Joint FAO/IAEA Programme
Nuclear Techniques in Food and Agriculture

Food & Environmental Protection Newsletter

Vol. 16, No. 1 January 2013

http://www-naweb.iaea.org/nafa/index.html
http://www.fao.org/ag/portal/index_en.html

ISSN 1020-6671

Contents

To the Reader

The Food and Environmental Protection Subprogramme continues to strengthen our joint efforts with FAO and IAEA to protect human health and improve food safety by providing research, technical support and training, including technical support leading to the development and application of international standards that facilitate agricultural trade. These activities are primarily related to the implementation of traceability systems and analytical techniques to control food contaminants, the use of ionizing radiation to control food bacteria and harmful insect pests, and the management of nuclear and radiological emergencies affecting food and agriculture, particularly following the accident at TEPCO's Fukushima Daiichi nuclear power plant.

In this regard, one recent event that we are especially proud of is the successful convening of the IAEA Scientific Forum on Food for the Future – Meeting the Challenges with Nuclear Applications, in September 2012. The Scientific Forum examined challenges related to the improvement of food production, food protection and food safety through the use of nuclear technologies. The 2012 Scientific Forum was organized into three sessions addressing Increasing Food Production, Ensuring Food Protection and Enhancing Food Safety, with the Food Safety session focussing on panel discussions related to food contamination and food irradiation. Additional details on the Scientific Forum are contained in the Past Events section of this Newsletter.

IAEA
International Atomic Energy Agency

In relation to the Japanese nuclear emergency and in follow-up to discussions at the 35th Session of the Joint FAO/WHO Codex Alimentarius Commission (July 2012), we are pleased to report that the IAEA, and particularly the Joint FAO/IAEA Division, is fully involved in the proposed review and potential revision of the Joint FAO/WHO Codex Alimentarius Guideline Levels for Radionuclides in Foods. As many of you are aware, these activities are part of the key role of the Joint FAO/IAEA Division in preparing for and responding to nuclear and radiological emergencies affecting food and agriculture as a full member and co-sponsor of the Joint Radiation Emergency Management Plan of the International Organizations (EPR JPLAN 2010). This on-going obligation includes our commitment to participate in the next ConvEx-3 international nuclear emergency exercise that will be conducted in Morocco in November 2013.

In the area of food contamination, our extra-budgetary funding obtained under the US Peaceful Uses Initiative (PUI) has already helped to facilitate our train-the-trainer activities related to the establishment of food control systems that lead to enhanced food safety and quality. These initiatives were undertaken in part through cooperation with the re-designated IAEA Collaborating Centre on eLearning and Accelerated Capacity Building for Food and Environmental Protection at the University of Costa Rica. Several training courses and workshops were already held in 2012 under this three year PUI project, with more than 90 developing country scientists being trained in various disciplines that aim to improve the sustainability of food controls through the enhancement of laboratory capabilities, practices and methodologies that promote food safety and quality worldwide.

In the area of food irradiation, our newly designated IAEA Collaborating Centre for Radiation Processing for Environmental Remediation, Advanced Materials and Food Irradiation has also already started to facilitate sub-programme training and capacity building activities. As indicated in the Past Events section, a Regional Asian Technical Cooperation Project Workshop on Best Practices for Phytosanitary Applications of Food Irradiation was convened at the Collaborating Centre in Jeongeup, Republic of Korea, from 22–26 October 2012. Among other outputs, the Workshop reviewed and finalized a Best Practice Manual for Phytosanitary Applications of Food Irradiation to assist producers, exporters, food irradiation processing facility operators and National Plant Protection Organizations (NPPO) by providing guidance on 'best practices' when irradiating food for phytosanitary purposes.

Our Feature Article in this issue provides a brief summary of the revision and website publication of our newly revised Food Irradiation Treatment Facilities and Irradiated Food Authorization databases. In addition, the article highlights the Joint FAO/IAEA Division publication of analytical methods through the Food Contaminant and Residue Information System (FCRIS) web application, which has been developed in collaboration with the Codex Committee on Residues of Veterinary Drugs in Foods and the Codex Committee on Pesticide Residues.

In closing, we extend our best wishes to our Ms Yao Minna, from the College of Food Science, Fujian Agriculture and Forestry University, China, who served for six months as a cost-free expert at the Food and Environmental Protection Laboratory, for her continued success in returning to her duties in China.

Best wishes to you and your families for a happy, healthy and prosperous New Year.

David H. Byron

Staff

Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture, Vienna International Centre, Wagramer Strasse 5, P.O. Box 100, A-1400 Vienna, Austria
Telephone: +43 1 2600 + extension; Fax: +43 1 26007; Email: Official.Mail@iaea.org

Name	Title	E-mail	Extension
Liang, Q.	Director	Q.Liang@iaea.org	21610

Food and Environmental Protection (FEP) Section

Name	Title	E-mail	Extension
Byron, D.H.	Section Head	D.H.Byron@iaea.org	21638
Blackburn, C.M.	Food Irradiation Specialist	C.Blackburn@iaea.org	21639
Sasanya, J.J.	Food Safety Specialist (Veterinary Drug Residues)	J.Sasanya@iaea.org	26058
Mashayekhi-Tabrizi, N.	Team Assistant	N.Mashayekhi-Tabrizi@iaea.org	26061
Attakpah, S.	Team Assistant	S.Attakpah@iaea.org	21641

Food and Environmental Protection Laboratory (FEPL) A-2444 Seibersdorf, Austria

Cannavan, A.	Laboratory Head	A.Cannavan@iaea.org	28395
Frew, R.	Food Safety Specialist (Traceability)	R.Frew@iaea.org	28326
Maestroni, B.M.	Food Scientist	B.M.Maestroni@iaea.org	28398
Jandrić, Z.	Analytical Chemist	Z.Jandric@iaea.org	28373
Rathor, M.N.	Laboratory Technician	N.Rathor@iaea.org	28397
Abrahim, A.	Laboratory Technician	A.Abrahim@iaea.org	28327
Islam, M.	Laboratory Technician	M.Islam@iaea.org	28394
Wimberger, T.	Team Assistant	T.Wimberger@iaea.org	28267
Ojeda Vinueza, A.M.	Team Assistant	A.M.Ojeda-Vinueza@iaea.org	28267

Feature Article

New FAO/IAEA Databases: Food Contaminant and Residue Information System; Food Irradiation Treatment Facilities; Irradiated Food Authorizations

Welcome to our three new and revised FAO/IAEA Databases on Food Contaminant and Residue Information System (FCRIS), Food Irradiation Treatment Facilities (FITF) and Irradiated Food Authorizations (IFA).

Food Contaminant and Residue Information System

FCRIS is a new database derived from the previously published Food Contaminant and Residue Information System (INFOCRIS) database that will be retired shortly. The two major new features of FCRIS are the Veterinary Drug Residues Method Database and the Pesticide Methods Database.

The Veterinary Drug Residue Database has been created to help establish acceptable assay methods and sampling protocols for national testing laboratories to ensure safe and suitable food products for both local consumption and international trade. The Veterinary Drug Residue Method Database seeks to provide public information relating to veterinary drugs used in animal production, including multi-residue and single analyte screening, quantitative and confirmatory analytical methodologies that are fit for national surveillance programs as well as physicochemical and toxicological data.

Similarly the Pesticide Methods Database has been created to help establish acceptable assay methods and sampling protocols for national testing laboratories to ensure safe and suitable food products for both local consumption and international trade.

Below is an image of the veterinary drug residue methods. A detailed view of a method is displayed in the next image.

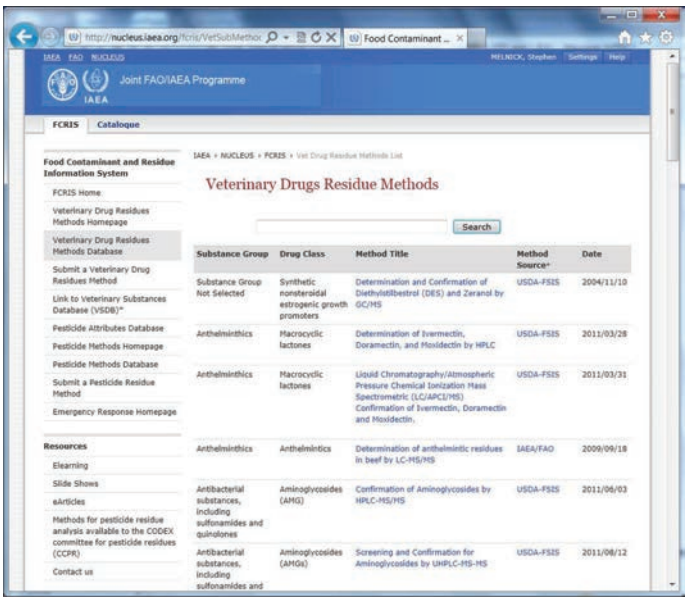


Figure 1: The Veterinary Drugs Residue Methods page shows a list of analytival methods sorted by Substance Group, Drug Class, Method Title, Method Source and Date.

Figure 2: Method Details page which displays specific database field information.

