Poised for growth... and challenges ahead

As interest in food irradiation mounts, experts outline future steps

by Lothar Wedekind

Since the 1950s, scientists have pursued the promise of food irradiation to help extend the world's harvest and improve the safe preservation and distribution of a variety of foods. Today, the process stands poised for growth following important breakthroughs, yet it still faces growing pains not uncommon to emerging technologies – mainly, those connected to questions of public information and industrial economics.

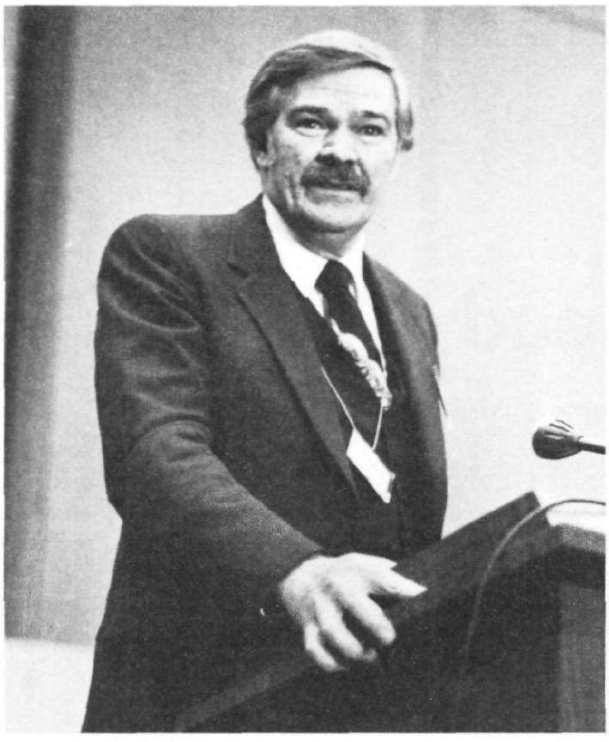
An expert panel of international food irradiation authorities recently emphasized these issues in a report released at the International Symposium on Food Irradiation, hosted in Washington, DC this past March by the United States and jointly organized by IAEA and the Food and Agriculture Organization (FAO). The 10-member panel included representatives from Australia, Ecuador, Egypt, Mexico, the Netherlands, the Philippines, the United Kingdom, and the United States.

Specifically, the panel identified three tasks now requiring attention: demonstration of the technology's economic feasibility, establishment of a uniform legislative framework, and securement of consumer acceptance. Toward these aims, it urged that steps be taken to broaden awareness of food irradiation's benefits, foster and accelerate the technology's commercial development for specific applications, and more sharply focus international co-operation in the field.

The panel stressed that the "technological efficacy" of food irradiation processing, and the absence of any harmful side-effects, already have been satisfactorily demonstrated – a fact deserving greater emphasis, particularly from national authorities.

Mr Wedekind, Editor of the *IAEA Bulletin*, served as press officer at the food irradiation symposium.

Inside the International Facility for Food Irradiation Technology (IFFIT) pilot plant in the Netherlands.



Addressing the symposium, Dr E. Kimbrell, chairman of the Codex Alimentarius Commission. (Photo: D. Caruthers, AIF)

"There is far more knowledge concerning the safety of food irradiation as a physical process, supported by many years of research and development, than is available concerning most other food preservation techniques," the panel's report said. "It is recommended that all government agencies be urged to recognize this fact, and to take all possible steps to facilitate its introduction on a commercial scale, so that this technology can be made available for the benefit of mankind."

Economics: Multi-purpose plants

Regarding food irradiation economics, the panel noted that the selection of the most suitable type and size of irradiation plant is of vital importance in achieving economic viability. A large, centrally located facility built for high volume and intensive use best meets the requirement for low unit cost of treatment. Yet the variable pattern of food production in many developing countries is not suitable for such large-scale operation. Consequently, a smaller, less highly automated plant may be preferable.

