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FOOD SAFETY ADVISORY COMMITTEE

Irradiated Food
Second Report

Report to the Minister for Health
and the
Minister for Agriculture, Food and Forestry

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REPORT NO. 19 SEPTEMBER 1994

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Content

Foreword

The Food Safety Advisory Committee was directed by Mr. Willie O'Dea, T.D., Minister of State at the Department of Health with particular responsibility for Food Safety, to report to him on developments in the area of Irradiated Food and to update the information contained in the Committee's first report on this topic which was compiled in December 1989.

In accordance with the Minister's policy this report is now published for public information.

Fergus Hill.

Dr. Fergus Hill
Chairman
Food Safety Advisory Committee
September 1994.

Food Safety Advisory Committee

The Food Safety Advisory Committee was established by the Minister for Health and the Minister of Agriculture, Food and Forestry in July, 1989.

Terms of reference

To advise the Minister for Health and the Minister for Agriculture, Food and Forestry on matters relating to food and zoonotic diseases referred to it and to make recommendations to the Ministers.

Current Membership of the Food Safety Advisory Committee

Dr. Fergus Hill (Chairman)	Dublin Region Public Analyst Eastern Health Board
Professor Charles Daly	Faculty of Food Science & Technology University College Cork
Mr. Martin Devine	Principal Environmental Health Officer Eastern Health Board
Dr. Hugh Dolan	Public Health Specialist
Mr. Raymond Ellard	Chief Environmental Health Officer Department of Health
Mr. James Flanagan	Deputy Chief Inspector Department of Agriculture, Food & Forestry
Professor John Flynn	Consultant Bacteriologist University College Hospital, Galway
Mr. Colm Gaynor	Director of Veterinary Services Department of Agriculture, Food & Forestry
Professor Michael J. Gibney	Department of Clinical Medicine Trinity College Dublin
Professor John Hannan	Faculty of Veterinary Medicine University College Dublin
Miss Maura Nolan	Food Division Department of Agriculture, Food & Forestry
Dr. Timothy O'Dwyer	Former Deputy Chief Medical Officer Department of Health
Mr. Tom Power	Public Health Division Department of Health
Mr. Michael Mulkerrin Mr. Billy McCarthy (Secretariat)	Department of Health, Hawkins House, Dublin 2.

IRRADIATED FOOD SECOND REPORT

Summary

The Food Safety Advisory Committee first reported on Irradiated Food in December, 1989 (Report No. 1 is reproduced in the Appendix).

The Committee endorses its previous recommendation that irradiation of foodstuffs is an acceptable and safe practice when carried out in accordance with the Codex Alimentarius Commission general standard for irradiated food and the Codex Code of Practice for the operation of radiation facilities for irradiated foods in international trade. The practice has the potential for reducing food wastage and spoilage.

IRRADIATED FOOD

Second Report

Irradiating food is a highly effective way of extending the shelf live of perishable food. The process preserves food by destroying the micro-organisms that cause spoilage. It kills parasites and dangerous micro-organisms such as salmonella. It also kills insects and their larvae and eggs. It slows the ripening of some fruits and inhibits the sprouting of potatoes and onions. TABLE 1 shows useful effects of food irradiation.

Irradiation kills microorganisms and insects by fragmenting DNA. It alters biochemical reactions such as those involved in fruit ripening and interferes with cell division, which is necessary for the reproduction of parasites and the sprouting of vegetables.

PUBLIC PERCEPTION OF IRRADIATED FOODSTUFFS

In many countries (exceptions being Canada and South Africa) the consumer reaction to foodstuffs labelled as irradiated "or treated with gamma radiation" or with any other term suggestive of the word radiation is most likely to be negative. Irradiation often suggests to the man on the street, Chernobyl, danger, nuclear waste, vitamin destruction and cancer. Much of the controversy is due to false perceptions and emotional responses by people who are not familiar with the scientific facts.

