



JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX COMMITTEE ON PESTICIDE RESIDUES

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MATTERS OF INTEREST ARISING FROM OTHER INTERNATIONAL ORGANIZATIONS

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

(Prepared by the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture¹)

1. The Food and Agriculture Organization of the United Nations (FAO) and International Atomic Energy Agency (IAEA), through the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture (herein after "Joint FAO/IAEA Division"), work with Member Countries to contribute to food security and sustainable agricultural development by use of nuclear techniques and biotechnology. Through its Food and Environmental Protection Section and Laboratory, the Joint FAO/IAEA Division assists Member Countries of both FAO and IAEA in the peaceful application of nuclear techniques and related technologies to improve food safety and control systems. The activities of the Joint FAO/IAEA Division are therefore closely related to the work of the Codex Alimentarius Commission and its committees, including the Codex Committee on Pesticide Residues (CCPR).
2. Activities of relevance to the CCPR include developing and using nuclear and isotopic analytical methods for the analysis and control of various chemical residues and food contaminants in agricultural products. Through its sub-programme on 'Improvement of Food Safety and Food Control Systems', the Joint FAO/IAEA Division continues to support laboratories and technical capabilities in Member Countries in their application of Codex standards and codes of practice as part of national and regional food control systems.
3. The activities of the Joint FAO/IAEA Division are carried out within the broad context of coordinating and supporting research; providing laboratory services, training and capacity building through its Food and Environmental Protection Laboratory (FEPL) at Seibersdorf, Austria, as well as collecting, analysing and disseminating information for the effective transfer of skills, knowledge and technology. The Joint FAO/IAEA Division also provides technical support for national, regional and inter-regional technical cooperation and capacity building projects in the field of food safety and control.

Coordinated Research Activities

4. Collaborative research activities are undertaken in selected nuclear and related techniques by scientists in IAEA and FAO Member Countries. These activities are implemented through coordinated research projects (CRPs) that bring together institutes from both developing and developed countries to work on common subjects. In the period covered by this report, nuclear and related analytical methods for measuring pesticide residues in foods were being developed in two CRPs in food safety and control (Table 1). New analytical methods and standard operating procedures have been and continue to be developed through the Joint FAO/IAEA Division and its CRPs.
5. An ongoing CRP, "Integrated Radiometric and Complementary Techniques for Mixed Contaminants and Residues in Foods" (Reference D52041) currently involves researchers from institutions in Benin, Botswana, China PR, Colombia, Ecuador, Macedonia FYR, Nicaragua, Pakistan, Papua New Guinea, Peru and Uganda. Other countries are also, namely: Italy, Republic of South Africa, Spain, The Netherlands and the United States of America. A number of multi-class analytical methods have been developed for pesticide residues and other contaminants/residues in a range of food commodities. The project's second research coordination meeting co-organized by the Joint FAO/IAEA Division and the Botswana National Veterinary Laboratory is planned for 25-29 March 2019 in Gaborone, Botswana. This upcoming event has attracted interest from the private sector.

