



## JOINT FAO/WHO FOOD STANDARDS PROGRAMME

### CODEX ALIMENTARIUS COMMISSION

#### *Thirty-fourth Session*

*Geneva, Switzerland, 4-9 July 2011*

### ACTIVITIES OF THE JOINT FAO/IAEA DIVISION OF NUCLEAR TECHNIQUES IN FOOD AND AGRICULTURE RELEVANT TO CODEX WORK<sup>1</sup>

1. For almost 50 years, the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture (Joint FAO/IAEA Division) has uniquely promoted the mandates of both FAO, in its efforts to eliminate world hunger and reduce poverty through sustainable agricultural and rural development, improved nutrition and food security, and the IAEA, through peaceful uses of atomic energy to accelerate and expand the contributions of nuclear technologies to promote global health and prosperity.
2. The mission of the Joint FAO/IAEA Division is to strengthen capacities for the use of nuclear methods to improve technologies for sustainable food security and to disseminate these techniques through international activities in research, training and outreach in its Member States. The Joint FAO/IAEA Division is subdivided into five sections on improving food and environmental safety, soil and water management, plant breeding and genetics, sustainable intensification of livestock production systems and sustainable control of major insect pests.
3. The Joint FAO/IAEA Division will continue to strengthen our joint efforts with FAO to protect human health and facilitate international agricultural trade by providing assistance in four main areas, namely, coordinating and supporting research, providing technical and advisory services, providing laboratory support and training, and collecting, analyzing and disseminating information. The activities related to the work of Codex are the use of ionizing radiation, the control of food contaminants, and the management of nuclear and radiological emergencies affecting food and agriculture.

#### JAPANESE NUCLEAR EMERGENCY

4. The magnitude 9.0 earthquake and subsequent tsunami that struck off the east coast of Honshu, Japan on 11 March 2011 resulted in significant damage to the nuclear power plant (NPP) at Fukushima Daiichi, with the consequent release of radioactive material into the environment. Air, soil, water and agricultural products around the damaged NPP were contaminated with radionuclides, chiefly iodine-131, caesium-134 and caesium-137. Various activities were initiated by FAO in relation to this emergency.

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<sup>1</sup> Document prepared by and under responsibility of the Joint FAO/IAEA Division.

5. FAO works in partnership with IAEA through the Joint FAO/IAEA Division on Nuclear Techniques in Food and Agriculture (Vienna) in preparing for and responding to nuclear or radiological emergencies affecting food and agriculture, including the application of FAO capabilities as a critical counterpart in defining and implementing agricultural countermeasures and remediation strategies in response to such events.<sup>2</sup>

6. Recent and on-going activities of the Joint FAO/IAEA Division include the following:

- As the focal point for the IAEA Incident and Emergency Centre (IEC) in Vienna, the Joint FAO/IAEA Division has continually manned the FAO Desk in the IAEA IEC, which includes the preparation and presentation of briefing texts and information on food contamination monitoring data and restrictions on food distribution and/or consumption to Member State Board meetings, press conferences and postings on the IAEA website.
- Participated in video/teleconferences through the Inter Agency Committee on Radiological and Nuclear Emergencies (IACRNE) to ensure a unified approach in addressing issues related to food and agriculture.
- Prepared joint FAO/IAEA/WHO “questions and answers” related to food safety and the application of international standards, including the dissemination of information on the interpretation and application of the Codex Guideline Levels for Radionuclides in Foods.
- Participated in a Joint FAO/IAEA Food Safety Assessment Mission to Japan (see below) and initiated follow-up activities to strengthen future capabilities for emergency preparedness and response to nuclear and radiological events affecting food and agriculture.
- Promoted knowledge and information sharing on radioactive contamination affecting food and agriculture, including the mechanisms and persistence of such contamination, radionuclide transfer rates and international standards.

7. On 26 March 2011, a Joint FAO/IAEA Food Safety Assessment Team was sent to Japan to provide advice on radioactivity monitoring being conducted by the Japanese authorities. The objective of the mission was to provide advice and assistance to the Japanese authorities on technical issues related to food safety and agricultural countermeasures, including sampling and analytical strategies and interpretation of monitoring data to ensure that reliable, continuous updates could be provided on the extent of food contamination in affected areas, with the understanding that the data would form a basis for the development of mitigation and remediation strategies.

8. IAEA and FAO can continue to offer assistance and support, as well as independent, scientific advice, if requested. The Joint FAO/IAEA Division has the multidisciplinary capacity building expertise to assist member states in responding effectively to similar incidents through both normative activities (information dissemination, preparation of manuals on sampling and analysis of soil and agricultural produce) and operational activities (research projects, building capacity to perform sampling and analysis).