In either case, the panel considered it most probable that a multi-purpose plant will prove necessary, at least in the initial period of introduction of the food irradiation process. Such irradiation plants already have been built, or are being planned, in more than a dozen countries, including Bangladesh, Belgium, Brazil, Egypt, Federal Republic of Germany, France, Hungary, Indonesia, Israel, Italy, the Netherlands, the Republic of Korea, South Africa, the USA, and the USSR.*

* See "Food irradiation makes progress," by J. van Kooij, in the June 1984 issue of the *IAEA Bulletin*, Vol. 26, No. 2.

Legislative harmony urged

In the legislative area, the panel pointed out that the introduction of food irradiation processing was "critically dependent" on the existence of a satisfactory system of regulatory control. "While national legislation is of primary importance, international harmonization of food irradiation legislation is an essential factor in the development of international trade," the panel reported. The current "disharmony" of existing and proposed national legislation constitutes a "significant obstacle" to the economic introduction of the food irradiation process, it added.

The best route to regulatory harmony, the panel said, is the Codex General Standard for Irradiated Foods. The Standard, adopted in July 1983 by the Codex Alimentarius Commission of the FAO and World Health Organization (WHO), is valid for all foods treated up to an overall average dose of 10 kilogray. It recognizes that food irradiation has been established as safe for general application up to an absorbed dose of 10 kilogray. Its provisions refer to regulation, technological requirements, labelling, and other factors concerning the processing of food with ionizing radiation. It also assumes that food processed by irradiation, like any other food, will be subject to general food regulations relating to quality, hygiene, weights and measures, and other factors.

Need for public education

In the area of consumer acceptance, the panel emphasized that public education and acceptance is an "essential prerequisite" for food irradiation development, and it urged concerted action among international agencies, governments, and industry to give the public accurate information by all available means.

Efforts should include marketing and promotion, the panel said. "Where marketing and promotion has already taken place," the panel reported, "consumer reaction has almost always been favourable."

Steps for more widespread applications

In its final report, the panel made five specific recommendations to prompt practical commercial uses. It recommended that:

- Programmes to achieve radiation disinfestation of stored foods should be expedited. Such programmes hold out the best prospect of immediate economic advantage, as well as improvements in public health that would result from raising nutritional standards and substituting for the use of chemicals.
- Programmes to achieve radiation disinfestation of fruit as a means of satisfying quarantine requirements should be assigned a high degree of urgency. Here, the benefits are principally economic, the panel reported, in that the use of food irradiation processing could promote international trade. Secondary advantages would lie in the reduction of post-harvest food losses, and the

improvement of public health through replacement of chemical treatments.

- The introduction of irradiation as a means of reducing food-borne disease resulting from contamination by pathogenic micro-organisms also should be pursued. Such applications principally would hold benefits for public health and international trade.
- Potential users of food irradiation processing should be encouraged to bring to the attention of their national authorities the key role of a uniform legislative framework for control of the process, based on the Codex General Standard. The advantages in promoting international trade, with consequent economic and other benefits, cannot be over-emphasized, the panel said.
- Every encouragement should be given to the production of educational and publicity material by national and international organizations and industry, with the aim of achieving the widest possible acceptance of the process by consumers.

