

Irradiation for the Prevention of Foodborne Diseases

A five-year coordinated research project (CRP) is currently under way in the Americas on the application of irradiation to prevent foodborne diseases. It is being cosponsored by the Pan American Health Organization/World Health Organization (PAHO/WHO) and the Joint Food and Agriculture Organization/International Atomic Energy Agency (FAO/IAEA) Division on Nuclear Techniques in Food and Agriculture. The objective of the CRP is to assist institutions in Latin America and the Caribbean in investigating the efficacy of using irradiation as a public health intervention to control *Vibrio* spp. infection resulting from consumption of raw or semi-cooked seafood, as well as cysticercosis/taeniasis from pork. Because the safety and effectiveness of irradiation in controlling these foodborne diseases has been amply demonstrated, the CRP will emphasize implementation of the technology through pilot projects throughout the Region.

BACKGROUND

Foodborne disease constitutes a complex global public health problem. The solution requires intensive cooperation and coordination among government institutions, the private sector, and other interested organizations. It also requires the use of adequate technical procedures—including the hazard analysis

critical control point (HACCP) system, residue control, and microbiological criteria—and innovative technologies such as food irradiation.

In recognition of the potential of irradiation to improve food protection in the Region, PAHO/WHO and the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture convened a Joint Consultation on Irradiation as a Public Health Intervention Measure for Foodborne Diseases in Latin America and the Caribbean, which was held at PAHO Headquarters, Washington, D.C., in October 1992. During this consultation, the epidemiologic and economic repercussions of irradiation as a method to inactivate pathogenic bacteria and parasites in food was discussed in depth. A plan of action was formulated which recommended carrying out investigations to ensure that concrete data were obtained and which contemplated the development of a coordinated research program on this important subject. In addition, it was agreed that the sponsoring agencies would continue to provide the necessary cooperation to the member countries in drafting regulations regarding irradiation, taking into account the principles embodied in the Codex Alimentarius Commission's Codex General Standard for Irradiated Food and Recommended International Code of Practice for the Operation of Radiation Facilities Used for the Treatment of Foods.

The IAEA/FAO/PAHO/WHO coordinated research project is an outgrowth of the technical consultation. The sponsoring agencies agreed to convene periodic meetings of the principal investigators over the course of the five-year project to discuss the planning, development, and evaluation of research. The first of these

Source: Pan American Health Organization, Veterinary Public Health Program. Final Report, First Meeting of the IAEA/FAO/PAHO/WHO Coordinated Research Project on Use of Irradiation as a Public Health Intervention Measure to Control Foodborne Disease in Latin America and the Caribbean, Baton Rouge, Louisiana, 14–16 September 1994. Washington, DC: PAHO. 12 pp.

meetings was held at the WHO Collaborating Center for Reference and Training in Remote Sensing and Geographic Information Systems for Veterinary Public Health, Louisiana State University School of Veterinary Medicine (Baton Rouge, Louisiana, U.S.A.), on 14–16 September 1994.

MEETING CONTENT AND RECOMMENDATIONS

The first CRP meeting was attended by 16 participants and observers from Brazil, Chile, Ecuador, Guatemala, Mexico, United States of America, Venezuela, PAHO/WHO, and IAEA. Following introductory remarks by representatives of the sponsoring institutions, scientists presented summaries of nine proposed research projects. Five of them dealt primarily with use of irradiation against *Vibrio* spp. in commercially harvested shellfish (in Brazil, Ecuador, Guatemala, United States, and Venezuela); one with irradiation of shellfish to inactivate both *V. cholerae* and *Listeria monocytogenes* (Chile); and three with irradiation of pork to prevent cysticercosis/taeniasis (Brazil, Guatemala, Mexico).

It was noted that there is an increased awareness in Western countries of the risks of diseases transmitted by foods of animal origin. In addition to the epidemic of cholera in Latin America, there have been outbreaks of *E. coli* 0157:H7 infection acquired from meat and deaths linked to *Vibrio* contamination of fresh and frozen seafood in the United States, all of which have heightened concern. Reports of contaminated seafood also have had devastating economic effects.