¹ <https://www.iaea.org/topics/food-and-agriculture>

Technical Cooperation and Networking

6. The Joint FAO/IAEA Division provided technical support to more than 40 IAEA Technical Cooperation Projects (TCPs) in food safety and control², in 2018 (See Table 2 for selected active TCPs, and Table 3 for prospective projects for the 2020-2021 cycle).
7. **Networking:** 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)³, the African Food Safety Network (AFoSaN)⁴ and a food safety network in Asia. These provide a platform for sharing knowledge and experiences as well as interlaboratory comparisons and benchmarking.
8. **Interregional training - Turkey:** An interregional training course on residues in honey and aquaculture products was conducted in 2018 at Bornova Veterinary Control Institute in Izmir, Turkey. It brought together 22 analysts from Argentina, Benin, Bolivia, Botswana, Cameroon, Chile, Costa Rica, Cuba, Ecuador, Egypt, Honduras, Lebanon, Mongolia, Morocco, Mozambique, Nigeria, Pakistan, Seychelles, Tanzania (UR), Tunisia, Uganda and Uruguay as well as the host, Turkey. The main purpose of the event was to enhance analytical and regulatory capabilities for obtaining reliable data to support national or international food safety standards for residues (including pesticides) using perspectives from different regions.
9. **Enhancing competence of food safety testing laboratories (new requirements for testing and calibration) - Botswana and Indonesia:** Two group training courses, one interregional and the other for the Asia-Pacific region, were held in Botswana and Indonesia, respectively. The event hosted by the Botswana National Veterinary Laboratory (BNVL) in Gaborone on 15-19 October 2018 was attended by 35 staff mainly from food testing laboratories in Angola, Argentina, Benin, Bolivia, Botswana, Chile, Costa Rica, Cuba, Ecuador, Egypt, Guatemala, Honduras, Indonesia, Mongolia, Morocco, Mozambique, Nigeria, Pakistan, Paraguay, Seychelles, Singapore, Sri Lanka, Tanzania, Tunisia, Turkey, Uganda, Uruguay and Venezuela. The course aimed at advancing testing laboratory practices by boosting staff competence to ensure that test results generated are credible. The second event "General Requirements for competence in food testing laboratories" held in Bogor, Indonesia 24-28 September 2018, was hosted by the Indonesian Research Center for Veterinary Science and attracted 39 participants from 19 countries from the Asia Pacific region and some of the Central Asia Regional Economic Cooperation program, namely: Azerbaijan, Bangladesh, Georgia, Indonesia, Jordan, Kazakhstan, Kyrgyzstan, Lebanon, Malaysia, Mongolia, Oman, Pakistan, Papua New Guinea, Philippines, Syrian Arab Republic, Thailand, Turkmenistan, Uzbekistan and Vietnam.
10. **Asia-Pacific regional training - Philippines:** A regional Asia-Pacific training course on analytical methods for veterinary drug and pesticide residues was held at the Bureau of Animal Industry, Quezon City, Philippines, 12-23 November 2018. The training aimed at improving the use of reliable analytical methods for testing and monitoring residues of veterinary drugs including related pesticides in foods. It attracted 30 participants from Bangladesh, Indonesia, Jordan, Lebanon, Malaysia, Mongolia, Oman, Pakistan, Syrian Arab Republic, Thailand, Vietnam and the host Philippines. Among other topics covered were: common guidelines for development and validation of analytical methods; screening and confirmatory analytical techniques; choice and use of stable isotope-labelled compounds; data analysis and computing method validation parameters; and cross-laboratory studies. The event involved cooperation with Iowa State University's Veterinary Diagnostic Laboratory, USA and the Flanders research institute for agriculture, fisheries and food, Belgium.
11. **Interregional training - Ecuador:** A 10-day interregional training course on analysis of toxic metals and related contaminants in foods with trade implications was organized at the Ministry of Aquaculture and Fisheries, Sub-secretary of Quality and Food Safety, in Guayaquil, Ecuador, from 13 to 28 August 2018. The aim was to provide guidance through practical sessions, lectures and discussions on the collection and interpretation of analytical data on toxic metals and pesticides and to share relevant methods and experiences. Twenty-two participants, from Botswana, Cameroon, Chile, Costa Rica, Guatemala, Indonesia, Mongolia, Paraguay, South Africa, Turkey, Uruguay and the host Ecuador, attended the training. The event benefited from collaboration with the Export Inspection Council of India, Ministry of Commerce and Industry, Export Inspection Agency Kochi and Kolkata, as well as the US Department of Agriculture, Foreign Agricultural Service (USDA-FAS).

² A full list is available in our latest Newsletter:

<https://www-pub.iaea.org/MTCD/Publications/PDF/Newsletters/fep-22-1.pdf>

³ See: <http://red-ralaca.net>

⁴ See: <http://www.africanfoodsafetynetwork.org/>

The training also included method validation and performance criteria; and procedures for pesticide residues analysis in food according to the European Commission's guidance document on analytical quality control and method validation procedures for pesticide residues and analysis in food and feed (SANTE/11813/2017).

