

# IRRADIATION OF FOOD



## Introduction

Food safety is a subject of growing importance to consumers. One reason is the emergence of new types of harmful bacteria or evolving forms of older ones that can cause serious illness. Researchers, working to determine how best to combat food-borne illness, are encouraging the use of technologies that can enhance the safety of the nation's food supply. Many health experts agree that using a process called irradiation can be an effective way to help reduce food-borne hazards and ensure that harmful organisms are not in the foods we buy.

## What is food irradiation?

Irradiation makes foods safer to eat by reducing the number of bacteria and parasites in meats, as well as helping to delay ripening and sprouting in fruits and vegetables. Food irradiation is a process in which foods are exposed to radiant energy, including gamma rays, electron beams, and x-rays. This in turn damages the DNA of the microbe, not allowing it to grow and replicate. Food irradiation DOES NOT increase the normal radioactivity level in foods. In 1963, the Food and Drug Administration (FDA) found irradiation of food to be safe. Irradiation is done in government-approved irradiation facilities. Irradiation is NOT a substitute for good sanitation and proper food handling. It is only an added layer of safety.

## What types of foods are irradiated?

The U. S. Department of Agriculture (USDA) and the FDA have approved the following applications for food irradiation:

- Wheat & white flour – reduce insects (1963).
- White potatoes – prevent sprouting (1964).
- Space foods – adopted by NASA to sterilize astronaut's food (1970's).
- Spices & dry vegetables seasonings – reduce microbes (1983).
- Pork – inactive trichinosis worm (1986).
- Fruits and vegetables – reduce insects and control spoilage of produce (1986).
- Herbs, spices & dry vegetable seasonings – reduce insects and microbes (1986).

- Animal & pet food – reduce bacteria (1986).
- Papaya fruit – reduce insects (1987).
- Poultry – reduce bacteria (1992).
- Fresh & frozen red meat – reduce bacteria, including E. coli and Salmonella (1997).

## How do I know if a food has been irradiated?

FDA currently requires that irradiated foods include labeling with either the statement "treated with radiation" or "treated by irradiation" and the international symbol for irradiation, the radura (pictured below).



FOOD IRRADIATION SYMBOL-Radura

## Are irradiated foods less nutritious than conventional foods?

Through the use of food irradiation there may be some nutritional content changes, but no more so than with other processing methods such as cooking, canning or heat pasteurization. Researchers have found that proteins, carbohydrates and fats showed no differences between the two types. Vitamins A, C, E, and B1 (thiamin) were affected but no greater than with other commercial processes. There is little or no change to the physical characteristics of most irradiated foods.

## Do irradiated foods cost more?

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### Do irradiated foods cost more?

Irradiated products cost slightly more than their conventional counterparts, but these costs may be offset by advantages such as keeping a product fresher longer and enhancing its safety. Food trade groups say that as irradiated foods become more widespread, their cost is likely to drop.

### How should I handle irradiated meat and poultry?

Irradiation does not replace safe cooking and handling. You should always follow the four safe food handling steps.

**CLEAN:** Wash hands, surfaces and utensils often.

**SEPARATE:** Don't cross-contaminate. Use different cutting boards for different foods, and separate foods in grocery carts.

**COOK:** Cook food at a safe internal temperature. Check the temperature with a meat thermometer. Ground poultry should be cooked to at least 165° F, ground meat 160° F,

roasts and steaks 145° F, and poultry (whole bird) 180° F. Cook eggs until the yolk and whites are firm, and cook fish until it is opaque and flakes easily. Boil sauces, soups and gravy when reheating, and heat other leftovers to 165° F.

**CHILL:** Refrigerate or freeze within 2 hours. Never defrost foods on a counter, instead use refrigerator, cold running water, or microwave

### References

Larson Duyff, Roberta, MS, RD, CFCS. The American Dietetic Association's Complete Food and Nutrition Guide, 3rd Ed. Wiley and Sons Inc. Publishing, 2006.

United States Department of Agriculture. Irradiation and Food Safety: Answers to Frequently Asked Questions. September 2005. [http://www.fsis.usda.gov/Fact\\_Sheets/Irradiation\\_and\\_Food\\_Safety/index.asp](http://www.fsis.usda.gov/Fact_Sheets/Irradiation_and_Food_Safety/index.asp)

United States Department of Agriculture. National Agricultural Library. A focus on Food Irradiation. December 2005. [http://fsrio.nal.usda.gov/document\\_fsheets.php?product\\_id=154](http://fsrio.nal.usda.gov/document_fsheets.php?product_id=154)

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