

CODEX ALIMENTARIUS COMMISSION



Food and Agriculture
Organization of the
United Nations



World Health
Organization

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Agenda Item 2

CX/MAS 18/39/2 Add.2

April 2018

JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX COMMITTEE ON METHODS OF ANALYSIS AND SAMPLING

39th Session

Budapest, Hungary, 8 - 12 May 2018

MATTERS OF INTEREST ARISING FROM OTHER INTERNATIONAL ORGANIZATIONS

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

1. The Food and Agriculture Organization of the United Nations (FAO) and the International Atomic Energy Agency (IAEA), through their Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture (the "Joint FAO/IAEA Division") support and implement specific activities relevant to the Codex Committee on Methods of Analysis and Sampling (CCMAS). This is achieved through the Food and Environmental Protection Section (FEP) and its associated Laboratory (FEPL). In collaboration with sister FAO Divisions in Rome, resources and support are delivered to member countries using various funding vehicles, such as national and regional technical cooperation projects (TCPs); coordinated research projects (CRPs²); additional extra-budgetary programmes; and regional and interregional workshops, to promote holistic food safety and control systems and reduce barriers to trade. In relation to food and food trade, the Joint FAO/IAEA Division assists member countries of both FAO and IAEA in their peaceful application of nuclear techniques and related technologies.

2. Joint FAO/IAEA Division activities include the analysis and control of various chemical residues and food contaminants; food origin and authenticity; food related radiation safety standards; food irradiation; and activities concerning nuclear emergency preparedness and response in food and agriculture. Activities in these areas involve coordinating and supporting research worldwide; providing technical and advisory services for projects and training activities; and providing applied and adaptive research, laboratory support and training through the FAO/IAEA Agriculture & Biotechnology Laboratories situated at Seibersdorf, Austria. The programme of work involves collecting, analyzing and disseminating information for the effective transfer of skills and technology related to the nuclear sciences in food and agriculture. Current activities of interest to this committee as well those of future benefit, are highlighted in the following paragraphs.

COORDINATED RESEARCH ACTIVITIES

3. In the period covered by this report, the Joint FAO/IAEA Division has been implementing seven CRPs in the field of food and environmental protection. Each of these CRPs involves about fifteen institutions from developed and developing countries that collaborate on a well-defined research topic for four to five years. Two CRPs relevant to CCMAS are currently underway: CRP D52038 "Accessible Technologies for the Verification of Origin of Dairy Products as an Example Control System to Enhance Global Trade and Food Safety", and CRP D52040 "Field-Deployable Analytical Methods to Assess the Authenticity, Safety and Quality of Food". A third CRP (D52041 "Integrated Radiometric and Complementary Techniques for Mixed Contaminants and Residues in Foods") also contains some activities that may be of peripheral interest to CCMAS.

4. As regards CRP D52038 on "Accessible Technologies for the Verification of Origin of Dairy Products as an Example Control System to Enhance Global Trade and Food Safety", the main objective is to develop a system

¹ Document prepared by and under responsibility of the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture, IAEA, Vienna, Austria (See <http://www.naweb.iaea.org/nafa/index.html> for additional details).

² See <https://cra.iaea.org/cra/how-to-participate.html>

for verifying the claimed origin of dairy products using stable isotope and trace element (SITE) profiling. The SITE approaches, as developed for dairy products, will be used as a template that can be applied to other food commodities. The participants have developed 11 sample preparation protocols (on milk, butter and cheese) and 7 analysis protocols using SITE profiling. A joint publication from the consortium on the validation of multi-element measurements on a common IAEA reference material milk powder (IAEA-153) is in press.

5. The CRP D52040 on “Field-Deployable Analytical Methods to Assess the Authenticity, Safety and Quality of Food” is a collaboration between the Joint FAO/IAEA Division and the IAEA Division of Physical and Chemical Sciences, focusing on the exploitation of portable atomic and molecular spectroscopic screening technologies for front-line food fraud detection. The project participants are comprised of eight contract holders (from China, India, Malaysia, Morocco, Russian Federation, Singapore, Sri Lanka and Uganda) and five agreement holders (from Austria, Belgium, Sweden, United Kingdom and the United States of America). This joint CRP strives to close the gap between instrumental capabilities found in research labs and technologies that can be easily used by various national gate-keepers in developing countries, such as national customs authorities and food regulators. The opportunity to accomplish this ambitious goal stems from a rapid and ongoing reduction in analytical equipment price and a rapid increase in portability. Throughout the last decade the analytical device industry has delivered new families of handheld, portable and transportable tools. Previously portable devices that have become handheld include Near Infra-Red (NIR), Raman, X-Ray Fluorescence and Laser Induced Breakdown spectrometers, and previously bench-top laboratory instruments that have become ‘field’ transportable include low-field Nuclear Magnetic Resonance, Mass Spectrometers and Multi-Spectral Imaging equipment. Nuclear techniques, such as Ion Mobility Spectrometry, widely used to detect drugs and explosives by the security services, also have the potential to be deployed to detect food authenticity and safety issues such as the onset of mould in grains, pulses and nuts. Currently the project is organizing an inter-laboratory comparison exercise using a pocket-size very-NIR sensor to test the authenticity of oregano herb with 20 institutes worldwide.