12. **Regional training - Africa:** An African regional training course on analytical method development/validation and national residue monitoring of pesticide residues (and other food contaminants) was held in Ouagadougou, Burkina Faso, from 16-20 July 2018. The event was hosted by the National Public Health Laboratory (LNSP) and attracted 27 participants from 22 countries: Algeria, Botswana, Burkina Faso, Burundi, Cameroon, Chad, Côte d'Ivoire, Egypt, Ghana, Malawi, Mauritania, Mozambique, Namibia, Niger, Senegal, Seychelles, Sierra Leone, South Africa, Sudan, Tunisia, United Republic of Tanzania and Zimbabwe.
13. **Training in Colombia:** A national training course on risk assessment was held in Bogota, Colombia covering: (a) hazard identification and pesticide registration and administration; (b) effective exposure assessment and systematic occurrence data collection; (c) national (or regional) standards and guideline settings, including maximum residue limits (MRLs) for pesticides in food; (d) a robust multi-institutional national residue monitoring program for local and export commodities; (e) a review of regional pesticide registration and risk-assessment – its relevance to Colombia; and (f) a gap analysis of existing analytical/regulatory capabilities. The event brought together 31 participants from the Universidad Nacional de Colombia (UNC), Laboratorio Nacional de Vigilancia de Medicamentos y Alimentos, Ministry of Health and Laboratorio Nacional de Insumos Agrícolas as well as Instituto Colombiano Agropecuario. A follow-up training course in cooperation with the European Union Reference Laboratory for Pesticide Residues in Fruit and Vegetables, Universidad de Almería, Spain was also implemented later in the year, where knowledge on establishing surveillance and monitoring of residues was enhanced.

Technology Transfer and Capacity Enhancement

14. The Joint FAO/IAEA Division continues to meet requests from our Member Countries for analytical methods, standard operating procedures and technical advice. The methods developed or adapted and validated in the FEPL and collaborating institutions are made available to Member Countries through various mechanisms, including training workshops, publications in the scientific literature and via the internet, public outreach events, conferences and symposia. A platform 'Food Contaminant and Residue Information System' (FCRIS, <http://nucleus.iaea.org/fcris/>) provides useful data on food contaminants and residues and includes analytical method databases.
15. The FEPL also continues to develop, validate and promote the application of innovative analytical techniques for selected pesticides various matrices such as vine leaves; plants like boldo (*Peumus boldus* Molina) and honey, among others. This includes collaboration with laboratories in Palestine, Panama, Syria and Uruguay. Findings of a study on validation of a multi-class-multi-residue method for Palestinian honey will be presented at the 14th International IUPAC Conference of Crop Protection in Ghent, Belgium, on 19-24 May 2019.
16. The results of an inter-regional project using various funding mechanisms were published in 2018. To demonstrate the success of the project and allow take-up by other countries we published two books, through Elsevier: (1) a book titled "Integrated analytical approaches for pesticide management" (<https://www.elsevier.com/books/integrated-analytical-approaches-for-pesticide-management/maestroni/978-0-12-816155-5>) collated inputs from 26 institutes in 12 countries, along with the FEPL to provide generic guidelines on pesticide analysis and environmental monitoring, and (2) a manual titled "Analytical methods for agricultural contaminants" (<https://www.elsevier.com/books/analytical-methods-for-agricultural-contaminants/maestroni/978-0-12-815940-8>), comprising operating procedures for 30 analytical methods from 17 institutes in 7 countries and the FAO/IAEA Food and Environmental Protection Laboratory.

Support to Codex and Participation in Codex meetings

17. 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 that would translate into capacity building (TC) or research projects.
18. The Joint FAO/IAEA Division continues to provide technical support to the electronic working groups (EWG), namely through contribution to the electronic working group of the Codex Committee on Food Import and Export Inspection and Certification Systems (CCFICS) to define the terms "food fraud" and "food integrity".