FCRIS also contains a Pesticide Attributes Database that contains information about pesticide properties.

Please visit the website at http://nucleus.iaea.org/fcris/ and send any suggestions or comments regarding the content and structure of the database. Also, please send any public veterinary or pesticide methods which may be posted on the website to official.mail@iaea.org Subject: New Veterinary Drug or Pesticide Method Submission. We look forward to receiving the methods.

Food Irradiation Databases

The new Food Irradiation Treatment Facilities (FITF) Database contains a detailed listing of facilities for the irradiation of foods intended for human consumption. The information includes the country location and name of the facility, contact details (address, phone/fax and

email), radiation type and date of insertion.

Please visit the website at http://nucleus.iaea.org/fitf/ and send us any comments or suggestions regarding the content and structure of the database. Please send public information about a facility to official.mail@iaea.org Subject: Food Irradiation Treatment Facility.

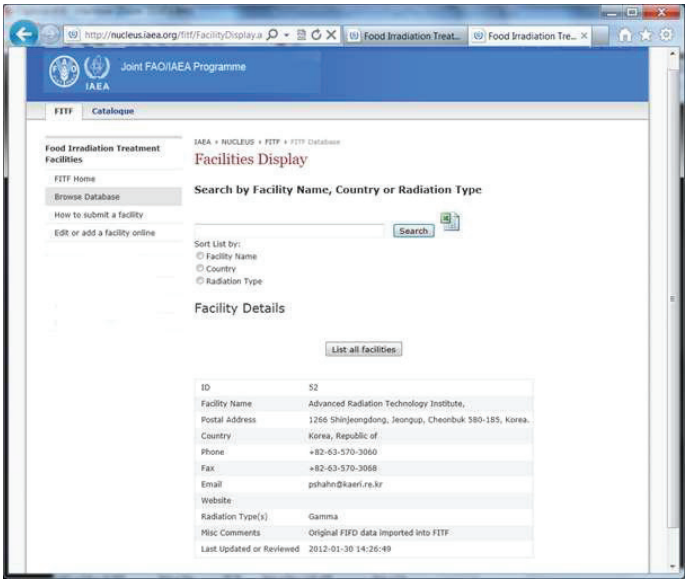


Figure 3: Facility Details page which displays specific database field information.

The new Irradiated Food Authorization Database (IFA) is a database on country approvals of irradiated foods for human consumption. The information includes country name, class of food, specific food product, objective of irradiation, date of approval and recommended dose limit.

Please visit the website at http://nucleus.iaea.org/ifa/ and send us any comments or suggestions regarding the content and structure of the database. Please send public information about irradiated food authorizations for specific foods by country to official.mail@iaea.org Subject: Irradiated Food Authorization.

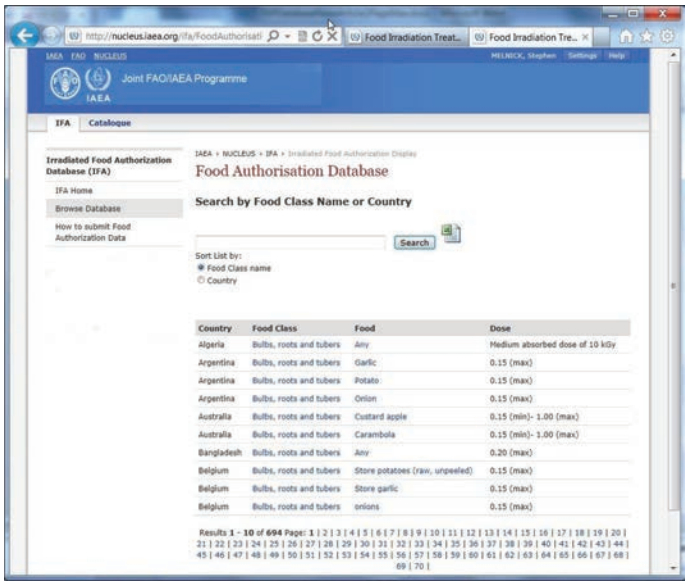


Figure 4: Food Authorisations database listings by Country, Food Class, Food and Dose.

Forthcoming Events

Research Coordination Meetings

Meetings	Dates	Venue	Technical Officer
1st RCM on the Application of Radiation Technology in the Development of Advanced Packaging Materials for Food Products	22–26 April 2013	Vienna, Austria	Blackburn, C.M. Safrany, A. (NAPC)
3rd RCM on the Development of Irradiated Foods for Immuno-compromised Patients and Other Potential Target Groups	9–13 September 2013	Jeongeup, Republic of Korea	Blackburn, C.M. Byron, D.H.
2nd RCM on the Implementation of Nuclear Techniques to Improve Food Traceability	TBD	TBD	Frew, R. Cannavan, A.
1st RCM on Isotopic Traceability Techniques for Rapid Response to Emerging Food Safety Risks	TBD	TBD	Frew, R. Cannavan, A.

Training Courses/Workshops

Workshop on Quality Assurance/Quality Control of Trypanosides	14–18 January 2013	Seibersdorf, Austria	Sasanya, J.J. Aiman, A.
Inter-regional Seibersdorf Train-the-Trainers Workshop on Traceability Techniques to Control Contaminants in Foods	25 February–8 March 2013	Seibersdorf, Austria	Maestroni, B.M. Cannavan, A.
Regional Workshop on Effective Monitoring of Food Contaminants – Sampling, Method Validation and Quality Control	20–24 May 2013	Bogota, Columbia	Maestroni, B.M.
Inter-regional Workshop on Quality Assurance/Quality Control of Analytical Methods for Food Contaminants and Traceability for the African Region	28 October–1 November 2013	Gaborone, Botswana	Maestroni, B.M. Sasanya, J.J.
Regional Train-the-Trainers Workshop on the Operation of Facilities Related to Food Irradiation	TBD	TBD	Blackburn, C.M. Byron, D.H.

International Meetings/Conferences

Meetings	Dates	Venue	Technical Officer
7th Session of the Codex Committee on Contaminants in Foods	8–12 April 2013	Moscow, Russian Federation	Byron, D.H.
45th Session of the Codex Committee on Pesticide Residues	6–13 May 2013	TBD, China	Sasanya, J.J. Byron, D.H.
2nd Coordination Meeting of the Inter-Agency Committee on Radiological and Nuclear Emergencies (IACRNE) Working Group on Coordinated International Exercises (WG-CIE)	7–9 May 2013	Rabat, Morocco	Byron, D.H. Blackburn, C.M.
23rd Meeting of the Interagency Committee on Radiological and Nuclear Emergencies	22–24 May 2013	The Hague, Netherlands	Byron, D.H.
4th Latin American Pesticide Residue Workshop on Food and the Environment (LAPRW)	26–29 May 2013	Bogota, Columbia	Maestroni, B.M.
36th Session of the Joint FAO/WHO Codex Alimentarius Commission	1–5 July 2013	Rome, Italy	Byron, D.H.
34th Meeting of the Radiation Safety Standards Committee (RASSC)	1–5 July 2013	Vienna, Austria	Blackburn, C.M. Byron, D.H.
3rd Coordination Meeting of the Inter-Agency Committee on Radiological and Nuclear Emergencies (IACRNE) Working Group on Coordinated International Exercises (WG-CIE)	9–11 July 2013	Rabat, Morocco	Byron, D.H. Blackburn, C.M.
AOAC International Annual Meeting and Exposition	25–28 August 2013	Chicago, USA	Cannavan, A.
21st Session of the Codex Committee on Residues of Veterinary Drugs in Foods	26–30 August 2013	TBD, USA	Sasanya, J.J. Byron, D.H.
4th Coordination Meeting of the Inter-Agency Committee on Radiological and Nuclear Emergencies (IACRNE) Working Group on Coordinated International Exercises (WG-CIE)	8–10 October 2013	Rabat, Morocco	Byron, D.H. Blackburn, C.M.
International Meeting on Radiation Processing (IMRP)	4–8 November 2013	Shanghai, China	Byron, D.H.
6th International Symposium on Recent Advances in Food Analysis	5–8 November 2013	Prague, Czech Republic	Cannavan, A.
35th Meeting of the Radiation Safety Standards Committee (RASSC)	9–12 Decmeber 2013	Vienna Austria	Byron, D.H.

Past Events

Final Meeting of the EU 7th Framework Project 'CONffIDENCE'; Brussels, Belgium; 17–18 December 2012

Technical Officer: Andrew Cannavan

The EU 7th Framework Integrated Project 'Contaminants in Food and Feed: Inexpensive Detection for Control of Exposure' (CONffIDENCE) is a 4 year project with 17 partners from 10 countries and a budget of €7.5 million, of which €5.8 million is from the EC. The main objective of the project is the development of novel, multiplex screening methods for a wide range of contaminants in high-risk products such as fish and cereal-based food and feed, and vegetables. The validated methods will be applied to provide data for risk assessment and for regulatory systems for food safety.

The final meeting of the CONffIDENCE consortium, Project Management Board, and Advisory Board took place in Brussels, Belgium, on 17–18 December 2013. Mr Cannavan, Head of the Food and Environmental Protection Laboratory, participated in the meeting as Chair of the Advisory Board.

