

TO irradiate or not? That is the question. The issue involved is simple: is irradiated food—in this case, wheat—safe for human consumption? A year-old row over the matter between two premier research institutions, one of which belongs to the Department of Atomic Energy (DAE) and the other to the Ministry of Health, has recently burst into the open. And as wheat is the staple diet of much of the Indian population, the question has assumed enormous significance.

Work on the radiation preservation of foods has been going on at the DAE's Bhabha Atomic Research Centre (BARC) in Bombay for quite some time. The BARC has long been a proponent of the radiation method and has been urging the authorities to grant health clearance to specific low-dose food irradiation processes.

"Chemical disinfection methods such as fumigation require repeated application because they do not eliminate insect eggs. They may also leave harmful residues in the treated grain. Irradiation, on the other hand, is a one-shot process that completely kills or sterilises the common grain pests, their pupae, larvae and even the eggs deposited inside the grains." Commending the radiation method thus, Director of the BARC, R. Ramanna, said in a lecture at a Bangalore college last year: "The work carried out at the BARC, especially on wheat, potatoes and onions, clearly shows that preservation of foods by radiation is not only economic but safe according to all standards; the earlier we adopt this method the better it is".

But the National Institute of Nutrition (NIN) in Hyderabad has stated (in its annual report for 1974) that irradiated wheat could be hazardous to health. Specifically, it claims to have found that: (a) consumption of irradiated wheat by both animals and humans caused them to develop polyploidy—a condition characterised by more than the normal number of chromosomes in cells; (b) rats which were fed on irradiated wheat and which developed abnormal or polyploid cells transmitted these chromosomal abnormalities to their offspring; (c) mutations took place faster in animals that ate irradiated wheat; (d) there was a significant reduction in reproductive cells in malnourished rats on irradiated wheat diet; and (e) incidence of polyploidy was reduced if irradiated wheat was stored for 12 to 14 weeks before consumption.

As soon as these findings were made public the DAE responded by repudiating the NIN claim. It maintained that its own experiments (at the BARC) had not revealed any of the 'hazards' referred to by the NIN. In support, the DAE statement mentioned that, on the

basis of similar feeding trials with laboratory animals, several countries (including the USA, the USSR, Canada, France, Holland and Denmark) had declared a variety of irradiated foods as safe and wholesome for unlimited human consumption. Moreover, specialised UN agencies like the Food and Agriculture Organisation (FAO) and the World Health Organisation (WHO), it said, had rejected contentions that irradiated wheat was meant exclusively for animals and not for human beings. The DAE also refuted the charge that it had "already spent crores" in setting up laboratories

Row over irradiation of wheat

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and equipment for radiation preservation of food.

Following this the NIN repeated its earlier warning about hazards from irradiated wheat and answered criticism of its findings. It said it had experimented with children only after "totally accepting" the DAE claim that its studies had shown irradiated wheat to be "harmless". (Although irradiated wheat was earlier found by the NIN to cause polyploidy it went ahead and fed this diet to five malnourished young children aged two to five for six weeks. This attracted severe criticism from many quarters.) But, "when we fed children irradiated wheat and found abnormal cells in circulation the study was promptly terminated", the statement added.

The DAE observation that polyploid cells in fact occurred naturally in humans and animals was countered by pointing out that in its (NIN's) experiments "feeding of irradiated wheat was consistently associated with a four- to ten-fold increase in the number of polyploid cells"; this was found to be true in rats, mice and monkeys irrespective of the protein content of the diet or the age of the animal. Although conceding that the precise significance of increased polyploidy was perhaps something that could be debated, the NIN statement pointed out that this condition had been generally associated with a kind of cancer.

The NIN denied the DAE charge that it had either underplayed or tried to conceal its own finding that the 'hazards' mentioned by it were absent when irradiated wheat was stored for over 12 weeks before consumption. But, the statement said, the NIN studies had further shown that the production of aflatoxin poison was considerably greater in stored irradiated wheat and potatoes than in the corresponding unirradiated foods. The NIN

also noted that, in the case of onions and potatoes, rotting rather than sprouting was a major problem in India and that irradiation seemed to accelerate rotting even though it did stop sprouting. (This observation was in reference to the fact that the BARC had been devoting considerable attention to preventing sprouting in onions and potatoes, instead of concentrating on the problem of rotting.)

The NIN statement said in the end that it did not look upon the matter as a prestige issue; "we are always prepared to look in all objectivity at any new evidence which may throw an entirely new light on the problem".

While the two institutions continue to exchange charges and arguments over apparently conflicting results, an expert technical committee has called for further "joint studies by the DAE and the NIN on post-irradiation storage problems of irradiated wheat and potatoes". This committee, headed by Dr M. S. Swaminathan (Director-General of the Indian Council of Agricultural Research), was set up last year at the instigation of the Prime Minister to go into the whole matter of the safety of irradiated wheat, onions and potatoes.

The committee, in its report submitted recently to the Ministry of Health, has steered clear of the safety question. In view of the problems of aflatoxin production during storage of wheat and potatoes (in the latter case, rotting as well), the government, the committee said, could consider clearing irradiated wheat and potatoes for sale only after insisting on proper storage—a minimum of six months for wheat and four months for potatoes.

The committee based its report on studies in India on wheat and on data from other countries in the case of potatoes, since none was available from India. In the case of onions, no studies had been carried out in India and the committee were of the view that studies abroad were "not yet conclusive about the safety of irradiated onions for human consumption". So it declined to make a recommendation at this stage.

In view of the serious differences between the NIN and the DAE over irradiated wheat, the Swaminathan committee called for an expert evaluation of the data by a team consisting of a statistical expert from the Maharashtra Association for Cultivation of Science and a geneticist from the Jawaharlal Nehru University. The committee also suggested that an inter-ministerial technical group should examine the techno-economic questions, the cost-benefit analyses and the feasibility of adopting radiation technology for food preservation on a large scale. □