



JOINT FAO/WHO FOOD STANDARDS PROGRAMME CODEX ALIMENTARIUS COMMISSION

37th Session, CICG
Geneva, Switzerland, 14-18 July 2014

ACTIVITIES OF THE JOINT FAO/IAEA DIVISION OF NUCLEAR TECHNIQUES IN FOOD AND AGRICULTURE RELEVANT TO CODEX WORK¹

1. The Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture (the Joint Division) this year celebrates its half century of exemplary collaboration within the United Nations (UN) system during which it has promoted the mandates of both the International Atomic Energy Agency (IAEA) — through peaceful uses of atomic energy to accelerate and expand the contributions of nuclear technologies to promote global health and prosperity — and the Food and Agriculture Organization of the United Nations (FAO) in its efforts to eliminate world hunger and reduce poverty through sustainable agricultural and rural development, improved nutrition and food security.
2. The Joint Division helps build and strengthen capacities for use of nuclear related techniques, for example to support sustainable food security and to disseminate such techniques through international activities in research, training and outreach in FAO and IAEA Member Countries. These activities span food and environmental protection; soil and water management; plant breeding and genetics; animal production and health; and insect pest control. With regard to improving food safety, protecting consumer health, and facilitating international trade, the Joint Division responds to the needs of Member Countries by coordinating and supporting research; providing technical and advisory services; providing laboratory support and training; and through the collation, analysis and dissemination of information. Our activities are implemented through technical cooperation and coordinated research projects in the main work areas of food irradiation, authenticity and traceability; the analysis and control of chemical contaminants; and nuclear and radiological emergency preparedness, response and management relating to food and agricultural production.
3. An International Symposium on Food Safety and Quality: Applications of Nuclear and Related Techniques will be hosted by the Joint Division at the IAEA's Headquarters in Vienna, Austria, from 10 to 13 November 2014.² The symposium will address various Codex relevant topics in food and agriculture. We extend our warm invitation to scientists, laboratory analysts, policymakers, regulators, food producers and others concerned with food safety, quality and the integrity of the food supply chain, who are all welcome to participate in the symposium.

THE JOINT FAO/IAEA DIVISION AND CODEX COMMITTEES

4. The Joint Division actively participates in the Codex Committee on Residues of Veterinary Drugs in Foods (CCRVDF), the Codex Committee on Contaminants in Foods (CCCF), and the Codex Committee on Pesticide Residues (CCPR). Joint Division activities are reported at each session of these Committees, and representatives contribute to deliberations in plenary and working groups both in session and by electronic means. This is of particular importance to our work because the Joint Division strives to assist FAO and IAEA Member Countries (e.g. regulators and food control laboratories) in the application and development of Codex standards and guidelines, for example in the application of national residue monitoring programmes. The Joint Division also hosts and maintains international resources such as the Food Contaminant and Residue Information System (FCRIS),³ which is an online resource that laboratories can use to freely access analytical methods and associated information. In particular, the FCRIS database supports the Guidelines for the Design and Implementation of National Regulatory Food Safety Assurance

¹ Document prepared by and under responsibility of the Joint FAO/IAEA Division (please see <http://www.naweb.iaea.org/nafa/index.html> for additional details).

² See <http://www.pub.iaea.org/iaea meetings/46092/Food-Safety-and-Quality>.

³ The Food Contaminant and Residue Information System (FCRIS) is available at: <http://nucleus.iaea.org/fcris/Default.aspx/> or indirectly via: <http://nucleus.iaea.org/Home/index.html>.

Programmes Associated with the Use of Veterinary Drugs in Food Producing Animals (CAC/GL 71-2009)⁴ and the Working Group on Methods of Analysis for Veterinary Drug Residues and Related Pesticides in Food and Feed. This is one of the most visible ways in which the Joint Division is supporting the CCPR's initiatives to develop guidelines for analytical methods.