The first day was comprised of meetings of each of the individual work packages within the project to finalise reporting and discuss results and completion of the research. On the second day, a stakeholders meeting was convened, which included representatives of the European Commission's Directorates General for Health and Consumers (DG-SANCO) and for Research and Innovation (DG-RTD), the European Food Safety Authority (EFSA), the European Technology Platform (ETP) – Food for Life partnership, the European Consumers Association (BEUC), European Cooperation in Science and Technology (COST) Actions Networks, the European Committee for Standardization (CEN), other relevant EU 7th Framework projects, and industrial food and feed organizations. The project work package leaders presented the project achievements, with a general overview of the impact of the project and future challenges by the project coordinator. Mr Cannavan gave a summary of the project's achievements and future challenges in the field of food and feed safety from the perspective of the project Advisory Board, with an emphasis on food safety linked to food security.

Some of the future challenges identified for food and feed safety and regulatory control focused on the dynamic nature of the problems and issues that arise in the field of food and feed. The integrity of the food supply is affected by issues such as climate change. For example, changes in rainfall and temperature in different parts of the world can influence fungal growth patterns, and therefore patterns of mycotoxin occurrence. Climatic issues are a concern in the world's oceans as they affect the distribution of harmful algae responsible for producing biotoxins that contaminate seafood resources. Climate change can also cause changes in insect pest infestation patterns, and therefore in pesticide use. Other factors such as changes in demographics and production practices may necessitate the increased use of veterinary drugs for both therapeutic and prophylactic purposes in semi-intensive or intensive animal production. The need for increased and optimized food production to meet the growing global population is also likely to necessitate increased use of agrochemicals. Associated with these factors are the risks of increased occurrence of potentially harmful chemical residues in food and feed.

Another challenge for the future is the need to take advantage of new technological developments. There is an extremely fast rate of development in, for example, mass spectrometric techniques for the detection and identification of both targeted and untargeted food contaminants. There is likely to be more emphasis in the future on controlling total toxic load in foods, taking into consideration the effects of multiple contaminants in a single food source.

Tackling these types of challenges will require more control at field level, using the type of user-friendly, multiplex methods developed in CONffIDENCE, as well as innovative approaches for both research and regulatory control analysis in the laboratory.

In the future the first priority is food security, which may be defined as ensuring a sufficient supply of safe and nutritious food. The safety and integrity of the food supply chain are absolutely essential for sustainable food security, and future projects along the lines of CONffIDENCE will be essential to ensure that this is realized. The Project Advisory Board concluded that further research and development will be needed in the future to develop and ultimately implement applicable methods and assess changing risks.

First Coordination Meeting of the Inter-Agency Committee on Radiological and Nuclear Emergencies (IACRNE) Working Group on Coordinated International Exercises (WG-CIE); Rabat, Morocco; 4–6 December 2012

Technical Officer: David H. Byron

The First Coordination Meeting of the Interagency Committee on Radiological and Nuclear Emergencies (IACRNE) Working Group on Coordinated International Exercises (WG-CIE) took place at the Moroccan Civil Protection Department Headquarters in Rabat, Morocco, from 4–6 December 2012. The meeting discussed initial preparations for the holding of the ConvEx-3 international emergency response exercise (see IAEA webpage on

International Response System for additional details) that will be held in Morocco in late 2013.

IACRNE Working Group at the Moroccan Civil Protection Department Headquarters in Rabat, Morroco.

Pursuant to FAO obligations under the IAEA Emergency Conventions, and in consideration of its key role in coordinating the arrangements of relevant international intergovernmental organizations for preparing and responding to nuclear and radiological emergencies affecting food and agriculture as a full member of IACRNE and co-sponsor of the Joint Radiation Emergency Management Plan of the International Organizations (EPR JPLAN 2010), international emergency response exercises and their effective evaluation is an essential tool for improving international emergency response arrangements.

In order to more efficiently plan, conduct, analyse and share the results of international nuclear emergency exercises such as ConvEx-3, the IACRNE serves as a coordination point for these activities. As the forthcoming ConvEx-3 exercise will be based on a severe radiological emergency triggered by malicious acts, it is envisioned that Joint Division contributions will include objectives related to the contamination of food and agricultural commodities, as well as the potential application of immediate agricultural countermeasures, as injects into the ConvEx-3 international exercise.

The IACRNE / WG-CIE meeting was convened at the invitation of the IAEA / IACRNE Secretariat and the Moroccan National Centre for Energy, Sciences and Nuclear Techniques (CNESTEN). Eight members of the IACRNE Working Group (CTBTO, IAEA, FAO, WHO and WMO), thirty-seven representatives from Moroccan authorities and two representatives from the Spanish civil protection authority attended the meeting. The Chair of the National Competent Authorities Coordinating Group (NCACG) also attended the meeting as an observer.

The objectives of the meeting were (i) to familiarize national exercise organizers and representatives of all major exercise players with the exercise preparation, conduct and evaluation process, roles of relevant international organizations in emergency preparedness and response, with the IACRNE and with lessons learned from the ConvEx-3 (2008) exercise; (ii) to discuss, consolidate and agree on ConvEx-3 (2013) international exercise objectives, scope, duration, dates and evaluation processes; (iii) to agree on the main features of the exercise scenario; and (iv) to prepare the overall exercise work plan.

Mr Martincic (IAEA) recalled the history and explained the role of IACRNE and its Working Group on Coordinated International Exercises. He also presented a generic overview of the preparation, conduct and evaluation of a full scale emergency response exercise and explained lessons identified in the previous ConvEx-3 exercise that was conducted in 2008. The emergency preparedness and response roles and capabilities of international organizations present at the meeting were explained by Mr Martincic and Mr Hlavacka (IAEA), Mr Byron (FAO), Mrs Carr (WHO), Mr Muscat (WMO) and Mr Auer (CTBTO).

Participants of the First Coordination Meeting in Rabat, Morocco.

Representatives of international organizations[1] attending the meeting presented their intended specific exercise objectives, including FAO objectives to test arrangements for the provision of advice in the case of food contamination, the shipment of contaminated foodstuffs and the application of potential agricultural countermeasures, and; to test the effectiveness of communication between the Joint FAO/IAEA Division – IAEA Incident and Emergency Centre (IEC) Focal Point (Vienna) and FAO Headquarters in Rome.

The Meeting reached the following conclusions:

- Common exercise objectives: Endorsed as proposed.
- Specific exercise objectives: List of specific objectives to be completed by inputs from International Organizations that were not present at the meeting.
- Common exercise evaluation: Agreed as proposed.
- Basic Exercise scenario: Dirty bomb(s) explosion(s) in port of Tangier, Morocco (with as much damage and contamination as credible) and possibly with a threat of additional explosion(s).

1 It is expected that the IMO, ICAO, Interpol and EUROPOL will also be participating in the exercise and will decide on their specific exercise objectives (if any).

- Exercise dates: 27–28 November 2013.
- Exercise start time: Afternoon/evening local (Moroccan) time.
- Exercise duration: At least 24 hours from the first exercise message to the IAEA IEC.
- Exercise Weather: Decision postponed until further discussions are held regarding the advantages/disadvantages of two options, i.e. actual weather at the time of the exercise or chosen/preferred historical weather on the day of the exercise.
- Exercise conduct: Near real time mode.
- Exercise overall work plan: Endorsed with minor changes.

The Second Coordination Meeting of the Inter-Agency Committee on Radiological and Nuclear Emergencies (IACRNE) Working Group on Coordinated International Exercises (WG-CIE) is tentatively scheduled to be held in Rabat, Morocco, from 14–16 May 2013.

33rd Meeting of the Radiation Safety Standards Committee (RASSC); IAEA Headquarters Vienna, Austria; 27–29 November 2012

Technical Officer: Carl Blackburn

Mr Pil-Soo Hahn (DIR-NSRW) welcomed participants and formally opened the joint sessions of the 33rd meeting of the RASSC and the 34th meeting of the Waste Safety Standards Committee (WASSC). It was recalled that the IAEA Nuclear Safety Action Plan (NSAP), endorsed by the General Conference in 2011, includes the review of the Agency's safety standards. Considerable progress has been made and work continues with the focus moving from the revision of safety requirements to the review of the associated guidance.

Many events were highlighted and included the Fukushima Ministerial Conference on Nuclear Safety, organized by the IAEA and the Government of Japan (15–17 December 2012, Fukushima Prefecture, Japan) that provide another opportunity to share the lessons learnt from the Fukushima nuclear accident. Also, commencing 28 January 2013, an International Experts Meeting will be held in Vienna on decommissioning and remediation after a nuclear accident.

Reference levels for radionuclides in foodstuffs and water were discussed in the context of nuclear or radiological emergencies. The Basic Safety Standards establish a dose criterion of 'about 1 mSv' for the annual average individual effective dose to a representative person. The publication Criteria for Use in Preparedness and Response for a Nuclear or Radiological Emergency (GSG-2) provides activity concentrations for use subsequent to an emergency. In addition, Guideline Levels (activity concentrations) applicable to radionuclides contained in foods destined for human consumption, contaminated following a nuclear or radiological emergency and traded internationally have been established by the Joint FAO/WHO Codex Alimentarius Commission (CODEX STAN 193-1995).