#### **RELEVANT COORDINATED RESEARCH PROJECTS**

9. The IAEA encourages and assists research and the development and practical application of nuclear techniques for peaceful purposes throughout the world to foster the exchange of scientific and technical information as well as capacity building for its member states. These coordinated research activities are normally implemented through Coordinated Research Projects (CRP) that join together research institutes in

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<sup>2</sup> For additional details, please see the Feature Articles in the July 2010 and July 2011 editions of the Food and Environmental Protection Newsletter.

both developing and developed Member States to collaborate on the research topic of interest. The research that is supported encourages the acquisition and dissemination of new knowledge and technology generated through the use of nuclear technologies and isotopic techniques in the various fields of work covered by both FAO and IAEA mandates. Some examples of research projects relevant to Codex are as follows:

#### **Coordinated Research Project on the Implementation of Nuclear Techniques to Improve Food Traceability**

10. Awareness of food safety has been rising and many importing countries have implemented food control regulations to guarantee the quality and safety of imported foods for their consumers. Food traceability and authenticity have evolved to be a major concern in this context. The IAEA has responded with the launch of a new CRP on the Implementation of Nuclear Techniques to Improve Food Traceability to help FAO and IAEA member states comply with traceability regulations and guidelines, including the Codex Guideline on the Principles for Traceability / Product Tracing as a Tool within a Food Inspection and Certification System (CAC/GL60-2006).

11. The main purpose of the CRP is to establish robust analytical techniques and databases to determine the provenance of food, using nuclear techniques such as isotope ratio analysis along with multi-element analysis and other complementary methods, for the verification of food traceability systems and claims related to food origin, production, and authenticity.

#### **Coordinated Research Project on the Development of Radiometric and Allied Analytical Methods to Strengthen National Residue Control Programmes for Antibiotic and Anthelmintic Veterinary Drug Residues**

12. The main objective of the CRP is to provide National Reference Laboratories of FAO and IAEA member states with effective and appropriate monitoring methods for residues of selected antibiotic and anthelmintic veterinary medicines through the development and application of analytical methods utilizing radiotracer detection methods in conjunction with confirmatory techniques using stable-isotope labelled analogues.

13. The outcomes of the CRP will help FAO and IAEA member states to implement the Codex Guidelines for the Design and Implementation of National Regulatory Food Safety Assurance Programme Associated with the Use of Veterinary Drugs in Food Producing Animals (CAC/GL 71-2009) and to comply with the Codex Maximum Residue Limits for Veterinary Drug Residues in Food.

#### **Coordinated Research Project on Integrated Analytical Approaches to Assess Indicators of the Effectiveness of Pesticide Management Practices at the Catchment Scale**

14. The main objective of the CRP is to assess the effectiveness of pesticide management practices through the evaluation of water quality monitoring data. The project aims to integrate risk assessment tools and targeted analytical monitoring as a cost-effective option for developing countries to identify specific water pollutants, their sources and occurrences and to use this information to critically evaluate and, where necessary, improve production practices. Nuclear and related techniques will assist in generating outputs such as harmonized protocols for the sampling and analysis of surface water.

15. A key outcome of the CRP will be a generic Guideline on Integrated Analytical Approaches to Assess Indicators of Pesticide Management Practices at a Catchment Scale, which will help FAO and IAEA member states in the application of various Codex texts related to the control of pesticide residues.

### **Coordinated Research Project on the Development of Irradiated Foods for Immuno-compromised Patients and Other Potential Target Groups**

16. The specific objective of the CRP is to research a range of simple and complex (ready prepared meals) irradiated foods with the overall objective to utilize irradiation technology to increase the variety, availability and acceptability of foods for immuno-compromised patients and other potential target groups with special dietary needs (for example, irradiated fresh produce such as fruits, vegetables and salads, and ethnic or locally produced ready-to-eat meals and functional foods). The research will generate data on the acceptability of irradiated foods in terms of both quantitative factors (microbiological safety, nutritional and organoleptic properties) and qualitative properties (psychological well-being, quality of life).

17. The outcomes of the CRP will help FAO and IAEA member states to expand the use of food irradiation for immuno-compromised patients and other target groups under the Codex General Standard for Irradiated Foods (CODEX STAN 106-2003).

### **Coordinated Research Project to Develop Generic Irradiation Doses for Quarantine Treatments**

18. The CRP on the Development of Generic Irradiation Doses for Quarantine Treatments seeks to establish validated irradiation doses for the treatment of non-fruit fly insect species of quarantine significance. Project results will strengthen existing phytosanitary irradiation standards developed under the International Plant Protection Convention, thereby enhancing international trade for various fruits and vegetables through the use of generic irradiation doses for a wide range of quarantine pests.

19. Good progress has been made in meeting the research objective of establishing generic doses for several groups of insect pests of regulatory importance and the allied objectives of researching the effects of low oxygen commodity storage and dose rate on efficacy and commodity tolerances.