5. During the 21st session of the CCRVDF5, the Joint Division reported on various activities, including support for Member Country laboratories to strengthen their capacities (instrumentation, technical and human resources) for monitoring veterinary drug residues, fostering networks and best practices among laboratories at regulatory and research institutions in both developed and developing countries. Through its coordinated research projects, the Joint Division recognizes the implications of decreasing detection limits as analytical methods become more technologically advanced (even far below the 1 µg/kg level). The need for fundamental discussions regarding substances or contaminants with zero tolerance levels, and whether this implies technically detectable or toxicologically relevant control levels, was raised at this session of the CCRVDF. Furthermore, the continued detection of naturally occurring antimicrobial chemicals and the transfer of veterinary drugs from feed to animals and the environment were reported as important issues for evaluation. The Joint Division has also contributed to the CCRVDF's work on draft guidelines on performance characteristics for multi-residue methods as an appendix to CAC/GL 71-2009.

6. Following the Joint Division's contributions to the eighth session of the CCCF6 at The Hague in the Netherlands, the CCCF is re-establishing an electronic working group on radionuclide levels in foodstuffs, with the Netherlands as chair and Japan as co-chair, supported by the Joint Division and the IAEA. This group is considering the conclusions and recommendations of an IAEA international working group relating to guideline levels for radionuclides in food and drinking water, including those in Codex standards⁷. Issues raised include: (i) the stage of food production to which the Codex guidelines on radionuclides apply; (ii) the period of time these guidelines should apply in food trade following a nuclear/radiological emergency; (iii) the identification of internationally validated methods of analysis of radionuclides in food and; (iv) the development of sampling plans to enhance the implementation of the Codex guideline levels. More details can be found below, under the heading "Criteria and Standards Related to Radionuclides in Food".

7. During the 46th session of the CCPR in Nanjing, China,⁸ the Joint Division highlighted its activities in assisting Member Countries to address food safety needs and concerns through: (i) projects to increase capacity for compliance monitoring in food safety and international trade, training and development, optimum use of pest control agents and veterinary drugs and increased production of safe and nutritious food; (ii) the electronic publication of detailed analytical methods for analysis of food contaminants and pesticides (on the FCRIS Internet platform), including several multi-residue methods and a Pesticide Attribute Database for food safety/environmental laboratories; and (iii) assistance to the CCPR in the development of relevant working papers e.g. a discussion paper on performance criteria for suitability assessment of methods of analysis for pesticide residues.

FOOD IRRADIATION

8. Food irradiation is one of the major areas of cooperation between the Joint Division and Member Countries. In the Asia and the Pacific region, the *Guidelines for the Audit and Accreditation of Irradiation Facilities Used for Sanitary and Phytosanitary Treatment of Food and Agricultural Products* established in 2012 were the basis of a new Regional Standard for Phytosanitary Measures (RSPM), *Approval of Irradiation Facilities* (APPPC RSPM No. 9), adopted by the Asia and Pacific Plant Protection Commission (APPPC) as a regional phytosanitary standard in September 2013. A *Manual of Good Food Irradiation Practice* has been developed and will be published by the IAEA in 2014. The manual builds on both phytosanitary standards and the Codex general standards and codes of practice relating to food irradiation. With the increasing application of food irradiation for food quality, safety and also phytosanitary purposes, this publication is timely and is intended to support "best practices" at irradiation facilities.

9. The IAEA coordinated research project on the development of generic irradiation doses for quarantine treatments is nearing completion in 2014. This research project is resulting in the development and adoption of additional phytosanitary irradiation treatments by the International Plant Protection Convention. The phytosanitary irradiation treatments and food quality applications of irradiation are likely to increase the demand for radiation processing capacity. Given the growing difficulties related to acquiring and transporting radionuclide sources, coordinated research and technical cooperation projects are aiming to develop and

⁴ See http://www.codexalimentarius.org/input/download/standards/11252/CXG_071e.pdf.

