

Advantages and disadvantages of food irradiation

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Irradiation is a food processing method that enhances an already safe food supply. It extends the shelf life of food, helping, to retain its quality and safety longer.

Food to be irradiated is carried on a conveyor belt into a metal-plated room and is exposed to a high dose of X-rays, gamma radiation or high-energy electrons. Irradiation never makes foods radioactive: it does, however, create small chemical changes. These result from radiations striking the atoms in the molecules of the food, causing them to lose electrons and form ions or free radicals that can react with one another and other food constituents [1].

Radiation kills microorganisms, destroys insects and slows vital processes such as germination and ripening of fruits and vegetables. Poultry is irradiated to control salmonella, a bacterium that can cause food-borne illness; pork, to control the trichina parasite. Irradiation destroys bacteria, mold, fungi and insects by passing food through a field of radiant energy. The effect of irradiation on texture, flavor, color and nutrient composition varies with the food but is comparable to other methods of food processing and preservation [2].

Irradiation is called cold food preservation because the temperature of food increases only slightly during the process. This is an important advantage of irradiation, since many nutrients are heat sensitive and may be destroyed by other preservation methods. Food that has been sterilized in this way has a shelf life of up to several years as long as the package remains sealed [1]. The World Health Organization has reported that food subjected to up to 1000 krad of radiation is safe for human consumption. The Food and Drug Administration views food irradiation as an additive, therefore, processors must establish the level of radiation

that a food receives and the level of any byproducts remaining in the food. However, high doses of radiation do cause partial destruction of some amino-acids, vitamins A, C, B6, B12 and E as well as niacin and thiamin [2].

In case of vegetable products dose of radiation may have negative effects like:

- Change of physic and chemic properties of fats;
- Modification of physic properties of proteins (solubility, viscosity);
- Modification of flavor thanks to degradation of fats and starch;
- Modification of color due to the stimulation of oxidative enzymes;

For animal products irradiation can cause:

- Formation of bad flavor thanks to oxidation of fats;
- Changing of color;
- Changing of texture [3].

Food irradiation has been approved by more than 50 countries. The safety and effectiveness of irradiation as a food process has been clearly established and this food technology is increasingly accepted by regulatory authorities all over the world. Irradiation provides an added layer of safety to many food products including meat, poultry, seafood and spices that are susceptible to contamination by pathogenic microorganisms. Food irradiation is a safe and effective process that can be used to improve the safety of our food supply [2].

Bibliography:

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