A major misconception is that irradiation of food induces radio-activity in the food. Under conditions relevant for the irradiation of foodstuffs, the quantum energy of electrons and photons is low. As the Scientific Committee for Food in its Report (Eighteenth Series) point out "as long as good radiation processing practice is complied with, no measurable radio-activity will be induced in irradiated food and no health problems can be associated with this issue". Radio-active foods are foods containing radio-active isotopes or in more modern terminology radio-nuclides whereas irradiated foods are foods that have been treated with ionising radiation. In May 1986, radio-active contamination of crops occurred in many European countries following the radio-active cloud emitted from the ruins of the nuclear-reactor at Chernobyl in the Ukraine. Media reports spoke of radio-active foods, radiated foods, radiating foods or irradiated foods as if these terms were synonymous. It should be kept in mind that naturally radio-active elements are found in all foods particularly isotopes of potassium (40K), carbon (14C) and hydrogen (3H or Tritium). Foods consumed by an adult in one day contain about 150/200 Bq (Becquerel) of natural radio-activity.

The Food and Drug Administration in the United States in its Regulations on Food Irradiation (final rule of April, 18th 1986) stated "because no evidence has been submitted to contradict F.D.A.'s finding that the irradiation of food does not cause the food to become radio-active, no further discussion of this issue is necessary."

A food irradiation plant is not a nuclear reactor. It is a processing plant containing a shielded area where foods are exposed to a source of ionizing radiation from Cobalt 60. The latter cannot explode and is insoluble in water and therefore cannot contaminate water supplies.

Food irradiation plants and medical products irradiators do not pose any risk to the local community any more than do hospital radiation therapy units. The necessary precautions for worker safety in a food irradiation plant are well understood as a result of long experience in designing and operating medical equipment radiation facilities. The Radiological Protection Institute would be the licensing authority in Ireland for food irradiation plants.

NUCLEAR WASTE

Some people claim that food irradiation is carried out with nuclear-waste materials and that the nuclear industry wants food irradiation to get rid of the waste with a profit. Most irradiators use Cobalt 60 as a radiation source. This is not a nuclear-waste material. Some irradiators like the large wheat irradiation facility in the harbour of Odessa are electron accelerators. These machines have nothing to do with the nuclear industry. Spent fuel rods from nuclear reactors are not suitable for commercial food irradiation. While the fuel rods are a source of gamma-radiation they do give off some neutrons. Since the latter introduce radio-activity when they interact with matters such as food, fuel rods are not suitable for irradiating food. Another problem with the use of fuel rods is that they have varying composition thus making dosimetry difficult.

NUTRITION ASPECTS

The Scientific Committee for Food reported that most of the components of food are not significantly changed by irradiation processing. However, some vitamins (vitamins B, C and E) and the polyunsaturated fatty acids may be affected. The extent of losses of such nutrients due to food irradiation depends on several factors - which include the type of food, temperature, and the presence of air. There is no evidence that technologically appropriate treatment up to 1 Kilogray will cause major nutrient losses in any foods but higher doses may cause significant losses of some essential nutrients in some food. This can be prevented only by proper technological precautions during irradiation and storage. In general, nutrient losses caused by food irradiation are unlikely to be significantly different from those induced by other methods of processing and storage. The Committee pointed out that the overall importance of nutrient losses in an irradiated food depends on the importance of the specific food to the total diet. There is no evidence that irradiation significantly influences the nutritional quality of foods or that any effects which do occur differ from those found with traditional food processing or indeed domestic cooking.

RADIOLYTIC PRODUCTS

Whenever food is heated a very small amount of the nutrients react with water to produce hydrolytic products. In the case of ordinary cooking methods, these products could be called thermolytic products. In the case of irradiated food they are called radiolytic products.

Radiolytic products are chemical compounds formed by exposure to ionizing radiation. Such compounds are formed in food processed by irradiation and they are identical or similar to compounds found in food processed by other techniques - such as cooking or even in unprocessed foods. All radiolytic products identified to date are similar to compounds commonly found in food. They are not unique in the sense that they occur only as a result of radiation. There is no evidence that any of these substances pose a danger to human health.

MUTAGENS

Chemicals and other agents capable of damaging cells are called mutagens. Food, irradiated or not, naturally contains some mutagens. They can be formed by conventional food processing methods whose safety is accepted. There is no evidence that irradiated foods present any increased risk of exposure to mutagens than do conventionally processed foods.

CANCER

Irradiated-sterilised chicken meat (1) irradiated with a dose of 58 Kilogray by either electrons or gamma rays was fed to dogs, rats and mice for carcinogenicity testing. Teratology studies (tests for possible damage to embryo or foetus during gestation) were conducted with mice, hamsters, rats and rabbits. Additional tests used the fruit fly Drosophila. More than 230,000 eviscerated broilers were used to produce 134 metric tons of chicken meat. The studies lasted seven years. The studies did not demonstrate a treatment related increase in cancer rate or any adverse effects.

