



# Facts about Food Irradiation

## Q:

## A:

**1** Some media reports claim that studies in India have shown that eating irradiated food causes development of abnormal chromosomes — is this true?

### *Genetic Studies*

**1** No. The issue of abnormal chromosomes as a result of eating irradiated food has been more sensationalized than any other.

The claims focus on the incidence of “polyploidy”, which is alleged to result from consumption of products made from wheat immediately after irradiation. Polyploidy means a multiple set of chromosomes. Human cells normally have 46 chromosomes. If they are polyploid they could have 92 or even 138 chromosomes. The incidence of polyploid cells is naturally occurring and varies among individuals; the significance of polyploidy is not known.

Media reports frequently cite results that were published in the mid-1970s by a group of scientists from the National Institute of Nutrition (NIN) in India. The scientists reported increases in the frequency of polyploid cells in rats, mice, monkeys, and even malnourished children that they attributed to consumption of products made from wheat immediately after irradiation at 0.75 kilogray. No polyploidy at all was seen when wheat was irradiated and stored for 12 weeks before consumption. A number of institutions in India and elsewhere have tried to repeat the studies conducted at NIN based on information made available to them. None of these institutions could come up with results similar to those found at NIN.

#### **INTERNATIONAL CONSULTATIVE GROUP ON FOOD IRRADIATION (ICGFI)**

*Joint FAO/IAEA Division of Nuclear Techniques  
in Food and Agriculture  
Wagramerstrasse 5, P.O. Box 100  
A-1400, Vienna, Austria*





Feeding studies using irradiated food have been done in many countries, including China. Chinese irradiation facilities are operating in Shanghai and other cities to process fruits and other foodstuffs.



mal range of the overall value of polyploid cells in participants. ■

**3** What are some of the other studies that have been done in this area?

**3** Some other studies are occasionally cited as corroborating the NIN research. They include one by D.T. Anderson and colleagues reported in 1981. This study, which looked at dominant lethal mutations in mice that were fed irradiated diets, was among those reported by MacPhee and Hall, advisers to a parliamentary committee in Australia, as failing to replicate the NIN results. Another study sometimes cited as supporting the NIN research examined the level of polyploidy in the bone marrow cells of Chinese hamsters fed freshly irradiated laboratory animal diets. These diets were irradiated at 100 kilogray, a dose at least 125 times higher than that used for

the NIN studies, and 10 times the internationally recommended limit for food irradiation. Frequently *not* cited is the author's own conclusion about the significance of his study: "*There is no evidence for any mutagenic effect being produced as a result of testing an irradiated diet*".

Extensive feeding tests have validated this conclusion. Over the last 20 years millions of mice, rats, and other laboratory animals have been bred and reared exclusively on an irradiated diet. The diet, treated at doses between 25 and 50 kilogray, has been fed to laboratory animals at many institutions involved in food, drug, and pharmaceutical research in Austria, Australia, Canada, France, Germany, Japan, Switzerland, United Kingdom, and United States. No transmittable genetic defects — teratogenic or oncogenic — have been observed which could be attributed to the consumption of irradiated diets. □

original contains  
color illustrations

#### **Scientific and Technical References:**

"An Analysis of the Safety of Food Irradiation: Genetic Effects", by D. MacPhee and W. Hall. *Use of Ionizing Radiation*. Report of the House of Representatives Standing Committee on Environment, Recreation and the Arts, AGPS, Canberra (1988).

"Irradiated Laboratory Animal Diets. Dominant Lethal Studies in the Mouse", by D.T. Anderson et al., *Mutation Research*, 80 (1981).

*Safety of Irradiated Foods*, by J.F. Diehl. Marcel Dekker Inc., New York (1990).