the food. This makes it particularly useful for fumigating spices because it does not drive off the volatile substances that give spices their characteristic flavor and aroma. Irradiation also does not damage the nutritional quality of the food.

Decades of research have determined the optimal conditions, packaging, and dose levels for irradiating different types of food products—from grains and vegetables, to shellfish, to cuts of meat and chopped meat. Very low levels of irradiation are required for sprout inhibition (.05 kilogray), slightly more for disinfestation (0.15 kilogray), and greater levels for sterilization (44 kilogray).



Gray*Star, Inc.

*This cobalt-60 irradiator, Gray*Star's Genesis, for food processing, is below ground in a shielded pool. The product is lowered in water-tight containers, called bells, to move past the radiation source in the pool, which is contained in a dry plenum filled with inert helium. This innovative design is less expensive than other irradiators and takes up less space, allowing it to be installed in existing food processing plants.*

The photo at right, taken through 14 feet of water, shows one of the two product bells next to the source plenum.