RASSC has asked the IAEA Secretariat to establish a Working Group with other interested international organizations, including the joint FAO / IAEA Division, in order to document the various international standards in existence, the basis on which they have been derived and the circumstances in which they are intended to be used. Following discussions at the 17th meeting of the Inter-Agency Committee on Radiation Safety (IACRS) on 26 November 2012 the Agency will now proceed to establish a working group. Collection of data has commenced.

In its statement to RASSC the Joint FAO/IAEA Division on Nuclear Techniques in Food and Agriculture was pleased to report on activities carried out within the context of FAO obligations as a full party to the IAEA Early Notification and Assistance conventions, and under the FAO cosponsored Joint Radiation Emergency Management Plan of the International Organizations (EPR JPLAN 2010).

FAO activities related to the Fukushima nuclear accident continue to ensure the dissemination of information on food monitoring and food restrictions, the consideration of agricultural countermeasures and remediation strategies to mitigate immediate and longer term effects arising from radionuclide contamination, and the interpretation of standards related to radiological protection of the public, to both FAO and IAEA and other international organization Member States. More importantly, activities related to the Fukushima nuclear accident identified lessons learned that highlighted the need to strengthen the development of appropriate contingency planning and capacity building to respond to nuclear and radiological emergencies and in strengthening country resilience to such emergencies.

In this regard, it is envisioned that these proposed activities will strengthen the development, enhancement and harmonization of Member State capabilities in the monitoring of radioactivity in food and agricultural commodities and for the utilization of monitoring data for the management of contaminated agricultural land and water, including the development of appropriate contingency planning and capacity building initiatives, such as train-the-trainers workshops and information exchange through e-resources, conferences and technical meetings.

Additional activities would include the development of field and laboratory practices in relation to harmonized sampling protocols and analytical strategies (including soils, agricultural commodities and foods) and control programs for monitoring commodities and selecting practical options for the application of agricultural countermeasures and remediation strategies to restore production and distribution systems for food, agriculture, forestry and fisheries products.

Recent and on-going activities of the Joint FAO/IAEA Division related to international standards also encompass coordination and participation in the on-going review of the Joint FAO/WHO Codex Alimentarius Commission guideline levels for radionuclides in foods contaminated following a nuclear or radiological emergency that are intended for use in international trade. The review of the Guideline Levels, which are contained in the Codex General Standard for Contaminants and Toxins in Food and Feed (CODEX STAN 193-1995), was initiated by the 6th Session of the Codex Committee on Contaminants in Foods (CCCF) in March 2012 and the CCCF proposal was approved as new work by the 35th Session of the Joint FAO/WHO Codex Alimentarius Commission in July 2012, which noted the importance of involving the IAEA and other relevant international organizations in this work.

In this regard, the CCCF established an electronic working group under the Netherlands (Chair) and Japan (Co-Chair) to undertake this new work on the review and potential revision of the Codex Guideline Levels. The Joint FAO/IAEA Division has assured the CCCF Working Group of its cooperation in undertaking the development of a discussion paper containing an overview of the current guideline levels for radionuclides in food, a description of their current interpretation and application, and the situation regarding traded foods that were subject to radionuclide controls, for consideration at the next 7th Session of the CCCF in April 2013.

The Joint FAO/IAEA Division looks forward to its continued collaboration with the RASSC in the on-going revision of international safety standards and in assisting governments to effectively respond to nuclear and radiological emergencies through the provision of training and support and the development, coordination and implementation of standards, management procedures and emergency preparedness and response mechanisms related to food and agriculture.

17th Meeting of the Inter-Agency Committee on Radiation Safety (IACRS); Vienna, Austria; 26 November 2012

Technical Officer: Carl Blackburn

The 17th meeting of the IACRS was hosted by the secretariat to The United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) and held at the United Nations Office, Vienna, Austria on 26 November 2012.

The IACRS was established in 1990 to promote consistency and co-ordination of policies with respect to areas of common interest in radiation protection and safety. The committee is a forum for consultation on collaboration in radiation safety matters between international organizations. Membership comprises the European Commission (EC), the Food and Agriculture Organization of the United Nations (FAO), International Atomic Energy Agency (IAEA); International Labour Organisation (ILO), OECD Nuclear Energy Agency (NEA), United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), World Health Organisation (WHO) and The Pan American Health Organization (PAHO). Organizations with observer status include the International Commission on Radiological Protection (ICRP), International Commission on Radiation Units and Measurements (ICRU), International Electrotechnical Commission (IEC), International Radiation Protection Association (IRPA), and International Organization for Standardization (ISO).

The meeting reviewed its terms of reference in the light of past experience, and new opportunities, the new International Basic Safety Standards (BSS) and the Fukushima nuclear accident, with a view to more effectively using the IACRS and its meetings to better assist member and observer organizations. Items discussed included the utility of new technology for conducting extraordinary/inter-regular meetings; continuity of infrastructure support (website, record-keeping, and communications); the 'visibility' of IACRS and its strategic agenda and concept of operations.

Participants of the 17th IACRS in Vienna.

Guideline levels (radionuclide concentrations) relating to the control of foods and other commodities contaminated with radionuclides were discussed (see details immediately above). Other IACRS agenda items also included the status of the BSS and arrangements for cooperating on their implementation. The IAEA provided a brief report on the current status of the BSS, and the EC gave an up-date and feedback on BSS as incorporated into the EC Directive. The IACRS also discussed a proposal to establish an ad hoc task group for cooperating on implementation of the revised BSS.

Two working groups were established. The first of these is to co-ordinate the implementation of the International Basic Safety Standards (BSS), while the second working group will consider approaches to the control of contaminated foodstuffs, such as the review of guideline activity concentrations in commodities, including food, in line with the advice received from the 32nd Meeting of the

Radiation Safety Standards Committee in June 2012 and in regard to the review of CODEX STAN 193-1995.

The next IACRS meeting will be arranged for June/July 2013, to be tentatively hosted by the FAO.

International Institute for Applied Systems Analysis (IIASA) 40th Anniversary Conference on Worlds Within Reach from Science to Policy; Vienna, Austria; 24–26 October 2012

Technical Officers: A. Abrahim and B. Maestroni

An international conference on Worlds Within Reach from Science to Policy was organized in Vienna by the International Institute for Applied Systems Analysis (IIASA) from 24–26 October 2012. The conference was attended by more than 800 researchers, policymakers, and industry leaders.

The objective of the conference was to discuss transformations taking place in todays' world, such as increased globalization, economic and political power, environmental challenges, social conflicts, and to analyse the impact of those on the relationship between science and policy in the future. Leading scientists and experts from a diverse range of disciplines, regions, and institutions presented findings to generate debate and further analyses, reinforcing the relevance and application of advanced systems analysis and integrated approaches in providing science-based solutions for policy-makers.

Discussion at the conference raised the issue that neither policymakers nor the public fully realize how urgent it is to achieve global sustainability. In a video message, UN Secretary-General Ban Ki-Moon suggested that a new generation of sustainable development goals should be generated, along with agreement on the means to achieve them.

The main speakers of the first day of the conference included the Director-General of UNIDO, Kandeh Yumkella, Dr B. Stigson, former president of the World Business Council for Sustainable Development, Prof Thomas Schelling, Nobel Prize recipient in economics and Dr A. Najam, Lahore University of Management Sciences in Pakistan.

Themes throughout the day included the current lack of a common framework for dealing with complex systems and the fact that there are many individual scientific efforts that are not integrated into a theoretical framework. It was noted that scientists find it difficult to convey information to policy makers and to the general public, and this leads to inefficiency in the use and application of scientific information and knowledge. Various presentations and discussions addressed issues such as the need for action to deal with climate change and especially its effect on the poor, the pressing need for education and the benefits of education for future generations, and the need for an integrated and harmonized global management of these types of issues.

The technical officers from the Food and Environmental Protection Laboratory (FEPL) attended the first day of the conference and presented a poster on The Role of the Laboratory in the Farm-to-Fork Food Safety Chain. The poster presentation was within the general theme of the conference on integrated, multi-stakeholder and multi-national approaches to solve current and future global problems; the specific focus being on the central role played by the analytical laboratory in the food safety chain, linking all stakeholders in efforts to create sustainable food safety systems and cost effective monitoring programmes that allow issues to be identified and addressed at an early stage in the food chain.

IAEA Scientific Forum 2012: Food for the Future – Meeting the Challenges with Nuclear Applications; Vienna, Austria; 18–19 September 2012

Technical Officer: David H. Byron

The 2012 IAEA Scientific Forum on Food for the Future – Meeting the Challenges with Nuclear Applications, examined the challenges related to the improvement of food production, food protection and food safety through the use of nuclear technologies. The Scientific Forum emphasized the successful collaboration between IAEA and FAO, discussed the role of nuclear techniques in food and agriculture, and gave concrete examples of efforts made by the IAEA and other organizations to improve food security worldwide. The 2012 Scientific Forum was organized into three sessions addressing *Increasing Food Production, Ensuring Food Protection* and *Enhancing Food Safety.*

IAEA Director General Mr Yukiya Amano at the Scientific Forum 2012.