⁵ See http://www.codexalimentarius.org/download/report/802/REP14_RVe.pdf.

⁶ See http://www.codexalimentarius.org/download/report/906/REP14_CFe.pdf.

⁷ Contained in the Codex General Standard for Contaminants and Toxins in Food and Feed (CODEX STAN 193-1995).

⁸ See ftp://ftp.fao.org/codex/meetings/CCPR/CCPR46/DRAFT%20REPORT/DRAFT_REP14-Pree.pdf (or ftp://ftp.fao.org/codex/meetings/ccpr/ccpr46/pr46_04e.pdf).

support the wider use of electrical 'machine source' irradiators (electron beam and X-ray) in addition to the radionuclide (cobalt-60) gamma irradiators more commonly used to irradiate food today. These activities were initiated by Member Countries for example in the Americas and Asia where the use of food irradiation is increasing. Several Member Countries in Africa are also expressing interest in food irradiation as a way to promote food security and enhance trade.

FOOD ANALYSES AND CONTROLS

10. The Joint Division, through the Food and Environmental Protection Subprogramme and its laboratories, continues to provide scientific and technical support for over 40 national and regional technical cooperation (TC) projects focusing on the detection and control of chemical and/or naturally occurring food contaminants such as veterinary drugs, pesticides, mycotoxins and heavy metals. The TC projects are typically biannual projects to build or enhance capacities to monitor the food supply for both domestic and international trade.

11. In the UN system, the Joint FAO/IAEA laboratory complex⁹ is a unique attribute of the Joint FAO/IAEA Programme of Nuclear Techniques in Food and Agriculture. The FAO/IAEA Agriculture and Biotechnology Laboratories have a long and successful history of developing, adapting and transferring technologies to Member Countries: for example, the Food and Environmental Protection Laboratory works to enhance food traceability, quality and safety. In order to ensure the sustainability of the services provided by the complex as a whole, a new capital investment project has been initiated to support the renovation and modernization of the laboratories which are located at Seibersdorf, Austria. The ReNuAL ('Renovation of the Nuclear Applications Laboratories') project aims to comprehensively renovate laboratory infrastructure and provide equipment to enable the Joint Division to continue to help meet the increasing demands from Member Countries.

FOOD TRACEABILITY AND AUTHENTICITY

12. The Joint Division provides support to FAO and IAEA Member Countries for the implementation of holistic food safety and control systems. This includes the development of isotopic and related analytical techniques to verify the origin of food and hence enable the audit of information-based traceability systems, and verify the authenticity of foodstuffs or detect adulteration. This area of work is necessary to combat fraud, enhance food safety and enable international trade in food commodities. For example, activities under the Joint Division are contributing to the Codex Standard for Honey (CODEX STAN 12-1981)¹⁰ as well as also assisting in the general development of methods and procedures to establish the authenticity of products or identify adulteration.

13. Capacity building activities in this field include a regional project for food traceability and food safety control systems in South-East Asia. Research activities include international research projects on the implementation of nuclear techniques to improve food traceability and on the application of accessible technologies for the verification of origin of dairy products as an example control system to enhance global trade and food safety.

14. The Joint FAO/IAEA Division is making an important contribution to the development of this area by working in collaboration with other IAEA specialist laboratories and institutes to develop certified reference materials (CRMs) for the assessment of trace elements and contaminants in food matrices. There is a need for such materials in food traceability and authenticity work, and isotopic techniques fundamentally rely on the availability of suitable CRMs. Research at the Joint Division's laboratories has identified several candidate materials and work is continuing to verify that they meet the necessary stringent criteria.