POLYPLOIDY

A report of increased polyploidy in malnourished Indian children who consumed freshly irradiated wheat for 4 to 6 weeks is frequently cited as evidence that irradiated foods may be harmful. The effect was not seen when wheat stored for 12 weeks after irradiation was used. Polyploidy means the occurrence, as detected under the microscope, of cells containing twice or more the normal number of chromosomes. Human cells normally have 46 chromosomes. If they are polyploid they have 92 chromosomes and occasionally 138 or even more. The research results from the National Institute of Nutrition in India were published between 1975 and 1978. The findings were discussed at length by the Joint Expert Committee on Food Irradiation and by various national agencies and expert groups who came to the conclusion that the studies did not demonstrate adverse affects. The studies claimed effects which were based on small numbers. They were of questionable statistical significance and were not considered to be an indication of a pathological situation. As far as these studies were repeated by other groups with much larger numbers the results were not confirmed. No mutagenic affect was observed in a study with monkeys fed wheat only 24 hours after irradiation using a different type of assay.

CHINESE STUDIES ON IRRADIATED FOOD

In April 1986, a conference on food irradiation was held in Shanghai, (2). Chinese investigators reported that they had conducted a large series of studies on human volunteers in which a wide variety of biological indicators, including polyploidy had been measured. In none of the studies had any effect of consuming irradiated food been observed. The most convincing study was on volunteers who were fed 13 to 15 weeks on a diet consisting wholly

of irradiated food. In all of these studies the incidence of polyploidy was measured. In no study, did it occur at a higher rate among those who were fed on irradiated food. In another study 70 volunteer medical students were randomly assigned to receive an irradiated or non-irradiated diet comprising 35 different foodstuffs for 90 days of the experiment. A wide variety of medical end points were measured including body-weight, blood and urine, genes test for mutagenicity of the subjects' urine collected over 24 periods. At the end of the 90 days trial the means for both groups were not statistically significantly different.

BOTULISM RISK

When fish are exposed to low doses of radiation to extend their shelf life, the radiation sensitive bacteria which normally cause spoilage are considerably reduced in number. The public health concern is that under these conditions the more radiation resistant Type E Clostridium botulinum, if present, would grow faster than the organisms which remain and toxin could be produced before the fish is rejected because of the obvious spoilage. Eyles and Worth (3) made an assessment of this risk for vacuum packaged fish. As long as vacuum packed raw fish are handled with the same precautions that apply to other fresh fish and proper instructions for handling of the product are prominently incorporated into the labelling, the risk of an outbreak appears remote.

Type E spores are injured at 3 Kilogray and do not grow at 100°C. Cooking for 30 minutes at 80°C is required to destroy the toxin. No cases of botulism have been associated with cooked fish.

PRODUCTION OF IRRADIATED FOOD

Each year, about half a million tons of food products are irradiated in 21 countries mainly in Eastern and Western Europe (4) The technology of food irradiation is permitted in 36 countries and is in use in the Netherlands, Belgium, France and Italy. In June 1991, the Ministry of Agriculture, Fisheries and Food issued the first licence in the United Kingdom for the irradiation of dried spices and condiments. For many years hospitals in the United States and in the United Kingdom have used irradiated foods for patients who have to be kept in a complete sterile environment because of their susceptibility to bacterial or viral infections. United States and Russian astronauts have also been fed irradiated diets.

In 1988, the FAO/IAEA/WHO (5) Joint Expert Committee on Irradiated Food came to the conclusion that further toxicological testing of foods irradiated in the dose range of up to 10 kilogram is not required.

LABELLING OF IRRADIATED FOODS

In the case of prepackaged foods which have been irradiated the European Union requires declaration of the irradiation. Foods which contain irradiated ingredients are at present exempt from the declaration requirement. The Directive 89/395/EEC of 14th June 1989 amends the Labelling Directive 79/112/EEC and requires foods which have been irradiated to carry an indication of the treatment in the name of the food. "Irradiated" or "treated by ionizing radiation" must be used. Restaurants and other catering outlets must inform consumers if

irradiated food is offered. The European Communities (Labelling, Presentation and Advertising of Foodstuffs) (Amendment) Regulations, 1991 (S.I. No. 228 of 1991) implement Directive 89/395/EEC in the Republic of Ireland. The Regulations became operative on the 26th June, 1991.

