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**FOOD SAFETY AND REFRIGERATION**

*by*

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**STATEMENT OF THE INTERNATIONAL INSTITUTE OF REFRIGERATION (IIR)**

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## INTRODUCTION

- Temperature is a key parameter ensuring food safety and wholesomeness: when the temperature and the environmental conditions are optimal, one bacterium in the morning can produce millions of bacteria in the same afternoon. Fortunately, refrigeration technology makes it possible to slow or totally inhibit microbial growth and the production of toxins.
- Development and modernization of a country cannot take place without refrigeration, and refrigeration plays an important role in food safety and health: it has very substantially decreased the occurrence of foodborne diseases in developed countries.
- Refrigeration is present all along the food chain: more than 50% of foodstuffs in developed countries (1.2 billion inhabitants) are retailed under refrigerated conditions; one can speak of a cold chain from raw materials (post-harvest) to food on the table of the consumer. And food safety starts with the raw materials. However, it took about 30 years in most developed countries (1945-1975 in Europe for example) to set up reliable cold chains.
- In developing countries (5 billion inhabitants), only a small proportion of food is chilled or frozen.
- As there is little mention of refrigeration (or even temperature levels) in the different working documents prepared for this Forum, this is an opportunity to link IIR activities with FAO/WHO's and countries' efforts to tackle food safety issues.
- In its approach to sustainable development, the IIR is deeply involved in:
  - o risk management, through its expertise in refrigeration and good practices;
  - o capacity building through institutional strengthening and technical assistance involving all refrigeration stakeholders: decision-makers, members of the civil service, the industry, researchers, teachers, food manufacturers and refrigeration practitioners.
- Several working papers have highlighted the need to tackle food safety issues with a coordinated, integrated holistic approach, for instance between different governmental bodies; this is how the IIR works with ministries in charge of food, health, fisheries, energy, trade, industry, research, university, education, and the environment, and also with all stakeholders.

## RECOMMENDATIONS

The International Institute of Refrigeration :

- recommends the implementation of refrigeration technology that is suitable for the preservation and retail sale of perishable foods. The IIR above all recommends that all possible means be employed in order to set up reliable cold chains in developing countries: training of refrigeration engineers and technicians, specific, tailored technology transfer, capacity building (food-safety-capacity building linked to cold-chain building), assistance with funding, etc. In this respect, CFC phase-out within the framework of the Montreal Protocol, must be seen as an opportunity to develop environmentally friendly, energy-efficient and cost-effective technology in developing countries.

- recommends introducing, where this has not already been achieved, maximum recommended temperatures for food storage and distribution, in specific codes of practice governing products. The IIR also recommends harmonizing, on a global level, regulatory or recommended temperatures for the storage of perishable foodstuffs; such harmonization has already been achieved in the refrigerated-transport field thanks to the Agreement on International Carriage of Perishable Foodstuffs (ATP) set up by the Economic Commission for Europe of the United Nations (Inland Transport Committee).
- recommends using air-temperature measuring instruments (temperature recorders in refrigerated-storage facilities and refrigerated vehicles; thermometers in small cold rooms, refrigerated display cabinets and domestic refrigerators), in order to improve cold chains from the producer to the consumer. These tools provide a good indication of how well refrigerating equipment is operating.
- recommends stricter monitoring of the interfaces between various links in the cold chain and the development of good practices ; such policy makes it possible to prevent temperature abuse which adversely affects food quality and wholesomeness. Regulations, standards, and codes of practice play key roles in this respect, for instance by recommending fast loading and unloading of refrigerated vehicles, closed, air-conditioned loading docks, and the use of insulated or refrigerated shopping bags at consumer level.
- recommends the implementation of stricter measures governing foods prone to contamination with psychrotrophic bacteria such as *Listeria monocytogenes* or *Yersinia enterocolitica*: lower temperatures and hurdle technology are effective in this context.
- recommends the implementation of temperature traceability. Each stakeholder in the food cold chain must receive information on the time-temperature history of the products from the operator handling the previous phase and must in turn provide all necessary information in his possession to the next stakeholder in the cold chain.
- recommends incorporating the HACCP approach in training in good refrigeration practice, and vice versa incorporating good refrigeration practice in training HACCP for food safety regulators.
- recommends raising consumer awareness : it has been demonstrated that the average temperatures inside domestic refrigerators are above the maximum recommended temperatures and that consumers do not always comply with use-by (expiry) dates.

## **PRESENTATION OF THE IIR**

The International Institute of Refrigeration (IIR) is a scientific and technical intergovernmental organization enabling pooling of scientific and industrial know-how in all refrigeration fields on a worldwide scale.

Its mission is to promote progress and expansion of knowledge and to disseminate information on refrigeration technology and all its applications. The IIR is committed to improving both quality of life and the environment, and thus contributes to sustainable development.

The IIR's members are Member Countries (currently 61) who take part in the IIR's activities through their IIR commission members. The IIR has also collective members (companies, laboratories, universities) and private members.

The IIR offers a wide range of services tailored to meet the varying needs of its worldwide member-country network, national and international organizations, decision-makers, industry, university, and refrigeration practitioners.

These services include education and training, information resources, a database, several periodicals, and publications and proceedings of conferences; among these, there are books on food technologies concerning all products (chilled, frozen) and specific products (fish, fruit and vegetables, meat and milk), their storage, transport and distribution; one can also find a "*Guide to Solar Refrigerators for Remote Areas and Warm Countries*".

All key information is available on the IIR's Web site: [www.ifiir.org](http://www.ifiir.org)

The IIR has been asked by FAO to revise the Code of Practice for the Processing and Handling of Quick Frozen Foods of the Codex Alimentarius (joint FAO/WHO Food Standards Programme).

Finally, the IIR has been asked by UNEP (United Nations Environment Programme) to prepare a report on the achievements and challenges of the refrigeration sector to serve as input to the World Summit on Sustainable Development (Johannesburg, September 2002).