The *Enhancing Food Safety* session was further divided into discussions concerning food irradiation and food contamination. Distinguished panellists participating in the food irradiation session included Mr Arun Kumar Sharma from the Bhabha Atomic Research Centre (India); Mr Suresh Pillai of Texas A&M University (USA),

and; Ms Karen Hulebak, former Chairperson of the Joint FAO/WHO Codex Alimentarius Commission and Principal of Resolution Strategy (USA). The food contamination panellists included Mr Frans Verstraete from the European Commission (Belgium); Ms Elizabeth Carozo Rojas from the University of Costa Rica (Costa Rica); Mr Ezzeddine Boutrif, former Director of the FAO Nutrition and Consumer Protection Division (Italy), and; Mr Chris Elliott from Queen's University Belfast (United Kingdom).

Mr Chris Elliott at the IAEA Scientific Forum 2012.

In the session on *Enhancing Food Safety*, it was noted that the IAEA plays a key role in the development of systems for the control of chemical contaminants in food, the application of traceability systems to identify and manage emerging food safety problems and trends, and the provision of information on food origin and authenticity that can help ensure food safety throughout the entire food production chain.

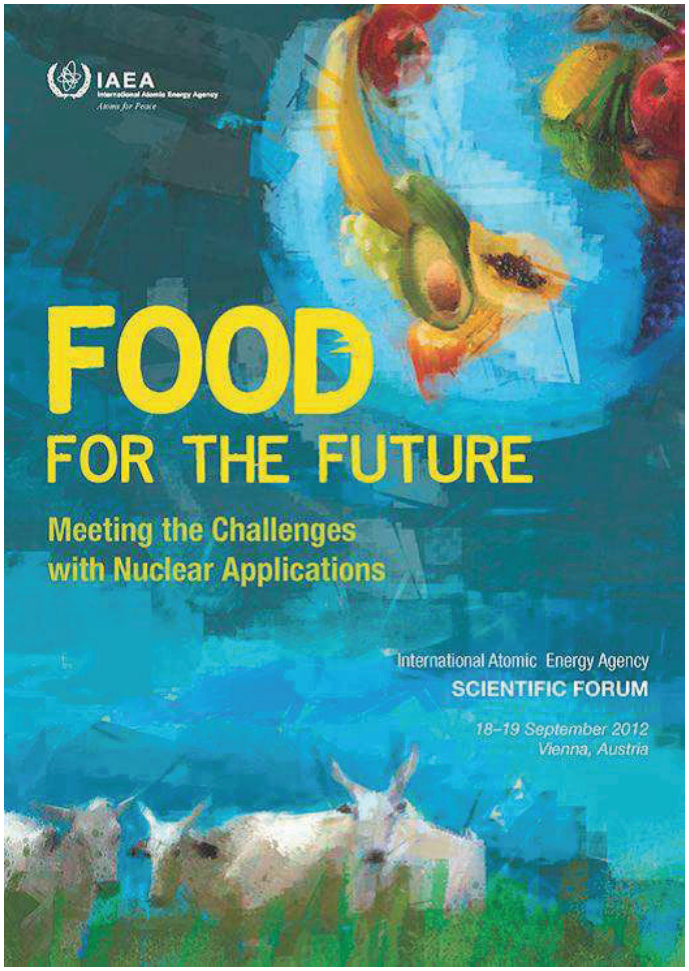
It was further noted that food irradiation is strongly supported by the IAEA as a proven and effective post-harvest treatment to improve food safety and maintain quality through the reduction of bacterial contamination and for the control of insect pests in agricultural commodities, without the need for chemicals or additives.

The panellists noted that food irradiation is one of the few technologies which address both food quality and safety and supported food irradiation as a safe and valuable technology. Applications of food irradiation for sanitary (human health) and phytosanitary (plant health) purposes helps to ensure food safety and quality and facilitate international trade while at the same time generating significant foreign exchange through the import and export of foodstuffs worldwide.

In the area of food contamination control, the Scientific Forum noted that exposure to chemicals and contaminants in the food supply represents a serious threat to the health of millions of people worldwide, particularly those in developing countries with poor nutritional status.

The panellists noted that the IAEA can play an important role to ensure food safety and facilitate international trade as a coordinator of a global network of food safety laboratories through the development and dissemination of traceability and contaminant control technologies and increased collaboration between multiple stakeholders throughout the food production chain.

In concluding, the Scientific Forum showed the significant capabilities that have been established in Member States with the assistance of the IAEA. However, it was concluded that more still needs to be accomplished to expand the essential role of the IAEA to optimize capabilities in the use of nuclear sciences and technologies to improve food security worldwide.



Poster presented at the the IAEA Scientific Forum 2012.

Fourth International Feed Safety Conference on Methods and Challenges; Beijing, The People's Republic of China; 11–13 September 2012

Technical Officer: Zora Jandrić

The Fourth International Feed Safety Conference on Methods and Challenges, held in Beijing, the People's Republic of China, from 11–13 September 2012, was the latest in this series of conferences which are the leading international meetings in this field. The conference was organised to present the state of the art and to discuss future challenges through presentations and plenary meetings. The following topics were covered: recent advances in feed analysis, impact of feed on food safety,

risk assessment, traceability, legislation framework, and future challenges in food and feed safety.

The scientific program addressed areas such as processed animal proteins, non-protein nitrogen (NPN) and organic contaminants (dioxins, polychlorinated biphenyls (PCB) and pesticides), feed additives, banned substances, heavy metals, mycotoxins, plant toxins, veterinary drugs, and genetically modified organisms (GMO). Results of recent European Union-funded international research, technical development and demonstration (RTD) projects were also presented. The conference was attended by more than 300 participants from more than 25 countries.

Ms Jandrić presented a poster on current applied research done in the Food and Environmental Protection Laboratory (FEPL) at Seibersdorf on the simultaneous determination of natural toxins in animal feeds by liquid chromatography - tandem mass spectrometry. The research was conducted to provide analytical methodologies for the risk assessment of feed contamination and carry-over of natural toxins from feed to food. The method developed is transferable to IAEA Member States.

The visit to the laboratories of China Agricultural University.

The presentation was followed by extended discussions with several symposium participants, both in the poster sessions and afterwards in the break sessions. Ms Jandrić took the opportunity to discuss issues relevant to the current food traceability work of the Food and Environmental Protection subprogramme. Collaboration was established between FEPL and Queen's University Belfast, UK, to exchange samples and work on method development for a current project on honey authenticity and traceability.

For the last day of the conference, a group visit was organized to Beijing DQY Agricultural Technology Company's eco-farm located in Beijing Songshan National Nature Reserve and to the laboratories of China Agricultural University. DQY is the world's leading eco-agricultural model, encompassing the cycle of ecological farm, food processing, clean energy, organic fertilizers, contract agriculture and ecological planting. They use ecological technologies such as biogas power generation, sewage treatment and solar power.

Participation in the conference offered an excellent way to network and share ideas with experts from all over the world. New models for risk-based contaminant control of feed materials on the basis of the risk for feed and food safety were presented and could be potentially used in IAEA projects in developing countries. Continuous research is needed to identify simple and rapid techniques that would be applicable and would benefit developing countries in feed and food safety regulatory testing and traceability.

35th Session of the Joint FAO/WHO Codex Alimentarius Commission; Rome, Italy; 2–7 July 2012

Technical Officer: David H. Byron

The technical officer represented the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture at the 35th Session of the Joint FAO/WHO Codex Alimentarius Commission to report on matters of interest to Codex. The Session was attended by 623 delegates from 147 Member countries, 1 Member Organization and 37 international governmental and non-governmental organizations, including UN agencies.

The technical officer reported on relevant matters of interest (CAC/35 INF/7) to Codex arising from the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture since the 34th Session of the Commission, including the control of food contaminants, the use of ionizing radiation and the management of nuclear and radiological emergencies, particularly following the Japanese nuclear emergency.

In relation to the Japanese nuclear emergency and in follow-up to discussions at the 6th Session (March 2012) of the Codex Committee on Contaminants in Foods (CCCF) to involve the IAEA and other relevant international organizations in the proposed revision of the Codex Guideline Levels for Radionuclides in Foods, the technical officer noted that the Joint FAO/IAEA Division intended to participate actively in this new work. It was further noted that the participation of the IAEA and the Joint FAO/IAEA Division in the review of the guideline levels was also strongly supported by the latest 32nd Meeting of the IAEA Radiation Safety Standards Committee in June 2012.

The Representative also noted that the Joint FAO/IAEA Division had collaborated with the Codex Committee on Residues of Veterinary Drugs in Foods in publishing analytical methods through the Joint FAO/IAEA Division Food Contaminant and Residue Information System (FCRIS) web application. The methods database contained methods from various sources and would accommodate both multi-residue analytical methods and single analyte methods. Access to the methods is intended to

enhance the capabilities of developing countries and strengthen residue monitoring plans.