Despite problems, progress noted

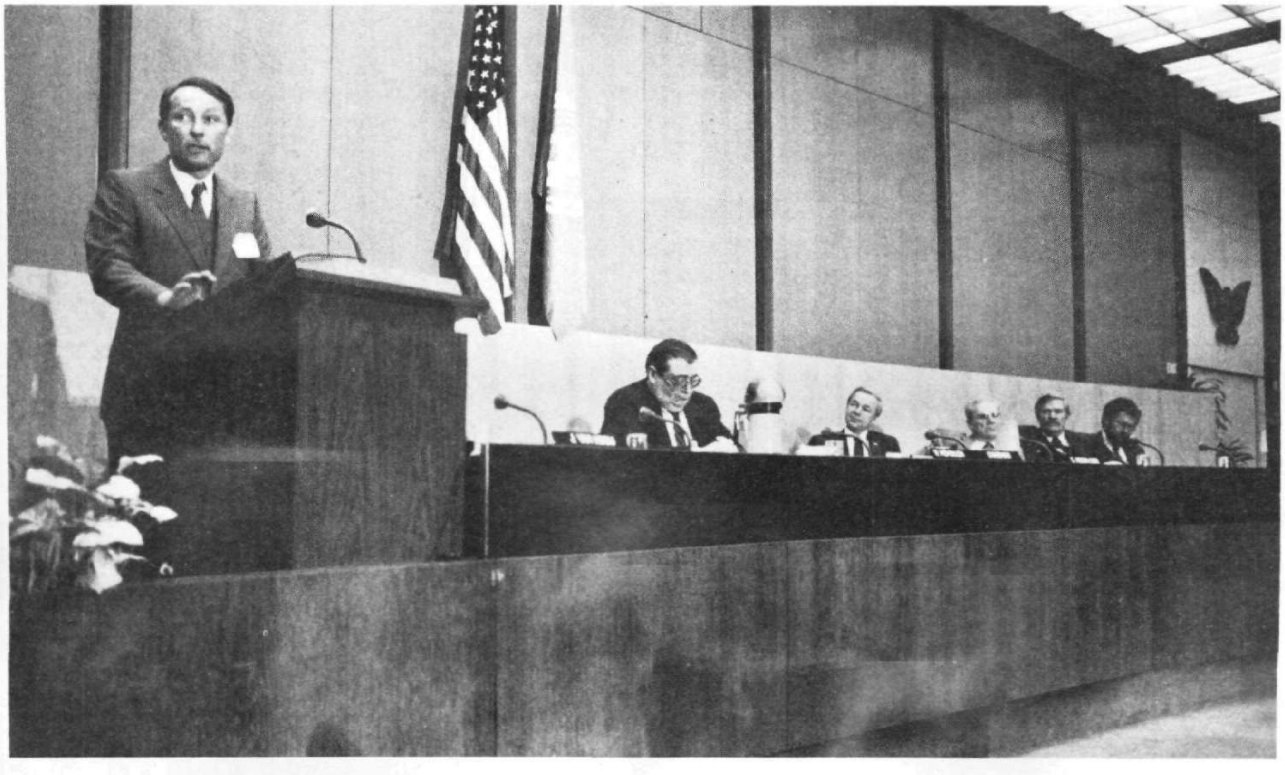
Although barriers remain, commercial interest in food irradiation appears to be mounting in several countries influential to the pace of the technology's worldwide development, based on individual reports at the symposium. In all, about 300 participants from 50 countries attended the five-day meeting, and they included representatives from food companies, equipment suppliers, industry trade associations and national regulatory agencies, as well as food scientists and researchers.

In the United States – the symposium's host for the first time – food irradiation has gained particular momentum in recent years, drawing support from several quarters. Currently working with media, educational and consumer groups in "out-reach" efforts, for example, are the Council on Radiation Applications, a trade arm of the US Atomic Industrial Forum, Inc., and the Coalition for Food Irradiation, which is affiliated with the US food industry.

In the legislative arena, national food and health authorities last year proposed regulatory changes that would allow wider use of food irradiation, primarily for fruits and vegetables.

This year, the proposal – which has proved controversial, drawing more than 4000 public comments that had to be individually answered – could become fact. At the symposium, Dr Sanford Miller, Director of the Center for Food Safety and Applied Nutrition of the US Food and Drug Administration, which regulates food safety, said that the new food irradiation rules could be issued by late summer. They would cover primarily low-dose applications, permitting doses of up to 1 kilogray to slow

The symposium's opening session featured several speakers, including Dr D.K. Kaferstein, food safety officer at the World Health Organization, here addressing participants. Others on the dais were (from left) Dr Sanford Miller, Director of the US Food and Drug Administration's Center for Food Safety and Applied Nutrition; William McMullen of the US Department of Energy; US Congressman Sid Morrison; Dr William Tallent of the US Department of Agriculture; Dr E. Kimbrell, chairman of the Codex Alimentarius Commission; and Dr James Brown of the World Bank. (Photo: D. Caruthers, AIF)



spoilage of fresh fruits and vegetables. The rules also would raise the dose level to 30 kilogray for disinfecting spices, an application previously approved at 10 kilogray and currently used by several American companies.