FUKUSHIMA DAIICHI ACCIDENT

15. Subsequent to our report to the 36th session of the Joint FAO/WHO Codex Alimentarius Commission (CAC) in 2013,¹¹ activities of the Joint FAO/IAEA Division related to the accident at the Fukushima Daiichi nuclear power plant (NPP) in Japan have included:

- Cooperation with other IAEA Departments, the World Health Organization (WHO) and other international organizations in the dissemination and interpretation of international standards;
- Collection and analysis of monitoring data (FAO/IAEA database);

⁹ See <http://www.iaea.org/Publications/Booklets/Seibersdorf/seibersdorf.pdf>.

¹⁰ See http://www.codexalimentarius.org/input/download/standards/310/cxs_012e.pdf.

¹¹ See the Joint FAO/IAEA report to the 36th session of the CAC at: ftp://ftp.fao.org/codex/Meetings/cac/cac36/if36_07e.pdf.

- Participation in the preparation of international reports — e.g. the IAEA report on the Fukushima Daiichi accident, which is in preparation, and the study of the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) that assesses the radiation doses and associated effects on health and the environment, published on 2 April 2014; and
- Implementation of activities related to the IAEA Action Plan on Nuclear Safety.

16. More than three quarters of a million sample results covering many different foodstuffs have been reported by the authorities in Japan over the three-year period since the emergency. These monitoring results have included foods both on sale and from production areas in Japan. Fewer samples (much less than 1% per month in 2014) are exceeding the Japanese standard limits for caesium radionuclides in foods and the authorities are maintaining comprehensive monitoring programmes to ensure the integrity of the food supply chain.

NUCLEAR AND RADIOLOGICAL EMERGENCY PREPAREDNESS

17. The FAO, through the Joint FAO/IAEA Division, works in partnership with the IAEA, the WHO and other relevant international organizations in preparing for and responding to nuclear or radiological emergencies within the framework of the Inter-Agency Committee on Radiological and Nuclear Emergencies (IACRNE) and in accordance with the Joint Radiation Emergency Management Plan of the International Organizations (EPR-JPLAN 2013)¹². These practical arrangements are also reflected in the cooperative arrangements between the FAO and the IAEA for the provision of support in response to nuclear or radiological emergencies. Recent activities include contributing to the IAEA's review of the accident at the Fukushima Daiichi NPP, and also being involved with emergency preparedness activities. For example, the Joint Division worked closely with the IAEA, other international organizations and Member Countries through the IAEA's Incident and Emergency Centre when participating in the ConvEx-3 exercise, an international emergency exercise held within the framework of the Convention on Early Notification of a Nuclear Accident and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency¹³ which took place in November 2013 and was hosted by Morocco.

18. The FAO, in addition to several other international organizations, is co-sponsor of the IAEA Safety Guide entitled *Criteria for Use in Preparedness and Response for a Nuclear or Radiological Emergency* (IAEA Safety Standards Series No. GSG-2)¹⁴. The guide provides criteria (both generic in terms of effective dose and operational in terms of gross alpha activity, gross beta activity and activity concentrations) for imposing restrictions on radionuclide contaminated food, milk and drinking water within an accident State or within States affected by a release of radioactive material. In the same regard, the FAO recently contributed to discussions of, and provided feedback on, the draft text of the new IAEA Safety Requirements publication *Preparedness and Response for a Nuclear or Radiological Emergency* (DS457), which will establish requirements for an adequate level of preparedness for, and response to, a nuclear or radiological emergency with the aim of mitigating its consequences. These requirements will replace the current IAEA Safety Requirements publication with the same title — *Preparedness and Response for a Nuclear or Radiological Emergency* (IAEA Safety Standards Series No. GS-R-2)¹⁵ — taking into account developments and experiences gained since its publication in 2002.

19. The Joint Division has initiated a new five-year coordinated research project entitled “Response to Nuclear Emergencies Affecting Food and Agriculture”. This project aims to develop and assess innovative systems for data collection and management as well as geovisualization. It is intended that the systems developed by the project participants will be used in both routine and emergency situations for the monitoring of radionuclide contaminants, and that they may also be further extended for the monitoring and visualization of chemical and other types of contaminants in the agricultural environment. Nine institutions from developed and developing countries are involved in this collaborative research which is initially focusing on radionuclides. Early results are already providing electronic systems that use internationally agreed protocols for the exchange of data and can assist the collection, transfer and visualization of sampling information.