DETECTION OF IRRADIATED FOODS

The United Kingdom's Ministry of Agriculture, Fisheries and Food has approved a Research and Development Programme on detection tests for irradiated food. Summaries of sixteen detection tests have been published in June 1994 (6).

The European Commission's Community Reference Bureau Programme on researching methods for the detection of irradiated food has validated three methods of analysis -

(i) Electron spin resonance (ESR),
(ii) Thermoluminescence and
(iii) DEFT/APC (Direct Epifluorescence Filter Technique/Aerobic Plate Count).

ELECTRON SPIN RESONANCE

Electron Spin Resonance (ESR) (7) allows the observation of unpaired electrons which arise from the production by irradiation of free radicals. ESR can be used as an identification test if the radicals are stable during commercial storage of the particular food. This is only the case in the solid and dry states where the reacting of the radicals with each other or with water is low. The method can be used for meat and fish bones, seeds and stones of fruits and shells.

THERMOLUMINESCENCE

The method (8) permits the detection of irradiated samples of all varieties of herbs and spices. Silicate minerals adhering to the surfaces of herbs and spices store energy by charge trapping processes as a result of exposure to ionising radiation. Releasing such energy by controlled heating of separated mineral extracts, gives rise to measurable thermoluminescence glow curves. Sample sensitivity is evaluated by re-irradiation to a standard dose followed by repeat thermoluminescence analysis. Irradiated samples are distinguished from non-irradiated samples on the basis of first and second glow thermoluminescence ratios, coupled to glow shape parameters.

DIRECT EPIFLUORESENCE FILTER TECHNIQUE (DEFT)/AEROBIC PLATE COUNT (APC)

Betts (9) proposes a combination of a direct epifluorescent filter technique (DEFT) count and an aerobic plate count (APC) as the basis for the detection of irradiated raw food. The DEFT count remains at pre-irradiated levels. Samples in which the DEFT count is significantly higher than the APC could have been irradiated. DEFT is based on a direct microscopic count of micro-organisms filtered from a food sample and stained with the fluorescent stain acrolein orange. In raw food samples viable cells stain orange and non-viable ones stain green. The count of orange fluorescing cells correlates with the total viable count.

AMERICAN MEDICAL ASSOCIATION ENDORSES FOOD IRRADIATION

In December 1993, the Board of Delegates of the American Medical Association endorsed food irradiation as part of a comprehensive food safety program. The Board was approving the recommendations of AMA's Council on Scientific Affairs, which urged:-

1. That the AMA affirm food irradiation as a safe and effective process that increases the safety of food when applied according to governing regulations.

2. That the AMA considers the value of food irradiation to be diminished unless it is incorporated into a comprehensive food safety program based on good manufacturing practices and proper food handling, processing, storage and preparation techniques.

3. That the AMA encourage the Food and Drug Administration and United States Department of Agriculture to continue the requirement that all irradiated fruits, vegetables, meats and seafood carry the international logo that has become recognized as indicating that the food has been subjected to gamma irradiation.

4. That the AMA affirm the principle that the demonstration of safety requires evidence of a reasonable certainty that no harm will result but does not require proof beyond any possible doubt (i.e. 'zero' risk does not exist).

WORLD HEALTH ORGANISATION (WHO)

A forthcoming World Health Organisation publication on Safety and Nutritional Adequacy of Irradiated Food concludes:-
Irradiated food produced in accordance with established good manufacturing practice can be considered safe and nutritionally adequate because the process of irradiation:

- will not lead to changes in the composition of the food that, from a toxicological point of view, would have an adverse effect on human health

- will not lead to changes in the microflora of the food that would increase the microbiological risk to the consumer

- will not lead to nutrient losses to an extent that would have an adverse effect on the nutritional status of individuals or populations.

EUROPEAN UNION POSITION

In the European Union opposition to food irradiation comes from Germany, Denmark, Luxembourg and Spain. The opposition appears to be related to questions of political and consumer acceptability in these States rather than on scientific or medical evidence.

RECOMMENDATIONS

The Committee reiterates its previous opinion that irradiation of foodstuffs is an acceptable and safe practice when carried out in accordance with the Codex Alimentarius Commission general standard for irradiated food and the Codex Code of Practice for the operation of radiation facilities for irradiated foods in international trade. The practice has the potential for reducing foodborne waste and spoilage.

