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FCOD IRRADIATION - THE NEW TOY ?

- By A.T. Dudani

Although food irradiation has been in use in U.S.A. for almost 30 years it has not caught up largely on account of the now well known,small but crucial Delaney Amendment in 1958 to the Food,Drugs and Cosmetic Act which described food irradiation as an "additive" instead of a "Process". This puts the onus of proving safety of any additives squarely on the manufacturers. The rationale being that irradiation resulted in new molecules in food that were not present before. To date some 30 countries have permitted commercial irradiation of 28 different food items. World-wide annual capacity of food irradiation is about 4.724 lakh tonnes-bulk of which is being used for wheat (4 lakh tonnes) and the balance for spices, fruits, and vegetables and seafoods.

Canada has so far sold some 134 Food Irradiations world-wide, including 4 to India largely for use in sterlisation of medical products. However in 1979, India exported one Irradiator to Indonesia. This country is endeavouring to enter food irradiation in a big way and some 5 Food Irradiators are at present in the process of fabrication and installation in addition to 4 already in operation.

How Irradiation Works:

When radiation strikes other material it transfers energy. At a certain level this radiation knocks out elections from the atoms of the material exposed-which in turn breaks the molecular 24 . * structure of the material yielding icns or free radicals- hence the term ionising radiation. The ions being chemically very active, easily re-combine with surrounding material. These give rise to potentially toxic materials products (URPs for short). While many of the URPs are similar to those that occur in cooking of food, some are unique to irradiation and have been implicated in causation of cancer. Formation of URPs has been found to be related to the dose of irradiation used. For example 10 KG results in about 300 mg of URPs per kg of food. Thus, irradiation triggers chemical reactions 1 causing gross disruption of the DNA in the cells, thereby inhibiting cell growth or division. Whereas USA permits at present 1 KGy (equivalent of ten million chest X-Rays) in India dose of upto 10 KGy has been permitted.

Irradiation Process:

This itself is not very complicated. Food is placed on a conveyer belt which takes it to a chamber and source of ionising irradiation.

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Protestive casing is removed enabling rays to go through the food and its packaging.

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and the average stilling is so in the for The dosage as also the amount of exposure ranging from several minutes to several hours is pre-determined.

Radiation doses are expressed in terms of Grays (Gy) or in rads (radiation absorbed dose) one Gy equaling 100 rads (1 Kgy equal to 100,000 rads).

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Areas of concern:

There are essentially 4 main areas of concern regarding widespread use of ionising radiation to sterlise, disinfest or stabilise food. Firstly the chemical impact of heavy doses on the food itself and 'engure that mutagenic or cacinogenic compounds or URPs are not formed. 1.05 Addied and a loss

Secondly whether the food is reddered safe from 3 poilage microbes and pathogens like botulinum and that irradiation does not give rise to mutants which produce increased amounts of highly undesirable products much as aflatoxins.

Third that vitamins and amino acids, minerals are not destroyed. A new area of concern is the possible deleterians offect of irradiation on antioxidants and other addictives in foods.

Fourthly that Irradiation plants do not create any threat either to environment or any undue occupational health hazards by way of accidents, disposal of waste or transport or radioactive material. and the state of the

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What is the record:

There is irrefutable evidence that irradiated foods suffer a _____ significant loss of vitamins A,B,C & E and some essential amino acids. Depending on dosage, in apples 70% loss of Vit. C has been reported. In case of wheat flour, 67% of thiamine was lost on irradiation and 8 months storage as against 25% loss in the nonirradiated control. Likewise in rolled oats the corresponding loss cf Vit. E was 85% and 26% respectively.

In another significant USDA has reported that thiamine content of bacon in raw cooked or freeze dried from degraded at significantly higher rate during cooking if the bacon had been 10.01 0 irradiated. 1. S. S. L. M. 1. 1991

Some dangers:

Studies have also shown that gamma irradiation was unable to inhibit botulinal toxin production in frankurters if normal salt content was reduced.

Stimulation and rapid division of naturally occuring aflatoxinproducing moulds has also been observed in irradiated foods. Aflatoxins are 1000 times more carcinogenic than the banned pesticide Etnyl dibromide for which irradiation has been suggested as a possible substitute. That fact that you cannot see it, taste it, smell it or even test for it, also poses problems of misuse.

Coll for Ban:

It is not therefore surprising that British Medical Association, and more recently the European Parliament has called for a ban on food irradiation. Several scientists, including 2 Nobel Laureates, Linus Pauling and George Ward have also supported a ban on food irradiation specially in view of results of trials at National Institute of Nutrition(NIN) Hyderabad during 1973-75 which showed polyploiding in blood, which has been linked with cancer. Although this work was caught up in a fierce controversy, recent evidence notably from Canada , U.K. and Austrialia supports the results obtained at NIN.Studies from US and Japan Radiation Research Foundation, Tokyo also show that harmful effects of nuckear radiation from Atomic bomb 42 years ago had been grossly underestimated due to a faulty calculations and US reluctance to provide information.

Moratorium pending safety assurance;

A conference of delegates from 9 Asia-Pacific countries cosponsored by International Organisation of Consumer Union, Penang which met at Canberra 9-11 November, 88 has in a Declaration urged W.H.O. to re-open the issue and also called for a world-wide moratorium on further use and development of food irradiation until various issues were sorted out. This is considered feasible since safe alternatives already exist, which can be further developed. Agency has been created under the Secretary, Ministry of Health, as Chairman to deal with all matters relating to irradiation of foodstuffs.

It does seem surprising that while this country faces the imminent prospect of its irradiated food exports being banned in several countries and boycotted in others, it is going ahead with building 5 new commercial irradiators (hopefully not for exports).

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