The associated FCRIS Pesticide Attributes Database (PAD) and the Pesticide Residue Methods (PRM) database are being developed through collaboration with the Codex Committee on Pesticide Residues as resources for physicochemical / toxicological data and for methods of analysis for pesticides, respectively. It was also further noted that two new Food Irradiation Treatment Facilities and Irradiated Food Authorization databases have been developed and published on the Joint FAO/IAEA Division website (see Feature Article of this Newsletter for additional details).

The Codex Member Delegations of Canada, Japan and Denmark (speaking on behalf of the member states of the EU present at the session), expressed their thanks for the continued support and assistance provided by IAEA and other international organizations in regard to the nuclear accident in Japan. The Chairperson of the Committee on Veterinary Drugs also thanked the Joint FAO/IAEA Division for its assistance with the web-based repository for methods of analysis for residues of veterinary drugs and its relevance for veterinary residue monitoring programmes, and the Delegation of Chile highlighted the importance of the development of isotopic nuclear techniques in agriculture, in particular in the area of pesticide residues.

In view of on-going work of the Joint FAO/IAEA Division directly related to activities of the Codex Alimentarius Commission, it is anticipated that a representative of the Joint Division will attend the next 36th Session (July 2013) of the Joint FAO/WHO Codex Alimentarius Commission to present a progress report on matters of interest to Codex.

Ninth European Pesticide Residue Workshop 2012; Vienna, Austria; 25–28 June 2012

Technical Officers: Zora Jandrić and Britt Maestroni

The Ninth European Pesticide Residue Workshop (EPRW) took place in Vienna from 25–28 June 2012. More than 520 participants from 54 countries attended the conference, which is the leading international meeting in this field. New advances and applications of analytical techniques, analytical quality assurance, regulatory issues, monitoring programmes, dietary intakes and consumer risk assessment were the most relevant topics covered by this workshop.

The current trend in chemical food safety control is characterized by improvement of the analytical instrumentation and equipment available, enhancing the ability to expand the scope of multiresidue methods (MRMs), in terms of both the number of analytes and commodities that can be covered. There is currently a great effort by scientists to integrate analysis of various groups of food contaminants/toxicants into single, high-throughput methods, whenever possible. The choice of optimal sample preparation step, especially forin complex matrices, and separation/detection principle represent the most important considerations to achieve good recovery of the target analytes and other required performance characteristics. However, for specific cases, there still remains a need for single residue methods.

Global sourcing of raw materials and global distribution of feed, food and dietary supplement products bring in a myriad of considerations with respect to the potential residues and regulatory consequences. These include questions such as which pesticides could have been applied, which residues could be present as a result of contamination, or which metabolites should be also tested together with, or instead of, the parent compound. Routine pesticide laboratories often face the dilemma of selecting which pesticides to include in their multiresidue methods. In many aspects, a non-targeted approach, using full scan MS data acquisition and database/library searching, seems like an intriguing and promising option for pesticide and other chemical control testing. A number of discussions were held about the practicability and feasibility of this approach for routine laboratories.

A participant from Colombia, a member of the "Red Analitica de Latino America y El Caribe (RALACA) network established with IAEA assistance, presenting his work at the EPRW2012.

Ms Maestroni (FEPL) presented a poster on a five year international coordinated research project (CRP) on integrated analytical approaches to assess indicators of the effectiveness of pesticide management practices at a catchment scale. This CRP brought together analytical laboratories that are members of wider and multidisciplinary groups. This network provided the assessment of good agricultural practice at a catchment scale using harmonized and integrated approaches to monitor the presence of selected high-impact-ranking pesticides in surface water and sediments.

The European Pesticide Residue Workshop provided the opportunity to share knowledge with colleagues and discuss the latest developments in the area of pesticide residues.

First European Workshop on Ambient Mass Spectrometry and Related Mass Spectrometry-Based Techniques in Food/Natural Products Control: Safety, Authenticity, Forensics, Metabolomics; Prague, Czech Republic; 18–20 June 2012

Technical Officers: Andrew Cannavan and Zora Jandrić

Mr Cannavan (Laboratory Head) and Ms Jandrić (Analytical Chemist) from the Joint FAO/IAEA Division's Food and Environmental Protection Laboratory (FEPL) participated in the 1st European Workshop on Ambient Mass Spectrometry and Related Mass Spectrometry-based Techniques in Food/Natural Products Control: Safety, Authenticity, Forensics, Metabolomics.

The workshop had approximately 80 participants and comprised plenary lecture/oral presentations, poster sessions, discussion sessions and workshops/demonstrations of analytical techniques by scientists and instrument vendors.

Ms Jandrić participated in all plenary sessions and presented a poster entitled Assessment of Fruit Juice Authenticity Using UPLC/QToF MS and MarkerLynx Data Evaluation, which summarized the outcome of research performed in FEPL under the project 'Traceability to improve food safety and quality and enhance international trade'. Ms Jandrić also participated in technical discussion sessions on various ambient mass spectrometry techniques, including direct analysis in real time (DART), desorption electrospray ionization (DESI), liquid extraction surface analysis (LESA) and atmospheric pressure solids analysis probe (ASAP), which is the technique currently used in FEPL. Following an oral presentation which introduced chemometric approaches and general strategies in data handling and interpretation, Ms Jandrić engaged in discussions with the presenter to gain specific knowledge on the data analysis applications relevant to the work performed in FEPL, and for transfer to Member States.

Mr Cannavan participated in all plenary sessions and workshops and also met with the co-chairs of the meeting to discuss collaboration with the Institute of Chemical Technology, Prague, in an integrated research project proposal for funding under the EU 7th Framework Programme. The current draft of the proposal was discussed and suggestions for amendments and improvements were made in the light of the information presented during the workshop. The relative advantages and disadvantages of the various analytical techniques were discussed with respect to their suitability for the development of methods for food authenticity, traceability and contaminant control for transfer to IAEA and FAO Member States. Mr Cannavan also contributed to the final panel discussion session on the need for the development of new regulations and guidelines through bodies such as the Codex Alimentarius.

Ambient Mass Spectrometry is a new analytical technique with many potential benefits for rapid screening for food contaminants, identification of new contaminant problems, detection of markers for food authenticity and adulteration, and profiling for food traceability. The workshop was of great benefit for the future work of FEPL, since it facilitated discussions with experts in this emerging technology and in depth analysis of the potential advantages and also the limitations of the various configurations of the technique.

On a technical level, Ms Jandrić gained essential experience and knowledge on the hands-on applicaton of the techniques that will facilitate faster and more focused and efficient method development at Seibersdorf. From a managerial point of view, the overview of the technology provided by the workshop and the potential applications in the fields of work relevant to FEPL's interactions with Member States will enhance both the planning and the evaluation of future research activities focusing on eventual technology transfer.

The workshop also provided the opportunity for detailed planning of collaborative efforts to gain extrabudgetary funding through the participation of FEPL in a consortium preparing a proposal under the EU 7th Framework.

Participation in events such as this workshop is essential in order to maintain the activities of the NA Laboratories on a par with other laboratories worldwide, and to fulfil the mandate of NA in identifying and fostering isotopic and related technologies of benefit to Member States, especially given the increasing pace of technology development and new food safety challenges arising due to factors such as changing demographics in developing countries, climate change and the need for increased food production.

An instrument demonstration at the ambient mass spectrometry workshop.

Coordinated Research Projects

Third Research Coordination Meeting of the Coordinated Research Project on the Development of Generic Irradiation Doses for Quarantine Treatments; Buenos Aires, Argentina; 15–19 October 2012

Technical Officers: Carl Blackburn and Andrew Parker

The third Research Coordination Meeting (RCM) of the Coordinated Research Project (CRP) on the Development of Generic Irradiation Doses for Quarantine Treatments was held in Buenos Aires, Argentina from 15–19 October 2012.

Participants of the Third RCM in Buenos Aires, Argentina.

This CRP is taking forward work to establish validated irradiation dose treatments to control insect species of quarantine significance and considerable progress has been made since the project commenced in 2009. The results will strengthen existing irradiation standards developed under the International Plant Protection Convention (IPPC), thereby enabling international trade for various fruits and vegetables through the use of generic irradiation doses for a wide range of quarantined pests.

Background

Regulatory authorities and scientists from many internationally recognised institutions have generated research data on the effectiveness of irradiation as a quarantine treatment against specific insect pests infesting various fruits and vegetables. These authorities have concluded that the development of generic irradiation dose treatments suitable to control a broad range of pests is both feasible and desirable, in many cases generic dose treatments could negate the need to develop or validate specific irradiation dose treatments tailored to individual arthropod species.

From left to right: Mr Ray Cannon (UK), Mr Peter Leach (Australia) and Mr Daniel Hahn (USA).

From left to the right: Mr Guoping Zhan (China), Mr Valter Arthur (Brazil), Ms Marsheille Hofmeyr (South Africa), Mr Hendrik Hofmeyr (South Africa) and Ms Magali Dalto (Argentina).