The Committee points out that the Radiological Protection Institute of Ireland would be the licensing authority for food irradiation units in this country and that responsibility for statutory controls in respect of irradiated foodstuffs should fall on the particular government department which has responsibility for the foodstuff in question. In the case of imported foodstuffs the Committee recommends that all importers be obliged to inform the Food Control Authorities of each item of imported foodstuffs which has been irradiated or contains irradiated ingredients and failure to notify the authorities should be made a criminal offence.

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3. Food Technol Aust 33,578 (1981)
4. IAEA News Features - December 1988
5. FAO - Food and Agricultural Organisation
   IAEA - International Atomic Energy Agency
   WHO - World Health Organisation
6. Food Science and Technology Today 8(2)94
7. REPORT EUR 13630,1992
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   Report V27, 1992 - Ministry of Agriculture, Fisheries and Food
9. REPORT EUR 13331, 1991
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TABLE 1

Useful effects of Food Irradiation		
EFFECT	Some Foods	Dose Range (Kgy)
Inhibition of sprouting	Tubers, bulbs	0.05 - 0.15
Insect disinfestation (quarantine)	Cereals, fruits	0.2 - 1.0
Parasite inactivation (e.g. Trichina, Taenia, Toxoplasma, Opisthorcis)	Meat, fish	0.02 - 6.0
Delaying ripening & senescence	Fruit, vegetables	0.2 - 0.5
Reduce spoilage	Fruit, vegetables	0.5 - 5.0
Destruction of pathogens (pasteurisation) (e.g. Salmonella, Campylobacter, Listeria)	Meat, poultry	3.0 - 10.0
Commercial Sterilisation (destruction of spores of Clostridium and Bacillus)	Meat, Poultry	10 - 50

Taken from Campbell-Platt -Proceedings 11th International Symposium World Association of Veterinary Food Hygienists. October 1993.

Appendix

FOOD SAFETY ADVISORY COMMITTEE,

Report No. 1

on "IRRADIATED FOOD"

December 1989.

Summary

The Food Safety Advisory Committee recommends that the Draft Directive 88/336/06 *"Proposal for a Council Directive on the approximation of the laws of the Member States concerning foods and food ingredients treated with ionizing radiation"* be accepted in principle, because the technology presents no hazard to the health of the consumer when applied in accordance with the conditions proposed, and it will be another weapon in the armoury against foodborne diseases, and will help to reduce spoilage of foodstuffs.

Irradiated Food

CODEX ALIMENTARIUS COMMISSION STANDARD FOR IRRADIATED FOOD

In 1980, the Joint FAO/IAEA/WHO* Expert Committee accepted the safety of the process of irradiation for the preservation of food, up to an overall average dose of 10kGy (1kGy = 1000 Joules absorbed per kilogram of mass). As a consequence of this decision the Codex Alimentarius Commission developed a general standard for irradiated food, and a code of practice, for the operation of radiation facilities for irradiated foods in international trade.

SCIENTIFIC COMMITTEE FOR FOOD

In 1986, the E.E.C. Scientific Committee for Food, (18th Series), reported on the wholesomeness of foods irradiated by suitable procedures. The report indicated that the major benefits of irradiating food are associated with the possibility of controlling many rather common health hazards related to several foodborne parasitic diseases, such as trichinosis, taeniasis, and those associated with the presence of salmonella, campylobacter and toxoplasma in meat and poultry, and of Shigella, Vibrio parahaemolyticus and enteropathogenic Escherichia coli in deep frozen sea food.

Table 1 lists the food classes and radiation doses submitted to the Scientific Committee for Food, and considered by the Scientific Committee to be acceptable from a public health stand point. The Scientific Committee believes that the health significance of any changes which may take place in the listed foods at the indicated radiation doses is not different from the health significance of the changes which are induced by heat treatment.

