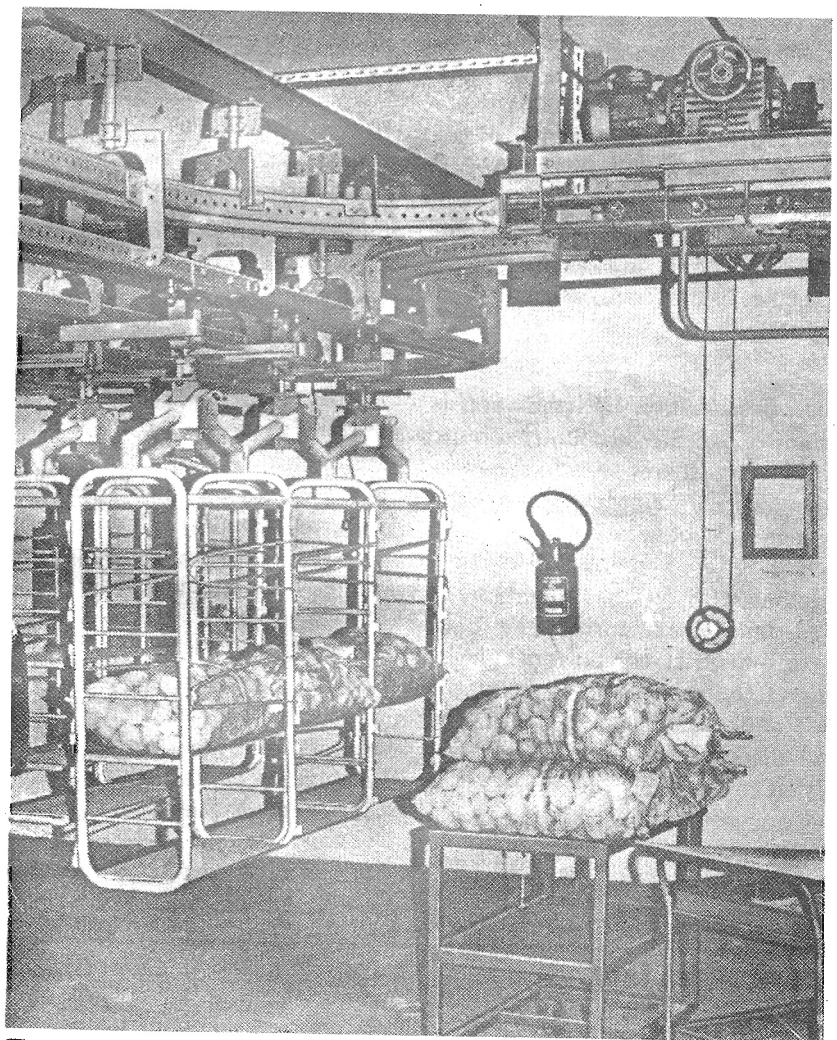


FOOD PRESERVATION BY IRRADIATION

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Food is preserved using a variety of methods including cold storage, drying, salting, smoking, adding sugar or other chemicals or heating. All these methods affect the activity of naturally occurring enzymes in the foods or that of microorganisms spoiling the foods thereby killing them. Thus further changes in the food are inhibited by these treatments.

The enzymic activity in the foods also could be prevented by exposure to x-rays or energy from electron beams. Gamma radiation is a more suitable type of radiation for food preservation which could be obtained from the cobalt 60 or cesium 137 isotopes. The energy is emitted due to nuclear activity in the isotopes.



Potatoes are loaded on the conveyor system. The irradiation is then carried out automatically.

The use of nuclear energy during the second world war for destructive purposes and the disasters resulted from leakages of nuclear energy from the nuclear reactors in the western countries have created a fear among mankind on the application of nuclear energy. These incidence highlight the disturbing aspects of nuclear power at extremely high dosages. We should also recognize that we are continuously exposed very low levels of natural radiation emitted by the elements in our surroundings. The nuclear energy under controlled conditions could be used in a variety of ways for betterment of mankind.

Food irradiation for preservation using irradiation brings about minor chemical changes in the foods in the same way as heat treatments. The radiation degrades some of the constituents in foods. However, research carried out during the last 40 years have not shown the presence of any new compounds in foods than what is produced by heat treatments. Food preservation by irradiation is referred to as "cold sterilization" since no heat is generated during treatment. The radiation energy ionizes the water molecules in the foods, which in turn inactivate the enzymes.

