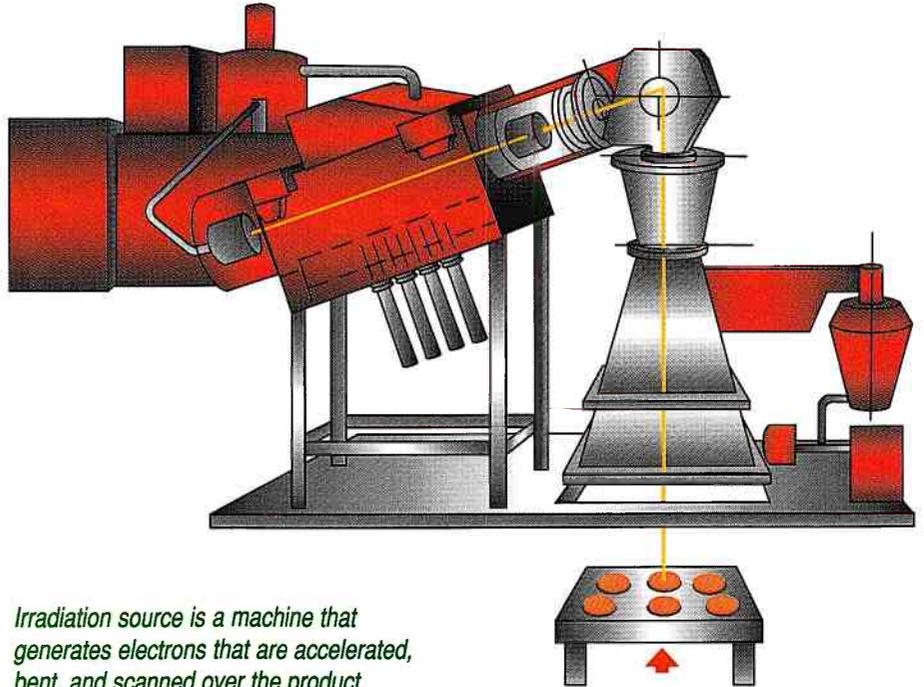


Linear Accelerator Facility

The Linear Accelerator Facility is a pilot plant housing a commercial-sized food irradiator at Iowa State University. The facility is attached to a meat and analytical laboratory to increase its usefulness for research. The accelerator is available for irradiation research and producing test market products on an hourly fee basis.



Irradiation source is a machine that generates electrons that are accelerated, bent, and scanned over the product.

THE ACCELERATOR

Accelerators work on the same principle as a television tube. Instead of being widely dispersed and hitting a phosphorescent screen at low energy levels, the electrons are concentrated and accelerated to 99 percent of the speed of light. This produces rapid reactions on the molecules within the product. The Electron Beam Linear Accelerator machine generates and accelerates electrons to energies of 5, 7.5, or 10 MeV with beam power of up to 10kW.

A stainless steel plate may be placed under the scanning horn to convert the electrons to X-rays at an energy level of 5 MeV to allow very thick penetration at low doses; however, this increases irradiation time considerably.

IRRADIATION PROCESS

A cart system moves the products to be irradiated under the electron beam at a predetermined speed to obtain the desired dosage. Multiple carts move products in and out of the irradiation area continuously with throughput up to 500 pounds per hour. Maximum product dimensions are 24 inches wide and 36 inches long. Product thickness depends on density and electron energy. For example, 3.5 inches is the maximum thickness for meat. Using X-rays increases thickness to several feet for various products.

To request irradiation services, contact Mike Holtzbauer at: 515-294-6334 (phone), 515-294-6328 (FAX), mholtz@iastate.edu (e-mail), or 194 Meat Laboratory, Iowa State University, Ames, IA 50011-3150.

MEAT LABORATORY

The attached Meat Laboratory has complete slaughter, cutting and processing operations with refrigeration and frozen storage. Contract research and/or irradiation services are available. An Analytical Laboratory is available for chemical, dosimetry, sensory, microbiological, and physical analyses on a per sample fee basis. In addition to meat, irradiation services can be conducted on a wide variety of fresh vegetables, fruits, and spices, as well as selected nonfood industrial products.



Radura symbol is required on food irradiated in the United States.

Activity Areas

1

CONSUMER

ACCEPTANCE

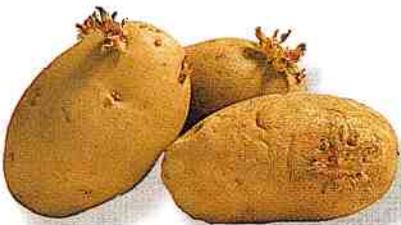
Tests are conducted to determine consumer acceptance and their willingness to pay for irradiated food. This research includes assessments of the effectiveness of informational techniques in increasing consumer understanding and acceptance of irradiated food.

2

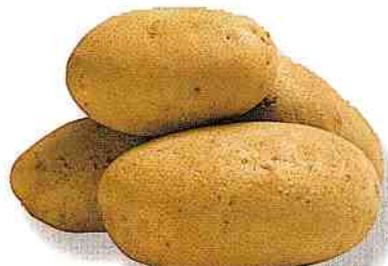
FOOD SAFETY AND

SHELF-LIFE EXTENSION

Researchers study the amount of irradiation needed to reduce spoilage organisms and to eliminate pathogenic bacteria, parasites, and viruses in muscle foods. Other pasteurization techniques combined with irradiation are under study. Extension of shelf-life is being studied to eliminate molds and prevent sprouting.



Non-irradiated Potatoes



Irradiated Potatoes

3

QUALITY

EFFECTS

Research on packaging, temperature, freshness, and additives is conducted to optimize the irradiation process. Studies are in progress to determine the effects of irradiation and environmental factors on color, flavor, odor, and texture of food.

Iowa State University is part of a Food Safety Consortium with the University of Arkansas and Kansas State University. Research seeks to: evaluate potential health risks from infectious agents and toxins in the animal product food chain; determine effective intervention points to prevent or control contamination; develop rapid identification methods; and develop techniques to control contaminants.



FOOD SAFETY CONSORTIUM GOALS

Research seeks to:

- *evaluate potential health risks from infectious agents and toxins in the animal product food chain*
- *determine effective intervention points to prevent or control contamination*
- *develop rapid identification methods*
- *develop techniques to control contaminants.*