Vibrio spp. cannot be effectively depurated from live mollusks, which are often consumed raw. Several species of *Vibrio*, including *V. parahaemolyticus* and *V. vulnificus*, are natural inhabitants of seawater, especially in warm areas. Am-

ple research data have demonstrated that low-dose irradiation (approximately 1 kGy) is sufficient to inactivate any species of *Vibrio* in seafood, including mollusks. There is, however, a need to confirm the effect of this dose level on organoleptic properties and longevity of irradiated live oysters.

The participants agreed that future research should be directed toward applied aspects of seafood irradiation to control *Vibrio* spp. infection, making use of pilot field trials. These studies should be designed in such a way as to demonstrate the epidemiologic and economic impact of the technology. It was agreed that the types of seafood that are often consumed raw (e.g., oysters, clams, and fish used in the preparation of *ceviche*) will be selected for pilot-scale studies in the first phase of the project.

The following recommendations resulted from the meeting:

1. Participants in the CRP should engage in active exchange of information and results in order to strengthen the coordination of work in this field. Periodic meetings should be convened by the sponsoring organizations to facilitate such data exchange. (To this end, it is expected that meetings will be held in 1996 and 1998.)

2. Every effort should be made to use the data that are being generated by ongoing studies, sponsored by PAHO and the Inter-American Development Bank, on the risk of some foodborne diseases. The revised protocol should be submitted to the sponsoring organizations for comments/suggestions.

3. Efforts should be made to identify the specific types of food that serve as vehicles for transmission of *Vibrio* and *Taenia*. In addition, the most appropriate point in the food production or marketing chain for use of irradiation should be determined prior to the introduction of field trials.

4. The local food industry should be asked to participate in the pilot studies in order to facilitate technology transfer and to aid in evaluation of the cost-effectiveness of this technology as a public health intervention.

5. It is critically important that dosimetric systems used in the pilot-scale experiments be calibrated with national or international standards. The IAEA maintains an International Dose Assurance Service (IDAS) to assist in calibrating various dosimeters used in radiation processing, including food irradiation.

6. Because a significant amount of data on the effectiveness of irradiation in inactivating various foodborne pathogens (especially *Vibrio* spp. and, to a lesser extent, *Taenia solium*) is available in the scientific literature, there is no need to repeat laboratory-scale studies on these pathogens. Instead, efforts should be fo-

cused on conducting pilot-scale trials to demonstrate the effectiveness of this intervention technology in the field.

7. Information on existing pilot and commercial irradiators in Latin American countries should be circulated to all participants to assist them in initiating pilot-scale experiments.

8. Governments are encouraged to adopt the principles of the Codex General Standard for Irradiated Food. Such action would not only ensure that food would be properly irradiated but would simplify implementation of the pilot-scale studies required for this CRP and would also facilitate trade in food that has been so treated. Irradiation should be considered an additional tool to protect human health, serving as a supplement to food inspection, good manufacturing practices, improvement of basic sanitation, and education.



Bellagio Statement on Tobacco and Sustainable Development

A group of 22 concerned individuals and representatives of international organizations met at the Rockefeller Foundation's Bellagio Study and Conference Center in Italy from 26 to 30 June 1995 to examine the implications of current global trends in tobacco production and consumption—especially in developing countries—for sustainable development. In the course of presentations and discussions on tobacco use and control and situation analyses from Africa, Asia, and Latin America, the following points were noted:

- Worldwide, there are only two major underlying causes of premature death

whose toll is increasing substantially—HIV and tobacco.

- Each year, 3 million of the 30 million adult deaths in the world are attributable to tobacco. With current smoking patterns, by about 2025 this annual number will rise to 10 million deaths, of which 7 million will occur in developing countries.
- Of today's children and teenagers, about 300 million will eventually be killed by tobacco use, given current smoking patterns. The addiction usually starts before adulthood.
- Each additional 1 000 tons of tobacco production will eventually result in about 1 000 deaths.