

[Article ID : 01/IV/08/0421]

FOOD IRRADIATION- CONCEPT OF PRESERVATION

Y. A. Zade*, V. N. Toprope, B. B. Mali

College of agriculture, Latur, VNMKV Parbhani
yugaz10@gmail.com

Introduction

Food irradiation (the application of ionizing radiation to food) is a technology that improves the safety and extends the shelf life of foods by reducing or eliminating microorganisms and insects. Like pasteurizing milk and canning fruits and vegetables, irradiation can make food safer for the consumer. The Food and Drug Administration (FDA) is responsible for regulating the sources of radiation that are used to irradiate food. The FDA approves a source of radiation for use on foods only after it has determined that irradiating the food is safe. Technology of irradiation was appropriate technology that can be used for preserving food. Nuclear irradiation technology in the field of food, besides being able to preserve food, can also sterilize certain foodstuffs in an effort to create food security. The advantages of this technology are efficient energy and materials, easily controlled, no residues and its' environmentally friendly.

Technology

Irradiation does not make foods radioactive, compromise nutritional quality, or noticeably change the taste, texture, or appearance of food. In fact, any changes made by irradiation are so minimal that it is not easy to tell if a food has been irradiated. The technology of preserving foodstuffs has been widely developed and practiced as with warm-up, freezing, evaporation, the use of synthetic chemicals and fogging. Technology is evaluated less effective in preserve foodstuffs due to not being able to kill microbial pathogens and tend to produce residues in spite the small concentrations. Microbial pathogens that originate from the air has good resistance when it was in a State of frozen or hot, smoky. Another dangerous thing is when adding synthetic preservatives that are obviously harmful towards health. It is therefore necessary that appropriate technology innovation can preserve food ingredients and retaining the quality of foodstuffs.

Insights

Ionizing radiation will break the bonds of phosphodiester and hydrogen bonding on the DNA strand of a Microbe that will lead to obstruct the growth of microbes. Based on the capability of resistance, there are several types of microbial pathogens having the ability to fix the strands of DNA which ties cut off. Other treatments such as fogging or frosting are necessary for the effectiveness of irradiation technology. Technology is the combination of irradiation with other treatments such as freezing is able to inhibit the growth of microbes. This is due to the low temperature, can stop enzyme activity as well as damaging the protoplasm of colloidal systems further will cause denaturation of cell growth so that it becomes obstructed.

How is food irradiated?

There are three sources of radiation approved for use on foods.

- Gamma rays are emitted from radioactive forms of the element cobalt (Cobalt 60) or of the element cesium (Cesium 137). Gamma radiation is used routinely to sterilize medical, dental, and household products and is also used for the radiation treatment of cancer.



- X-rays are produced by reflecting a high-energy stream of electrons off a target substance (usually one of the heavy metals) into food. X-rays are also widely used in medicine and industry to produce images of internal structures.
- Electron beam (or e-beam) is similar to X-rays and is a stream of high-energy electrons propelled from an electron accelerator into food.

Safety of Irradiation Technology on Food Products

World Health Organization (WHO) States that the technology of irradiation is a safe way to extend the power save food. The WHO also stated that the recommended doses of irradiation do not damage the nutrient content and toxic hazards [14]. The Sources of ionizing radiation that is the recommended gamma ray has a maximum of 5 MeV. These limits are based on the radioactive impact will be incurred if the energy source of radiation used exceeds 5 MeV for gamma radiation. At the stage of high energy ionizing radiation that exceeded the recommended threshold will cause a dangerous radioactive material. The material contains high radioactive elements capable of altering the genetic order permanently.

Conclusions

Technology of irradiation is a very appropriate technology applied to the prospects for the process of preserving food. These technologies are environmentally friendly because it does not leave residue, easily controlled and energy efficient as well as materials. Gamma irradiation technology with the recommended dose may be extend the power save and do not cause radioactive materials as well as capable of creating security food products without changing the quality of the ingredients such as the chemical and nutritional content. This technology is also still need to be developed such as the necessity of the combination of irradiation Technology with existing Technologies to improve the effectiveness and efficacy in prolonging the power save, kill microbes without the slightest change the quality of the food.