6. The 3rd CRP (D52041) focusses on the development of “Integrated Radiometric and Complementary Techniques for Mixed Contaminants and Residues in Foods”, but also includes some food adulterants. Participating research and regulatory institutions in the following member countries are involved: Benin, Botswana, China, Colombia, Ecuador, Italy, Macedonia FYR, Netherlands, Nicaragua, Pakistan, Papua New Guinea, Peru, South Africa, Spain, Uganda and USA. The 1st RCM was held 19–23 June 2017, at the IAEA Headquarters in Austria. A common research framework and an international network of 16 participant laboratories/institutions were established. The research work will support systematic programmes for measuring mixtures of contaminants and residues and generating multi-class analytical methods. The overall aim of this CRP is to leverage the advantages of nuclear, isotopic and complementary techniques to strengthen the capacity of analytical laboratories in member countries and therefore enhance respective national contaminant and residue monitoring programs. Whilst this CRP falls mainly under the scope of CCRVDF, CCPR and CCCF, some activities will also be of interest to CCMAS.

TECHNICAL COOPERATION AND NETWORKING ACTIVITIES

7. The Joint FAO/IAEA Division provided technical support to 49 IAEA TCPs in food safety and control in 2017. These TCPs included 38 national, 10 regional and one inter-regional project. As regards future technical support in this area, 26 new TCPs for the 2018-19 biennium have commenced, with 13 of these focusing on residues and chemical contaminants in foods and one regional project on “Enhancing Food Safety and Supporting Regional Authentication of Foodstuffs through implementation of Nuclear Techniques” (RAS5081).

8. The Joint FAO/IAEA Division continues to promote the formation of regional laboratory/food safety networks - as a mechanism to enhance capacity building - including the Latin American and Caribbean Analytical Network (RALACA), the African Food Safety Network (AFoSaN) and a food safety network in Asia. The RALACA involves 54 member institutions in 21 countries in the Latin American and the Caribbean region; the AFoSaN involves institutions in 33 African countries, while the newly established Asia and the Pacific region network currently includes institutes from 16 countries.

9. Under AFoSaN, several common activities relevant to CCPR were implemented, such as a regionally tailored proficiency testing scheme for the analysis of pesticide residues in fruits. A total of 19 institutions participated in this proficiency testing scheme; the exercise will be repeated in 2018. There is a growing list of institutions keen on promoting such regional proficiency schemes. Training in analytical methods was also undertaken by this Network; for example, group training was conducted in Benin on analysis of pesticides of plant and animal use relevance. Twenty participants attended this training event, including several from laboratories in Asia and Latin America who were funded under the inter-regional TCP.

10. This inter-regional TCP provides a platform for countries to collaborate and jointly address food safety and

control issues. It is helping to open up new opportunities for institutes to share experience and resources. A training event on analytical methods and procedures for the detection of pesticide residues was held in Singapore in collaboration with the Agri-Food & Veterinary Authority (AVA) under this project with twenty participants taking part.

11. The new regional project RAS5081 seeks to establish a regional consortium of nuclear science practitioners and end-users, following the example of the IAEA-initiated autonomous laboratory network 'RALACA' in Latin America and the Caribbean, to strengthen cooperation amongst partners through sharing of resources and experience. Efforts will be made to identify potential partners/funding agencies, including the private sector, and seek financial support through partnerships and collaboration. It will also establish and provide training in regionally-agreed and harmonised standards, protocols and procedures. This will build upon learnings from previous regional TCPs and will focus on what types of data need to be collected, how samples should be analysed, and in particular how exactly to use the data to verify the authenticity of a food sample (i.e. data handling, database, statistical methods for interpretation and mapping). The project will also initiate the development and initial population of a web-accessible database for archiving of information for the region. This may be supported through a platform such as CLP4NET with the objective to harmonise the collection and storage of background data and make these data available to RCA partners for implementation of a food authentication system.

12. In 2017, assistance, technical meetings and workshops were requested by several of our member countries. For example, in cooperation with colleagues at FAO Headquarters in Rome, Italy and the FAO National Office in Ghana, as well the Indian Export Inspection Council, the Joint FAO/IAEA Division has provided support to the Ghana Standards Authority (GSA) to help facilitate and build laboratory capacity for collecting occurrence data on methyl mercury in fish and inorganic arsenic in rice under the Codex Trust Fund (CTF2). Technical meetings and workshops included regional Latin American training workshops in Montevideo and Paysandú, Uruguay, in February on 'Analytical methods for residues of selected pesticides' and in San José, Costa Rica, in May, on 'Data Quality for Decision Making'. Others include an interregional training course in October on radionuclides in food: sampling, analysis, standards and regulations, and its relevance to international trade, Singapore, and a regional African training course on method development and validation for the analysis of mycotoxins in food and feed, Lusaka, Zambia, in July. These were in addition to several nationally tailored capacity building activities and services to help enhance analytical instrumentation in Asia, Africa and Latin America, further details of which are published in our newsletter³.