¹² Available online at: http://www-pub.iaea.org/MTCD/publications/PDF/EPRJplan2013_web.pdf.

¹³ The texts of both Conventions are available online at: http://www-pub.iaea.org/MTCD/publications/PDF/Pub0765_web.pdf.

¹⁴ Available online at: http://www-pub.iaea.org/MTCD/publications/PDF/Pub1467_web.pdf.

¹⁵ Available online at: http://www-pub.iaea.org/MTCD/publications/PDF/Pub1133_scr.pdf.

CRITERIA AND STANDARDS RELATED TO RADIONUCLIDES IN FOOD

20. Considerable attention is focused on radionuclide contamination of food and related standards and applicable criteria. The Joint FAO/IAEA Division, through the IAEA Radiation Safety Standards Committee (RASSC)¹⁶ and the Inter-Agency Committee on Radiation Safety (IACRS)¹⁷, has been directly involved in discussions on reference levels for foodstuffs contaminated as a result of a nuclear or radiological emergency, with particular reference to lessons learned from the situation in Japan and the guideline levels for radionuclides in the Codex General Standard for Contaminants and Toxins in Food and Feed (CODEX STAN 193-1995), as was reported in detail at the eighth session of the CCCF.

21. The IAEA has established an international working group, comprising experts from international organizations, including the Joint Division, the FAO, the IAEA, and the WHO, as well as invited consultant experts and the International Commission on Radiological Protection (ICRP) as an observer. This working group has met three times. A discussion paper produced in the early meetings was considered by the RASSC and feedback on guideline levels for radionuclides in the Codex General Standard for Contaminants and Toxins in Food and Feed (CODEX STAN 193-1995) was provided to the eighth session of the CCCF.

22. This working group met for a third time in May 2014 and further developed the draft of a new IAEA Technical Document (TECDOC) that will detail the various national and international standards related to radionuclide contamination of food and drinking water, the basis on which they have been derived and the circumstances in which they are intended to be used, with particular focus on an existing (post-accident) exposure situation. The TECDOC will include a framework to help countries develop activity concentration levels for use at the national level in an existing (post-accident) exposure situation. A Technical Meeting with the purpose of providing guidance and input on the development of the TECDOC will be held at the IAEA's Headquarters in Vienna, Austria, from 8 to 12 September 2014. The meeting will focus on radiological criteria, including radionuclide activity concentrations, used as the basis for the control of foodstuffs and drinking water in the recovery phase following a nuclear or radiological emergency (i.e. in an existing exposure situation after termination of the radiological emergency phase). The numerical values of radionuclide concentrations used for the control of foodstuffs in international trade will also be covered by this meeting. The meeting and the TECDOC publication will be of interest to food authorities and to the CCCF in their consideration of the guideline radionuclide levels in the Codex General Standard for Contaminants and Toxins in Food and Feed (CODEX STAN 193-1995), and details of the Technical Meeting will be posted online in due course.¹⁸

¹⁶ The Radiation Safety Standards Committee (RASSC) is a standing body of senior experts in radiation safety, established by the Deputy Director General, Head of the Department of Nuclear Safety and Security. RASSC advises the IAEA on its radiation safety programme to support the development, review and revision of IAEA safety standards relating to radiation safety as well as the programme for their application. Its objectives are to provide feedback and recommendations to the IAEA on the radiation safety programme and areas for improvement, and to achieve consensus, quality, coherence and consistency in the development of IAEA safety standards.

¹⁷ See: <http://www.iacrs-rp.org/>.

¹⁸ See: <http://www-pub.iaea.org/iaemeetings/2014>. The IAEA meeting reference number is: J1-TM-47005.