The application of ionizing radiation (gamma, electron beam or X ray irradiation) as a plant health (phytosanitary) treatment has expanded rapidly in recent years with several countries irradiating fruit in order to meet quarantine requirements for exports (Table 1). This application of irradiation technology is important for both developed and developing countries due to uncertainties on the future availability and increasing price of methyl bromide, a fumigant facing increasing restrictions under the Montreal Protocol, but still widely used as a quarantine and pre-shipment treatment for pests of quarantine significance. There is a need for validated alternative post-harvest pest control methods, and ionizing radiation is a viable and effective alternative as is being demonstrated by applied research leading to the development of additional irradiation treatments.

Country of Origin	Destination Country	Commodity	Date trade started	Volumes (tonnes)	Radiation Type	Minimum Dose
USA (Florida)	USA (Texas and California)	Guava	1999	750 t (2011)	Gamma	70 Gy
USA (Hawaii)	USA (mainland)	Sweet potato, rambutan, longan, applebanana, curry leaf, dragonfruit, mangosteen	2000	4,000 t (Mainly sweet potato)	X-ray	400 Gy
Australia	New Zealand	Litchiis, mango, papaya	2004	580 t (2010) 1262 t of mango (2011/12)	Gamma	-
USA	USA	Mango	2007	275 t (2008)	Gamma (E-Beam facility authorized in 2012)	400 Gy
India	USA	Mango	2007	79 t (2011)	Gamma	400 Gy
Thailand	USA	Mango, longhan, mangosteen, rambutan	2007	4,080 t (by late 2007)	Gamma	400 Gy
Vietnam	USA	Dragon fruit, rambutan	2008	> 1,500 t (2011)	Gamma	400 Gy
Mexico	USA	Mango, guavas, citrus fruit, Manzano, Mangosteen, chilli	2008	10,318 t (2010)	Gamma	150 or 400 Gy
Pakistan	USA*	Mango*	2010	5.8 t (2011)	X ray (USA)*	400 Gy
Malaysia	USA	fruits	-	-	Gamma / E-Beam?	Proposed

Country of Origin	Destination Country	Commodity	Date trade started	Volumes (tonnes)	Radiation Type	Minimum Dose
Philippines	USA	Mango	-	-	Gamma / E-Beam?	Proposed
Australia	Malaysia	Mango	-	-	Gamma ?	Proposed
Vietnam	Chile	Dragon fruit	-	-	Gamma / E-Beam?	Proposed

Table 1: Countries Using Irradiation as a Quarantine Treatment.
** Irradiated on arrival in the USA, all others are irradiated at country of origin*

Since 1981, the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture has supported research, education and cooperation in the use of ionizing radiation as a post-harvest treatment. In this regard, the Food and Environmental Protection Sub-programme has implemented four coordinated research projects in the area of phytosanitary applications of irradiation. These projects established the basis for developing national and international standards on the use of irradiation as a phytosanitary treatment. Specifically, in 2003 the IPPC approved the International Standard for Phytosanitary Measures Guidelines for the Use of Irradiation as a Phytosanitary Measure (ISPM 18), and subsequently established irradiation treatments under the IPPC Standard on Phytosanitary Treatments for Regulated Pests (ISPM 28).

In 2009, eight irradiation treatments were adopted, a year later in 2010 a further three irradiation treatments were included, and an additional three treatments were adopted at the March 2011 meeting of the Commission on Phytosanitary Measures (CPM) of the International Plant Protection Convention (IPPC), making a total of fourteen internationally adopted post-harvest phytosanitary treatments. All fourteen irradiation treatments are included in the annexes to the standard ISPM No. 28 Phytosanitary Treatments for Regulated Pests, as follows:

Adopted by the Commission on Phytosanitary Measures from 2009–2011:

Annex 1 Irradiation treatment for Anastrepha ludens,

Annex 2 Irradiation treatment for Anastrepha oblique,

Annex 3 Irradiation treatment for Anastrepha serpentine,

Annex 4 Irradiation treatment for Bactrocera jarvisi,

Annex 5 Irradiation treatment for Bactrocera tryoni,

Annex 6 Irradiation treatment for Cydia pomonella,

Annex 7 Irradiation treatment for fruit flies of the family Tephritidae (generic),

Annex 8 Irradiation treatment for Rhagoletis pomonella.

Adopted by the Commission on Phytosanitary Measures in 2010:

Annex 9: Irradiation Treatment for Conotrachelus nenuphar,

Annex 10: Irradiation Treatment for Grapholita molesta,

Annex 11: Irradiation Treatment for Grapholita molesta under hypoxia.

Adopted by the Commission on Phytosanitary Measures in 2011:

Annex 12: Irradiation treatment for Cylas formicarius elegantulus,

Annex 13: Irradiation treatment for Euscepes postfasciatus,

Annex 14: Irradiation treatment for Ceratitis capitata.

Despite these successes, important gaps in knowledge still remain, and there are a number of other critical insect pests of quarantine significance where comparatively little research on their susceptibility to irradiation has been performed. Such pests include mites, thrips, mealybugs, weevils, leaf miners, aphids and scale insects.

Objectives of the Coordinated Research Project

The overall objective of the CRP is to validate generic treatment doses for groups of arthropod pests of quarantine significance in international trade. Secondary objectives include an examination of the effects of low oxygen commodity storage and dose rate on efficacy and commodity tolerances.

Research will assist in the development of a generic dose treatment for Insecta (except for pupae and adults of Lepidoptera). The work will also assist in setting doses for the quarantine treatment of phylum Arthropoda (and a few subgroups within that phylum) as well as directly establish minimum doses that will provide quarantine security against specific pests in various commodities.

Research on specific non-fruit fly pest species or groups will be conducted at different locations by researchers using practices that are adequate for phytosanitary applications of irradiation, such as accurate, traceable dosimetry, acceptable pest-rearing methods and precise determinations of efficacy. Efficacy under commercial conditions of oxygen stress, whether intentional or passive,

will be tested for certain applications. Tolerances of specific commodities under various commercial conditions will also be studied.

Review of Research and Planning for the Future

This 3rd RCM was held in order to review and appraise research activities and outputs produced so far during the CRP and to agree a programme of work for the final phase of the project. The logical framework used in formulating the CRP was used as the framework for its evaluation, which included an examination of what had been achieved by each participating organization and how this is contributing to the objectives of the project as a whole.

Ms María Julia Palacín, Vegetal Quarantine Director in SENASA (National Food Safety and Quality- Phytosanitary Regulatory Authority) and Ms Eulogia Kairiyama, Radiations Technology and Application Manager welcomed the participants and each provided an opening address. Opening remarks were presented on behalf of the FAO and IAEA by Carl Blackburn and Andrew Parker of the Joint FAO/IAEA Programme of Nuclear Techniques in Food and Agriculture, based in Vienna, Austria. They thanked the hosts and in particular Ms Celina Horak and her team, for the excellent arrangements in place for hosting the meeting.

Participants of the Third RCM in Buenos Aires, Argentina.

The participants introduced themselves and reviewed the meeting arrangements. Mr Guy Hallman was appointed chair and Ms Celina Horak was appointed co-chair of the meeting, Mr Ray Cannon volunteered to be rapporteur.

The meeting reviewed the research results achieved to date and evaluated the progress towards meeting the CRP objectives and outcomes. The majority of participants have been undertaking research to directly address the main objective of developing and validating irradiation treatment doses for groups of arthropod pests of quarantine significance in international trade. Secondary objectives include an examination of the effects of low oxygen commodity storage and dose rate on efficacy and commodity tolerances. These issues are also being investigated; there is some information on the effects of oxygen e.g. research in USA and Brazil. Data are being produced on commodity tolerances, for example work in Turkey and in Australia and the study by Mexico is focused on fruit quality at a commercial scale irradiation facility; a new CRP participant in Uruguay will also address this research area. Some research has investigated the effects of dose rate on efficacy but this issue has not been explored in great detail.

The CRP is generating data for a number of insect groups that have not been researched in great detail, including one or more species of dermestid beetles; eriophyid and spider mites; leaf miners; white flies; diaspid scales; mealybugs; psyllids; carpospinid, gelechiid, noctuid and tortricid moths. The meeting attempted to prioritize an order of preference for future work and in descending order of preference the following was proposed: Mites, scales, thrips, weevils (Premnotrypes spp.) and whiteflies (Bemisia tabaci).

Research outputs are already assisting in the development of a generic dose treatments and the CRP is assisting in setting doses for the specific pests. Four new irradiation treatments (all produced by CRP participants) have been submitted to the TPPT in response to the 2012 Call for Treatments for consideration for inclusion in ISPM 28.

In addition, research findings, including those of this CRP is suggesting that 250 Gy (not 400 Gy) may be sufficient for the majority of insect pests excluding *Lepidoptera* adults and pupae and possibly mites. A previous proposal for a generic irradiation treatment (*Generic irradiation treatment for all insects (Arthropoda: Insecta) except lepidopteron pupae and adults (Insecta: Lepidoptera) in any host commodity*) is being retained by the Technical Panel on Phytosanitary Treatments (TPPT) of the IPPC for future consideration. It is likely that the data generated by this CRP will help modify and develop this submission by providing additional support for a generic dose treatment for this broad range of significant insect pests.

