



Facts about Food Irradiation

Food irradiation is the treatment of food by a certain type of energy. The process involves exposing the food, either packaged or in bulk, to carefully controlled amounts of ionizing radiation for a specific time to achieve certain desirable objectives. The process cannot increase the normal radioactivity level of the food, regardless of how long the food is exposed to the radiation, or how much of an energy "dose" is absorbed. It can prevent the division of living cells, such as bacteria, and cells of higher organisms, by changing their molecular structure. It can also slow down ripening or maturation of certain fruits and vegetables by causing biochemical reactions in physiological processes of plant tissues.

Who is interested in the process?

Alongside traditional methods of processing and preserving food, the technology of food irradiation is gaining more and more attention around the world. In 37 countries, health and safety authorities have approved irradiation of altogether some 40 different foods, ranging from spices to grains to deboned chicken meat to fruits and vegetables. Twenty-four of these countries are actually applying the process for commercial purposes.

Decisions in these and other countries have been influenced by the adoption, in 1983, of a worldwide standard covering irradiated foods. The standard was adopted by the Codex Alimentarius Commission, a joint body of the Food and Agriculture Organization of the United Nations (FAO) and World Health Organization (WHO) representing more than 130 countries. It is

Status and Trends

based on the findings of a Joint Expert Committee on Food Irradiation (JECFI) convened by the FAO, WHO, and International Atomic Energy Agency (IAEA).

JECFI has evaluated available data in 1969, 1976, and 1980. In 1980, it concluded that "the irradiation of any food commodity" up to an overall average dose of 10 kilogray "presents no toxicological hazard" and requires no further testing. It stated that irradiation up to 10 kilogray "introduced no special nutritional or microbiological problems" in foods.

Why are countries interested?

Governmental interest in the process is emerging for many reasons. They are largely related to persistently high food losses from infestation, contamination, and spoilage; mounting concerns over foodborne diseases; and growing international trade in food products that must meet stiff import standards of quality and quarantine — all areas in which food irradiation has demonstrated practical benefits when integrated within an established system for the safe handling and distribution of food.

The FAO has estimated that worldwide about 25% of all food production is lost after harvesting to insects, bacteria and rodents. The use of irradiation alone as a preservation technique will not solve all the problems of post-harvest food losses. But it can play an important role in cutting losses and reducing the dependence on chemical pesticides. Many countries lose huge amounts of grain because of insect infestation, moulds, and premature germination. For roots and tuber, sprouting is the major cause of losses. Several countries, including Belgium, France, Hungary,

INTERNATIONAL CONSULTATIVE GROUP ON FOOD IRRADIATION
(ICGFI)

ICGFI is an international group of experts designated by Governments to evaluate and advise on global activities of food irradiation. It was established under the aegis of the Food and Agriculture Organization of the United Nations, World Health Organization, and International Atomic Energy Agency.



Japan, Netherlands, and USSR are irradiating grains, potatoes, onions, and other products on an industrial scale. Pilot quantities of potatoes, onions, and garlic have been irradiated in Argentina, Bangladesh, Chile, China, Israel, Philippines, and Thailand.

Foodborne diseases pose a widespread threat to human health and they are an important cause of reduced economic productivity. Studies by the US Center for Disease Control show that even in the highly developed country of the United States, foodborne diseases caused by pathogenic bacteria, such as *Salmonella* and *Campylobacter* and by *Trichinae* and other parasites, claim an estimated 7000 lives annually and cause 24-81 million cases of diarrhoeal disease. Economic losses associated with foodborne diseases are high — estimated between US \$5 billion and \$17 billion by the US Food and Drug Administration.

The relatively low doses of radiation needed to destroy certain bacteria in food can be useful in controlling foodborne disease. Considerable amounts of frozen seafoods, as well as dry food ingredients, are irradiated for this purpose in Belgium and the Netherlands. Electron beam irradiation of blocks of mechanically deboned, frozen poultry products is carried out industrially in France. Spices are being irradiated in Argentina, Brazil, Denmark, Finland, France, Hungary, Israel, Norway, United States, and Yugoslavia.

Trade in food products is a major factor in regional or international commerce, and markets are growing. The inability of countries to satisfy each other's quarantine and public health regulations is a major barrier to trade. For example, not all countries allow importation of chemically treated fruit. Moreover, some countries, including the USA and Japan,

have banned the use of certain fumigants identified as health hazards.

The problem is most acute for developing countries whose economies are still largely based on food and agricultural production. Radiation processing offers these countries an alternative to fumigation and some other treatments.

How much food is being commercially irradiated?

Each year about half a million tonnes of food products and ingredients are irradiated worldwide. This amount is small in comparison to the total volumes of processed foods and not many of these irradiated food products enter international commerce.

One factor influencing the pace of the development of food irradiation is public understanding and acceptance of the process. So far, this has been difficult to achieve, in view of the misconceptions and fears often surrounding nuclear-related technologies and the use of radiation.

To help address concerns and correct myths about food irradiation, a series of fact sheets has been prepared by the International Consultative Group on Food Irradiation (ICGFI). Currently (early 1991) 37 countries are participating in the work of ICGFI. The Group was established under the auspices of the FAO, IAEA, and WHO to advise the organizations and their Member States on the use of irradiation to solve food problems related to international trade, public health, economics, regulations, and public information. Information about ICGFI and the technology of food irradiation may be obtained by writing:

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