Food preservation by irradiation is permitted in nearly 40 countries in the world today. It is applied in commercial scale in 20 countries. Some of the applications of irradiation in food technology are presented in Table 1, together with dosages of energy is used. In presenting irradiated foods to consumers it is compulsory by legislation to indicate in the label that the food is preserved by irradiation and also display the internationally accepted logo of radura to indicate that the food is irradiated.

The goal of food irradiation is to make the food safe. Exposure to radiation retains the hygienic and nutritional quality of foods. Radiation does not affect the taste appreciably. The fresh appearance of the food is not altered

Table 1
Applications in food irradiation

Effect	Dosage (kGy)
Protecting from insects,	
- spices, grains, cocoa, dates	0.5 - 1.0
- fruits	0.25 - 0.5
Reducing microbial populations in,	
- spices	5 - 10
- fruits (in combination with heat)	0.5 - 1.0
- fish products, cocoa beans	2 - 3
Eliminating pathogenic microorganisms in,	
- spices	5
- fish products	3 - 5
- meat products	2 - 4
Prevent sprouting in,	
- potato, onions	0.05 - 0.05
Control ripening of	
- fruits and vegetables	1
Reduce risk of trichinosis,	
- in pork	1

by the treatments. The treatment also could be used to extend the shelf life of meat contaminated with pathogenic organisms such as Salmonella. The application of chemicals such as nitrates to preserve meat and fumigants to preserve grains and spices could be avoided by application of irradiation. Irradiation does not produce new toxic compounds in foods. The energy does not alter the digestibility of proteins and carbohydrates. However, irradiation destroys some of the fats and oils readily. The destruction is minimized by using low temperatures and eliminating contact with air (oxygen) during irradiation.

Many of us fear to consume foods preserved by irradiation assuming that the foods themselves carry radiation. This is a false fear. There is also doubts in the minds of many regarding possible leakages of nuclear energy in

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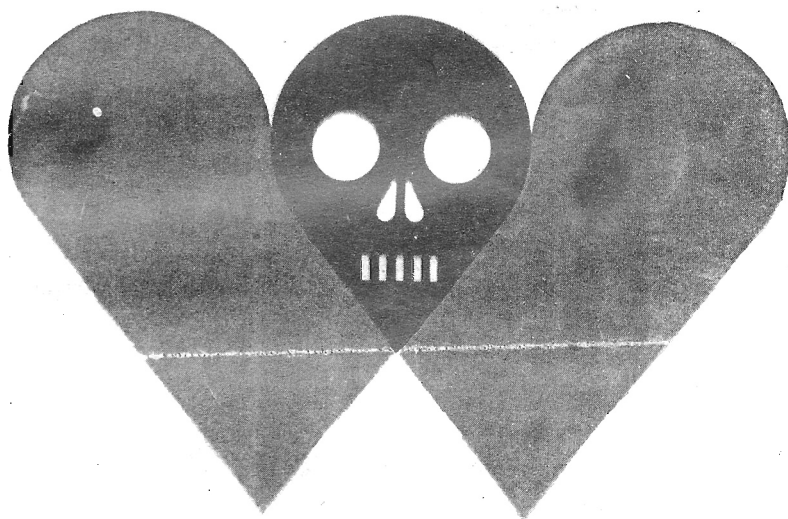
the equipment used for food irradiation in the same scale as from nuclear power stations generating electricity. The equipment used in food irradiation are similar to what is used to sterilize medical equipments. The low energy generated in these equipments are incapable of causing nuclear explosions. A concern also arise from the possible exposure of workers in processing plants to unlimited radiation energy as well as possible hazards associated with disposal of radioactive isotopes. There are internationally accepted protective techniques and procedures adopted in use of irradiation equipment. They need to be carefully applied in food irradiation too.

The public attitudes towards irradiated foods should be developed based on scientific facts. A survey carried out in Netherlands among the housewives on unsafe foods have shown that the consumers were more concerned about pesticides (55%) and food preservative (45%) than irradiated foods (38%). In one hand there is public protests against food preservation by irradiation in the Western countries. On the other hand the fear is disappearing among many. The scientists engaged in research on food preservation by irradiation feel that the techniques will gain popularity with time.

Food preserved by irradiation are not available in the local markets. The basic facilities needed for food irradiation in laboratory scale were available in Sri Lanka. Identification of conditions necessary for microbial decontamination of spices, and control of fruit spoilage are more important to us today. Application of methods to preserve onions, spices, fruits and dried fish are planned for Sri Lanka after installation of a cobalt 60 irradiator within the next five years. suggestions are also made to market test imported irradiated foods in Sri Lanka.

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