APPROVAL IN 36 COUNTRIES

At present health authorities have approved the irradiation of more than 40 different foods in 36 countries. Twenty-one of these countries are actually applying the process, including the United States (spices), France (spices, dehydrated vegetables, mechanically separated frozen chicken meat), Netherlands (spices, frozen products, poultry, dehydrated vegetables, rice), and Belgium (spices, dehydrated vegetables, frozen sea-food). Food irradiation is shortly to be

* F.A.O. = Food and Agricultural Organisation
I.A.E.A. = International Atomic Energy Agency
W.H.O. = World Health Organisation

allowed in the United Kingdom but its use will be strictly controlled, and all foods treated will have to be clearly labelled. The process is already in use in the United Kingdom for the treatment of food for some hospital patients with some very severe illnesses. Astronauts have also been fed on irradiated food. Governments are also interested in the process because it has the potential to reduce the incidence of food borne diseases and widespread post-harvest food losses, and losses due to premature ripening, germination and sprouting. The process uses the radiation energy of gamma rays from radionuclides of cobalt 60 or caesium 137 or X rays generated from machine sources operated at or below an energy level of 5 MeV or electrons generated from machine sources operated at or below an energy level of 10 MeV.

The United Kingdom Advisory Committee on Irradiated Novel Foods in 1986, under the Chairmanship of Sir Arnold Burgen, Master of Darwin College, Cambridge, was satisfied as to the safety and wholesomeness of food that would result from irradiation and made it clear, that for all practical purposes, there would be no change in the low level of radioactivity that food naturally contains.

EFFECTIVE AGAINST SALMONELLA, LISTERIA & CAMPYLOBACTER

Irradiation has been shown to be effective in dealing with bacteria such as salmonella, listeria and campylobacter. Therefore, the process has a useful contribution to make in the reduction of some foodborne diseases. For herbs and spices, irradiation can be used to destroy insects and bacterial contamination in place of the existing chemical fumigation methods. It should be noted that irradiation cannot improve appearance, cannot disguise taste, and it cannot mask unpleasant odours. Irradiation cannot make "bad" food good, but it can enhance safety margins in food which is microbiologically acceptable at the time of treatment, but which could, without treatment, present a hazard subsequently in the distribution, retailing or catering chain. Food irradiation is not a substitute for Good Manufacturing or Good Agricultural Practice.

NUTRITIONAL ASPECTS

The components of food are not significantly changed by irradiation. However, some vitamins (B, C and D) and the polyunsaturated fatty acids may be affected. The extent of losses of such nutrients, due to food irradiation, depends on several factors which include the type of food and the irradiation conditions and the storage conditions. There is no evidence that the treatment up to 1kGy causes major nutrient losses in any foods, but higher doses may cause significant losses of some essential nutrients. The Scientific Committee for Food pointed out that in general, nutrient losses caused by food irradiation are unlikely to be significantly different from those induced by other methods of processing and storage. The Scientific Committee indicated that the overall importance of nutrient losses in an irradiated food depends on the importance of the specific food in the total diet.

CHANGES IN TASTE AND SMELL

Most foods are not noticeably affected by radiation processing. However, milk is not suitable for treatment because of off-flavour development. Irradiation can also cause colour changes in meats and the softening of some fruits. The extend of these changes is minor in comparison to changes due to other processing methods.

MICROBIOLOGICAL CHANGES

Irradiation damages living organisms mainly at the sites of the genetic system, by altering micro-molecular cellular components such as DNA, RNA and other micro-proteins. Because the molecular weight of DNA is about one million times that of an amino acid, fatty acid or monosaccharide, and because the number of chemical changes in a molecule, after irradiation, is roughly proportional to its molecular weight, the sensitivity of DNA to irradiation damage is about one million times that of basic food constituents. Therefore bacteria are much more sensitive to radiation because they consist largely of DNA . Bacterial spores however, are radiation resistant. Opponents of food irradiation frequently argue that because of the greater radiation resistance of Clostridium botulinum spores compared with spores of certain spoilage organisms, there is a possibility that Clostridium botulinum surviving in irradiated food, might grow without the parallel growth of spoilage organisms, which would render the food inedible.

However, as the Burgen Report points out, the protection against Clostridium botulinum poisoning in conventionally processed foods, does not rely primarily on other organisms producing food spoilage, but rather on adequate microbiological evaluation of the process and storage conditions. The Burgen Committee was satisfied that there was no special hazard, for example in irradiated fish, which cannot be satisfactorily evaluated and avoided, using standard microbiological and technological methods.