13. The Joint FAO/IAEA Division was also invited to participate at a full range of technical conferences and meetings. These have included activities with regional food safety networks and the transfer of nuclear related analytical techniques to laboratories in member countries. Regional food safety networks include the RALACA; the AFoSAN and the Food Safety Asia (FSA) network. A new regional TCP aims to enhance and expand the FSA network over the next few years. Working with these networks has facilitated technology transfer and enabled group training on techniques such as radioreceptor assays. In addition, inter-laboratory comparisons and proficiency trials have also been supported. Another example of the effectiveness of working with these networks is that it enabled the Joint FAO/IAEA Division to provide training to 1217 food specialists in 2017, with the help of our counterparts in member countries and various TCPs.

14. In cooperation with the FAO Regional Office for Africa, the National Metrology Institute of South Africa and other stakeholders, the Joint FAO/IAEA Division is organizing an African "Food Safety Workshop to Promote Standards, Reliable Methods of Analysis and Inter-Institutional Cooperation" in Pretoria, South Africa, 4–8 June 2018. Themes include analysis of veterinary drug and pesticide residues as well as mycotoxins and related contaminants. This will be followed by a food fraud and authenticity awareness-raising seminar sponsored by the European Framework 7 "Food Integrity" project. The event has also attracted interest from Asia, Canada, the EU, Latin America and USA. Other planned capacity building opportunities in 2018 include: Interregional training on the analysis of mycotoxins and of toxic metals in Chile and Ecuador, respectively, and arrangements are being made for training in an African country (possibly to be hosted in Cameroon) on the analysis of toxic metals. Regional training for Asia and the Pacific region will take place in New Zealand to introduce member countries to stable isotope and trace element profiling for food authenticity and origin assessment. For countries with more mature food authenticity surveillance programs a "train the trainer" event will take place in Sri Lanka towards the end of 2018 to encourage a self-sustaining programme of training in nuclear and related techniques for food authenticity in the region.

³ <https://www-pub.iaea.org/books/IAEABooks/12333/Food-and-Environmental-Protection-Newsletter-Vol-21-No-1-January-2018>

SUPPORT TO CODEX AND RELEVANT COMMITTEES

15. In addition to the CCMAS, the Joint FAO/IAEA Division participates and provides input to the Codex Alimentarius Commission, the Codex Committee on Pesticide Residues (CCPR), the Codex Committee on Residues of Veterinary Drugs in Foods (CCRVDF) and the Codex Committee on Contaminants in Food (CCCF). The Joint FAO/IAEA Division has been involved in providing data to the Codex Alimentarius Commission and helping develop many Codex standards, a recent example being participation in the electronic working group (eWG) on maximum levels for cadmium in chocolate and cocoa products. Joint FAO/IAEA Division counterparts and members of the networks have also contributed to the eWG discussion paper on maximum level(s) for hydrocyanic acid and mycotoxin contamination in cassava and cassava-based products. Through colleagues at FAO, the Joint FAO/IAEA Division has also contributed to the Codex Committee on Food Import and Export Inspection and Certification Systems (CCFICS) eWG on Food Integrity and Food Authenticity definitions. Many member countries expressed their support for new work to be carried out in this area as they had experienced various forms of food fraud, where the analytical methods for detection of the fraud by food authorities were either missing or not widely available.

16. The Joint FAO/IAEA Division has produced and coordinated technical input to Codex, including the CCPR. At Codex, member countries have also provided the Joint FAO/IAEA Division with feedback on potential future research and development work. Participation at Codex meetings over the period covered by this report has included a meeting of the Codex Alimentarius Commission, with a contribution to a plenary discussion for international organizations. This was an opportunity for the Joint FAO/IAEA Division to highlight its commitment to Codex and to strengthening global partnerships for sustainable development in terms of the application of Codex standards and the peaceful use of nuclear and related techniques in food and agriculture. The Joint FAO/IAEA Division also participated in the past CCCF, CCRVDF and CCPR meetings. Another example of providing support to Codex and helping develop Codex standards is that of the Joint FAO/IAEA Division working with radiation safety experts in IAEA and WHO to develop TECDOC-1788 on "Criteria for Radionuclide Activity Concentrations for Food and Drinking Water", which was published by the IAEA and is freely available online. The Joint FAO/IAEA Division is pleased to assist in the development of international standards and thus co-organized and hosted a meeting of the Technical Panel on Phytosanitary Treatments (TPPT 2017), which evaluates data submissions from national and regional plant protection organizations and provides guidance to the Standards Committee regarding specific phytosanitary treatment issues pertaining to the use of irradiation technologies.