19. **Interregional training on MRLs - Argentina:** The Joint FAO/IAEA Division is pleased to continue supporting CCPR work on developing and promulgating the standards and will continue to work with Member Countries to enhance food safety and control systems. An interregional training course on establishment of MRLs (for pesticide and veterinary drugs) and risk assessment will be organized in Buenos Aires, Argentina, from 25th March to 5th April 2019. To this end, the Joint Division is joining forces with the United States Department of Agriculture; IR-4 Project, Rutgers University and Servicio Nacional de Sanidad y Calidad Agroalimentaria (SENASA). Fifty-six participants and resource persons from the following countries will take part in the event: Angola, Argentina, Benin, Bolivia, Botswana, Brazil, Cameroon, Chile, Colombia, Costa Rica, Ecuador, Egypt, Honduras, India, Indonesia, Kenya, Lebanon, Mongolia, Morocco, Mozambique, Nigeria, Panama, Pakistan, Paraguay, Peru, Seychelles, South Africa, Sri Lanka, Tunisia, Turkey, Uganda, UR Tanzania, USA and Uruguay.
20. **Regional multi-stakeholder workshops/conferences:** In cooperation with the FAO Regional Office for Africa, as well as the National Metrology Institute of South Africa, the Joint FAO/IAEA Division successfully organized the “African Food Safety Workshop to Promote Standards, Reliable Methods of Analysis of various residues/contaminants” in Pretoria, South Africa, 4-8 June 2018. The workshop had approximately 240 participants. Three days of the workshop focused on pesticides and related contaminants. A follow-up event is anticipated in June 2020 in South Africa.
21. The FEPL will hold on May 5th, 2019 a Joint FAO/IAEA / RALACA workshop on quality assurance and quality control measures in food testing laboratories. This will take place during the 7th Latin American Pesticide Residue Workshop (LAPRW) in Brazil.

Table 1. Coordinated Research Projects (CRPs) supported by the Joint FAO/IAEA Division and relevant to CCPR's work

| CRP Ref. No. | Active CRPs |
|---------------------|--|
| D52039 | Development and Strengthening of Radio-Analytical and Complimentary Techniques to Control Residues of Veterinary Drugs and Related Chemicals in Aquaculture Products |
| D52041 | Integrated Radiometric and Complementary Techniques for Mixed Contaminants and Resides in Foods |

Table 2. Ongoing IAEA TCPs supported by the Joint FAO/IAEA Division and relevant to CCPR's work

| Number | Country/ Region | Project Concept No. | Title |
|--------|---|------------------------|--|
| 1 | Bahrain | BAH/5/001 | Determination of Pesticide and Mycotoxin Residues in water and food |
| 2 | Botswana | BOT/5/017 | Enhancing Capabilities for Inter-Institutional Monitoring of Chemical Food Contaminants Using Nuclear/Isotopic and Complementary Analytical Techniques |
| 3 | Colombia | COL/5/025 | Improving Capacity to Diagnose Residual Pesticides and other Contaminants in Exotic Tropical Fruits to Make Food Exports More Acceptable on the International Market |
| 4 | Iraq | IRQ/5/021 | Developing Food Safety and Assurance System Using Nuclear and Other Related Technologies |
| 5 | Mauritius | MAR5/024 | Building Capacity to Analyse Veterinary Drug Residues and Related Chemical Contaminants in Animal Products |
| 6 | Panama | PAN5/024 | Developing Analytical Capabilities for the Detection of Chemical Contaminants in Food and the Quality of Agrochemicals |
| 7 | Uganda | UGA/5/040 | Enhancing the Monitoring of Veterinary Drug Residues, Related Chemicals and Natural Food Contaminants |
| 8 | Africa | RAF/5/078 | Establishing a Food Safety Network through the Application of Nuclear and Related Technologies — Phase II |
| 9 | Asia and the Pacific | RAS/5/078 | Enhancing Food Safety Laboratory Capabilities and Establishing a Network in Asia to Control Veterinary Drug Residues and Related Chemical Contaminants |
| 10 | Latin America | RLA/5/069 | Improving Pollution Management of Persistent Organic Pollutants to Reduce the Impact on People and the Environment (ARCAL CXLII) |
| 11 | Inter-regional | INT/5/154 | Improving Food Safety through the Creation of an Inter-regional Network that Produces Reliable Scientific Data Using Nuclear and Isotopic Techniques |
| 12 | Cameroon | CMR/5/023 | Strengthening Laboratory Capabilities to Monitor Contaminants in Fisheries Products |
| 13 | Costa Rica | COS/5/036 | Improving Analytical Capacity to Monitor Food Contaminants and Veterinary Drug Residues Using Nuclear/Isotopic and Complementary Techniques |
| 14 | Cuba | CUB/5/022 | Promoting Food Safety through the Mitigation of Contaminants in Fruits for Human Consumption |
| 15 | Mongolia | MON/5/024 | Enhancing Food Safety Analytical Capabilities for Veterinary Drug Residues and Related Contaminants Using Isotopic Techniques |
| 16 | Morocco | MOR/5/037 | Enhancing Control of Chemical Food and Feed Contaminants, Animal Disease Diagnosis and Trade in Fresh Fruits |
| 17 | Namibia | NAM/5/015 | Developing Capacity of the National Standard Institution and Agro-Marketing and Trade Agency in the Areas of Food Safety |
| 18 | Niger | NER/5/022 | Strengthening Nuclear / Isotopic and Complementary Laboratory Capabilities for Monitoring Contaminants in Food, Feed and Water |
| 19 | T.T.U.T.J of T. Palestinian A. | PAL/5/010 | Strengthening Capability to Monitor Contaminants in Food and Related Matrices through Nuclear and Complementary Analytical Techniques |
| 20 | Sudan | SUD/5/039 | Enhancing the Capacity to Monitor Pesticide and Veterinary Residues in Food Using Nuclear and Complementary Techniques |
| 21 | Uganda | UGA/5/040 | Strengthening Multi-Sectoral Food Contaminant Monitoring Programmes Through the Effective Use of Nuclear, Isotopic and Complementary Techniques |
| 22 | Viet Nam | VIE/5/022 | Promoting Interlaboratory Comparison and Accreditation in Testing Chemical Contamination for Food Safety |
| 23 | Zambia | ZAM/5/032 | Strengthening and Expanding Analytical Capacity to Monitor Food Contaminants using Nuclear/Isotopic and Complementary Tools |