PROPOSAL FOR A COUNCIL DIRECTIVE ON THE APPROXIMATION OF THE LAWS OF THE MEMBER STATES CONCERNING FOODS AND FOOD INGREDIENTS TREATED WITH IONISING RADIATION

The Draft Directive 88/336/06 based on Article 100a of the Treaty of Rome was submitted by the Commission to the Council on the 9th December, 1988. Under Article 5, irradiated foodstuffs may be marketed only if the package or container bears the following information "Irradiated" or "Treated With Ionising Radiation" (see Council Directive of 4th June, 1989, 89/395/EEC which amends Directive 79/112/EEC). In the case of foodstuffs containing irradiated ingredients, the Council Working Party on Foodstuffs on the 18th July, 1989, decided that specific rules should be adopted for irradiated ingredients within limits yet to be determined. The view of the Food Safety Advisory Committee on this matter, is that all irradiated ingredients should appear in the list of ingredients. The Committee's view is that the label must tell the whole truth in the consumer's interest.

Under Article 9, materials used for the packaging of foodstuffs to be irradiated shall be appropriate for the purpose. Table 3 shows a list of the United States, Food and Drug Administration approved packaging materials for irradiation processing. Under Article 8, irradiated foodstuffs may not be imported from a third country, unless they comply with the provisions of the Directive, and the documents accompanying any consignment of the foodstuffs provide the identity and address of the unit which has carried out the irradiation, and further details as specified in Article 7. Article 8 also demands official confirmation, for individual units carrying out food irradiation that official supervision is exercised in the third country ensuring that the conditions in which irradiation is carried out are equivalent to those laid down in Article 6 of the Directive. Article 8 also points out that the Commission may arrange for Community inspection of irradiation plants in third countries.

RECOMMENDATION OF ACCEPTANCE IN PRINCIPLE OF THE DRAFT DIRECTIVE

The Food Safety Advisory Committee is of the opinion that because of the potential to reduce foodborne diseases and to prevent food wastage without any risk to public health the Draft Directive 88/336/06 should be accepted in principle. Also by strictly regulating the irradiation treatment of food, and by requiring labelling informing the consumer, the Directive affords the consumer safeguards, and the right of choice, which he did not previously enjoy.

The Committee further recommends that a licensing authority for irradiation units in this country be established, and that responsibility for statutory controls in respect of irradiated foodstuffs should fall on the particular government department which has responsibility for the foodstuff in question. In the case of imported irradiated foodstuffs the Committee recommends that all importers be obliged to inform the Food Control Authorities of each item of imported foodstuffs which has been irradiated or contains irradiated ingredients and failure to notify the authorities should be made a criminal offence.

TABLE 1

Report of the Scientific Committee for Food
(Eighteenth Series)

List of Food Classes and Radiation Doses considered by the Scientific Committee for Food to be acceptable from a public health standpoint.

FOOD CLASS	OVERALL AVERAGE RADIATION DOSE (kGy)
1. Fruits	up to 2
2. Vegetables	up to 1
3. Cereals	up to 1
4. Starchy tubers	up to 0.2
5. Spices and condiments	up to 10
6. Fish and shellfish	up to 3
7. Fresh meats	up to 2
8. Poultry	up to 7

TABLE 2

Draft Directive 88 (336) 06

Foodstuffs authorised for irradiation treatment and maximum radiation doses

FOODSTUFFS	OVERALL AVERAGE RADIATION DOSE (kGy)
1. Strawberries, papayas, mangoes	2
2. Dried fruits	1
3. Pulses (legumes)	1
4. Dehydrated vegetables	10
5. Cereal flakes	1
6. Bulbs and tubers	0.2
7. Aromatic herbs, spices and vegetable seasonings	10
8. Shrimps and prawns	3
9. Poultry meat	7
10. Frogs' legs	5
11. Arabic gum	10

TABLE 3

List of Packaging Materials approved by the United States

Food and Drugs Administration for use in food irradiation processing

PACKAGING MATERIAL	MAXIMUM DOSE (kGy)
Kraft paper	5
Glassine paper	10
Wax-coated paperboard	10
Nitrocellulose-coated cellophane	10
Vinylidene chloride copolymer (Saran) coated cellophane	10
Vegetable parchment	60
Vinylidene chloride-vinyl chloride copolymer film (Saran)	-
Vinyl chloride-vinyl acetate copolymer film	60
Rubber hydrochloride films	10
Ethylene-alkene-1 copolymer	10
Polyethylene films	60
Nylon-6 films	60
Polystyrene films	10
Polyethylene terephythalate films	60

Source: Code of Federal Regulations 21, parts 170 to 199 (1987).

COLLEGE OF SURGEONS
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