### **SAMPLING PROCEDURES TO DETECT MYCOTOXINS IN AGRICULTURAL COMMODITIES**

20. Adherence to regulatory limits for mycotoxins in agricultural commodities is important to safeguard consumers and to permit trade in affected commodities across international borders. Reliable estimates of mycotoxin concentrations are required to implement regulatory decisions on the suitability of lots of produce for consumption or trade. Effective schemes to test for mycotoxins depend not only upon sound analytical methods, but also on well designed and implemented sampling plans.

21. In this regard, we are pleased to report the publication of a book on *Sampling Procedures to Detect Mycotoxins in Agricultural Commodities*<sup>3</sup>. The manual provides information to food analysts and regulatory officials on effective sampling plans to detect mycotoxins in food. The concepts of uncertainty and variability in mycotoxin test procedures are discussed as well as the importance of ensuring that samples are representative of the lot being sampled, and the consequences of a poorly designed sampling plan on the reliability of the measured levels of mycotoxins, possibly resulting in legal disputes and barriers to trade.

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<sup>3</sup> Th.B. Whitaker, North Carolina State University, Raleigh, NC, USA; A.B. Slate, North Carolina State University, Raleigh, NC, USA; M.B. Doko, International Atomic Energy Agency, Vienna; B.M. Maestroni, International Atomic Energy Agency, Vienna; A. Cannavan, International Atomic Energy Agency, Vienna (Eds.) (2010). *Sampling Procedures to Detect Mycotoxins in Agricultural Commodities*. Springer, Dordrecht, Heidelberg, London, New York, ISBN 978-90-481-9633-3.

22. The manual discusses the mycotoxin sampling plan in the context of the multi-stage mycotoxin test procedure; sampling, sample preparation and analysis; explores uncertainty and variability in mycotoxin test procedures, and; describes the design of sampling plans, the use of operating characteristic curves and the calculation of acceptance probability.

23. The manual will assist FAO and IAEA member states to meet the Codex General Standard for Contaminants and Toxins in Food and Feed (CODEX STAN 193-1995) and to comply with Codex mycotoxin limits in various commodities.

#### **TRAINING COURSE ON LINKING SOIL AND PESTICIDE BEHAVIOUR AT A LANDSCAPE SCALE**

24. A training course on Linking Soil and Pesticide Behaviour at a Landscape Scale was organized at the IAEA in Vienna, Austria, from 15th November to 3rd December 2010. The training course was planned as one of the 2010 activities of the IAEA technical cooperation project RLA/5/053 on Implementing a Diagnosis System to Assess the Impact of Pesticide Contamination in Food and Environmental Compartments at a Catchment Scale in the Latin American and Caribbean (LAC) Region. The training course was attended by 10 participants from Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Ecuador and Uruguay.

25. The purpose of the training was to provide participants with an understanding of the link between soil components and pesticide behaviour. The training was organized in three modules: (1) measurement of the soil sorption and QuEChERS methodology (2) definition of local Pesticide Impact Rating Index (PIRI) parameters related to the soil compartment and (3) assessment of spatial variability and pesticide transport processes. The course will help participants to improve agricultural practices and laboratory monitoring to comply with Codex Maximum Residue Limits for Pesticides.

#### **METHODS OF ANALYSIS FOR RESIDUES OF PESTICIDES AND VETERINARY DRUGS**

26. Access to analytical methods continues to be a problem in many developing country Member States, especially in the form of validated method protocols. To help address this problem, the Joint FAO/IAEA Division has collaborated with the Codex Committee on Pesticide Residues in publishing analytical methods made available by national authorities on its web pages. To date, pesticide residue methods have been made available by Argentina, Canada, Costa Rica, Germany, the Netherlands and the United Kingdom.<sup>4</sup>

27. The Joint FAO/IAEA Division will also publish analytical methods made available by national authorities for residues of veterinary drugs in foods on its web pages. We are of the opinion that methods, including full protocols of validated methods or links to method protocols, could enhance the capabilities of developing countries to identify and implement suitable methods in support of residue monitoring plans.

#### **FAO AND IAEA TECHNICAL COOPERATION PROJECTS**

28. The Joint FAO/IAEA Division is responsible for providing scientific and technical support for over 20 active and almost 30 newly proposed national and regional FAO and IAEA Technical Cooperation (TC) Projects in the areas of traceability, food contaminants and food irradiation. These projects provide recipient countries with equipment, expert advice and training, and are financed by both the FAO and IAEA Technical Cooperation Programmes and through trust funds provided by donor countries and international funding agencies.

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<sup>4</sup> Please see <http://www.naweb.iaea.org/nafa/fep/News-Main-page.pdf> for details.