Table 3. New/prospective IAEA TCPs supported by the Joint FAO/IAEA Division and relevant to CCPR's work (Beginning 2020)

| Number | Country/ Region | Project Concept No. | Title |
|--------|---------------------------------|------------------------|---|
| 1 | Benin | BEN2018002 | Expanding Analytical Capabilities for Systematic Control of Veterinary Drug Residues and Related Contaminants in Foodstuff |
| 2 | Botswana | BOT2018006 | Enhancing capabilities for a holistic approach to testing food hazards in poultry production/products |
| 3 | Cameroon | CMR2018004 | Developing laboratory testing capabilities to enhance the safety and competitiveness of cocoa and coffee beans |
| 4 | Cote D'Ivoire | IVC2018005 | Strengthening Capabilities to Monitor Contaminants in food and the Environment |
| 5 | Democratic Rep. of the Congo | ZAI2018004 | Building Nuclear/Isotopic and Complimentary Laboratory Capabilities to Control Food Contaminants and Enhance Fish Production. |
| 6 | Eritrea | ERI2018004 | Developing Food Safety Analytical Capabilities in Eritrea |
| 7 | Mauritania | MAU2018002 | Strengthening INRSP's Laboratory Capacity to Analyse and Monitor Food Contaminants |
| 8 | Niger | NER2018004 | Strengthening capacity of the public health laboratory to monitor food contaminants |
| 9 | Rwanda | RWA2018005 | Strengthening Laboratory Capacity to Analyze and Monitor Food Contaminants by Rwanda |
| 10 | Sudan | SUD2018002 | Strengthening evaluation of quality and monitoring/control programmes for contaminants |
| 11 | Lebanon | LEB2018003 | Risk evaluation of carcinogenic organic pollutants (PCBs, PAHs, OCs) in the Lebanese Diet |
| 12 | Vanuatu | NHE2018001 | Strengthening Agro-Food Laboratory Quality Infrastructure in Vanuatu |
| 13 | Georgia | GEO2018001 | Enhancing National Programmes for Testing and Monitoring Food Contaminants and Residues |
| 14 | Kyrgyzstan | KIG2018005 | Strengthening Food Safety and Animal Disease Testing Laboratories and Systems |
| 15 | Bahamas | BHA2018002 | Developing laboratory capacity for testing contaminants in animal and related products including fish in Bahamas |
| 16 | Dominica | DMI2018003 | Enhancing Capacity to Monitor Agrochemical Residues in Foods and Related Matrices |
| 17 | Nicaragua | NIC2018004 | Strengthening Monitoring and Control System for Food Contaminants |
| 18 | Fiji | FIJ2018001 | Establishing a Food Safety Laboratory for Analysis of Pesticide Residues in Fresh Fruits, Vegetables and Root Crops |