Food irradiation experts generally regard the long-awaited US action as especially important for accelerating the technology's commercial prospects internationally, as a leading signal of legislative acceptance and industrial interest. The US move is indicative of recent regulatory progress in several countries. National authorities in Bangladesh, Canada, Chile, Denmark, France, Hungary, the Netherlands, Norway, and South Africa all have taken positive regulatory action regarding food irradiation in recent years.

In Canada, for example, revised regulations were proposed in 1983 to facilitate the petition process for irradiated foods. According to reports, commercial interest has mounted. "Developments are far more positive than they've ever been," B.K. Wilson of the Radiochemical Company of Atomic Energy of Canada Ltd. (AECL) said at the meeting.

Such broad-based progress is instrumental to technology-transfer activities, particularly in the developing world, the symposium's expert panel noted. The question of implementing food irradiation in developing countries cannot be "considered in isolation," the panel's report stated, "since many aspects are common to all countries and progress in one country depends on progress in another."

Food irradiation for preservation of many food items has been approved in some 21 countries, and about 80 specific commodities, including fish, poultry, fruits, and vegetables, have gained governmental clearances in recent years. Although the process is not commercially applied in all countries that have granted clearances, estimated worldwide production of irradiated foods amounted to about 35 000 tones in 1983. Additionally, an estimated 30 000 tonnes of grain were irradiated for disinfestation in the Soviet Union.

Proceedings of the 1985 International Symposium on Food Irradiation will be available for purchase later this year through IAEA's Division of Publications.

Trade promotion in Asia and the Pacific

Eight Asian and Pacific countries actively engaged in a co-operative international food irradiation project have taken important steps aimed at opening avenues to marketing and trade of irradiated foods in the region.

At a meeting recently in Australia, representatives agreed to assist and evaluate shipping trials of irradiated foods from countries affiliated with the project, which is officially called the Asian Regional Co-operative Project on Food Irradiation (RPFI) and jointly organized by the IAEA and the Food and Agriculture Organization (FAO) of the United Nations. RPFI member countries are Australia, Bangladesh, India, Indonesia, the Republic of Korea, Malaysia, Pakistan, Philippines, Thailand, and Viet Nam.

Secondly, they agreed to request relevant authorities associated with RPFI, as well as its supporting agreement, to accept the Codex Standard and Code of Practice on Food Irradiation at the earliest possible date. Acceptance of the standard – which establishes the safety of irradiated foods up to a specified dose level and was adopted in 1983 by the Codex Alimentarius Commission of the FAO and World Health Organization – would harmonize legislation on food irradiation and facilitate international trade of irradiated food in the region. It has been distributed for acceptance to all 125 member countries of the Codex Commission. Thirdly, the representatives agreed to request relevant authorities in the region to assist with international trade in treated commodities whenever regulations permit.

The agreements were reached by representatives from Australia, Bangladesh, Indonesia, the Republic of Korea, Malaysia, Pakistan, Philippines, and Thailand at the first meeting of the project committee for the second phase of RPFI. The meeting was held at the Australian Atomic Energy Commission in Lucas Heights, Australia from 13–15 May 1985.

The RPFI project's second phase, under the sponsorship of Australia, is directed at activities to transfer the technology of food irradiation to local industries in the region. RPFI also has co-ordinated research and pilot-scale studies on selected products of particular interest to the region, notably fish products, tropical fruits, onions, and spices.

Commercial/demonstration irradiators for processing food currently are under construction or planned in several RPFI countries. Food irradiation's potential benefits to the region include the reduction of post-harvest losses, improvement of public health, and strengthening of economies through expanded worldwide trade.

– Contributed by Paisan Loaharanu, Food Preservation Section, Joint IAEA/FAO Division