The CRP may also result in the development of future generic quarantine treatment doses; e.g. for weevils (170 Gy?) and mites (350 Gy?). It may also be possible to propose generic doses for other insect groups, e.g. Whiteflies (100 Gy?); aphids (100 Gy?); Thrips (250 Gy?); Mealybugs (250 Gy?); Scale insects (250 Gy?). The next TPPT meeting was held in Nagoya, Japan in December 2012 and Ray Cannon will provide feedback from this meeting to inform the TPPT of progress. Ray Cannon, Guy Hallman and Andrew Parker may participate at this meeting.

Dosimetry issues were discussed and it was emphasized that actual measured doses of irradiation as received by the irradiated samples and the dose distribution / dose uniformity ratio should be reported. One of the problems is that studies available in the scientific literature do not always include these data, quoting only target (intended) irradiation dose in place of the dose actually delivered. All of the irradiation treatments approved by IPPC so far

use the maximum dose utilized in the research as the minimum dose for the commercial application of the treatment (the minimum dose for wide scale application of the treatment). This is why it is important to record the distribution of dose throughout the irradiation chamber and to minimize the dose distribution (dose uniformity ratio) so that it is as close to 1.0 as possible. Ideally the minimum dose, the maximum dose and some measure of the dose range should be available for each experiment as agreed in the research guidelines produced by the first RCM and available in Annex C of the meeting report[2]. In practice, detailed dosimetry data can be difficult to obtain if the product is irradiated by a third party.

The CRP participants are aware that dose mapping (e.g. product validation) is carried out in commercial situations to take into account the processing conditions (packet size, density, etc.) and 'target dose' under commercial conditions can be used to ensure that the minimum (treatment) dose is exceeded for in all parts of a consignment. In practice, some parts of the consignment will receive considerably more than the treatment dose.

It was felt that 2013 will be too early for the final RCM as there is on-going research and time will be needed to write and finalize papers for publication in a special edition of a scientific journal. A RCM in early 2014 was thought to be more appropriate.

Conclusions and Recommendations of the Third RCM

Conclusions

(1) The presentations demonstrated excellent progress in achieving the objectives of the CRP; Studies have used considerable numbers of insects in confirmatory tests and several treatments are almost finalized. CRP participants were responsible for all four treatments (including two generic treatments) submitted to the IPPC in response to the 2012 call for irradiation treatments for consideration as annexes to ISPM28. Other treatment doses will be proposed by the end of the project. It is worth noting that the two generic treatment proposals relied heavily on SIT expertise and data demonstrating the importance of interactions between sections of the Joint FAO/IAEA Division.

(2) Recognizing the importance of dosimetry practices and dosimetry systems, participants have implemented procedures to record doses and have presented these data during the RCM although some have difficulties in obtaining appropriate data from their irradiation treatment provider.

(3) Participants have been collaborating and exchanging information using email and an on-line internet forum. However, more proposals could have been produced for the IPPC with improved communication. Also, links could be improved with national counter parts at the National Plant Protection Organization (NPPO).

(4) The presence of observers at the meeting enriched the discussions, and encouraged further discussions.

Recommendations

(1) The CRP is developing both generic dose treatments and species-specific dose treatments. Participants are encouraged to submit phytosanitary treatments that are species specific especially in those cases where the specific treatment dose will be lower than the generic (the majority of cases). A lower dose may be more cost effective and help maintain product quality in cases where product is sensitive to radiation treatment.

(2) Participants should continue to use the dosimetry reporting guidelines agreed at the first RCM and contained in the Research Protocol (Annex C of the first RCM meeting report[3]).

(3) Participants need to keep in touch. First draft manuscripts are needed at the next RCM which should be held in early 2014 at the earliest. Email should be used to keep in touch, announce important activities, exchange information, review and discuss and help each other. For example participants working on the same group of insects should share lists of references, results and conclusions.

(4) Participants should establish a mutually beneficial relationship with their NPPO. This will help participants understand phytosanitary issues in their country and region. It will also help the NPPO understand the expertise participants can provide and solutions for solving these issues. For example contact your NPPO and tell them about this meeting.

(5) Observers should be encouraged to attend meeting, for example this is an effective way of ensuring continued liaison and cooperation with both the IPPC secretariat and the TPPT in order to facilitate the adoption of generic irradiation dose treatments stemming from this CRP.

Consultants Meeting to Develop a Proposal for a Coordinated Research Project on Integrated Analytical Techniques for Food Forensics and Contaminant Control; Vienna, Austria; 11–14 September 2012

Technical Officers: Russell Frew and Andrew Cannavan

A meeting of expert consultants was held to (1) review the current state of the art for food traceability using nuclear techniques, (2) identify the barrier to uptake of this technology especially from the perspective of the member states, (3) advise the Food and Environmental Protection (FEP) subprogramme on a proposal for a CRP on the application of nuclear technologies for enhancing food safety and trade and the development of techniques for rapid response to food safety issues.

2 http://www-naweb.iaea.org/nafa/fep/crp/generic-irradiation-1st-meeting.pdf

3 http://www-naweb.iaea.org/nafa/fep/crp/generic-irradiation-1st-meeting.pdf

Background

Food safety and quality are vital aspects of food security. The food supply is vulnerable to a range of food hazards (microbiological, chemical, physical) that may arise at any stage of the food supply chain. The dramatic increase in the volume of global trade and complexity of supply chains over recent decades has caused a number of issues concerning food authenticity and safety. Commodities that attract premium prices are subject to fraud such as adulteration or counterfeit. This poses serious health risks due to the unknown origin of the counterfeit.

In addition to well publicized food safety incidents such as aflatoxins in maize, dioxins in pork, melamine in dairy products, and Salmonella in peanuts, new hazards and risks are continually emerging. These may be related to unintentional contamination with, e.g., food additives or microbes, or intentional contamination (adulteration for economic fraud or with the intent to harm consumers). Other issues may also pose threats to food safety which are not yet well understood or characterized, for example the effects of climate change on food production, or emerging technologies such as the use of nanoparticles in food.

Questions concerning origin are among the first to be asked when a food safety incident arises. In addition, consumers in key markets are increasingly concerned with the origin of their food and are willing to pay more if they can be assured of its origin.

One of the primary tools for ensuring food safety is a traceability system. These are paper-based systems that pass information along with the commodity. This provides the consumer with confidence that the product they are purchasing comes from a supplier with the appropriate food safety and quality measures. All such systems are subject to failure either inadvertently or deliberately (fraud). The incidence of fraud is difficult to measure but estimates from the EU TRACE project suggest levels of 15–20% are likely in the European market.

It is recognized that there is a need for a system to verify the origin of food and hence audit the traceability control systems. Nuclear techniques have been shown to be very effective in authenticating food products (i.e. detection of adulteration or counterfeit), and in discriminating foods from different geographical origins. These systems have the potential to provide verification of information-based traceability systems and provide information on the integrity of the food product itself.

The Consultants Meeting

The consultants' meeting was held at IAEA headquarters in Vienna, Austria from 11–14 September 2012. Five internationally recognised experts (Mr Jose Almirall, Mr Gabe Bowen, Mr Jurian Hoogewerff, Mr Zhihua Ye and Mr Daniel Wunderlin) were invited and attended the meeting. Each made a technical presentation highlighting issue related to determining food provenance using nuclear and complimentary techniques.

Mr Almirall presented some recent developments in analytical technology that were pertinent to food analysis. One of the highlights is Laser Induced Breakdown Spectroscopy (LIBS). The technique allows low-level (ppm) determination of trace elemental composition of a variety of material. There is one of these instruments on the Mars rover being used to analyse features on the planet's surface. It is a rapid technique (mS) that can be used at stand-off distances of several metres.

Mr Bowen is an international leader in the use of spatially-variable data to produce maps (isoscapes) that summarise this information and provide tools for distinguishing samples from different regions. Recent work has focussed on providing these tools via the web as a toolbox and developing further statistical treatments so that reliable estimates of certainty can be made. The challenge is to obtain a value for a sample and then assign it to a location on a map, to do this you really need to understand the system you are working with.

Mr Hoogewerff provided a detailed overview of the state of the field in terms of scientific developments. In particular his insights in to what was effective in eth EU-TRACE programme and where the barriers to uptake of the technology lie. His recent work in developing solutions for commercial users of the technology was particularly helpful.

Mr Wunderlin discussed the work that is underway in Argentina. They have had spectacular success in distinguishing produce from the three main regions based on chemical attributes. Further work involves linking the origin information with quality attributes such as nutritional differences. This offers the potential to build and protect brand value hence enhancing trade.

Mr Ye provided an overview of the challenges for the food industry in China and the advances being made in terms of traceability. It is a huge market, for example over 50% of the world's pork is produced in China. The challenges include verification of origin, production practice and to develop a rapid response system within the market. He stressed the need for presumptive tests and databases.

In addition to the consultants, several IAEA staff gave presentations to the meeting. Mr Cannavan provided an overview of the traceability and food safety work of the FEP laboratory. He highlighted the types of needs of the member states and showed how the CRP programme was effective in developing technologies and technical capability for addressing many of these issues.

Mr Manfred Groening presented the work of the Terrestrial Environment Laboratory, especially aspects concerning the development and supply of Certified Reference Materials (CRM's). This is one of the significant obstacles to the development of the technology for food traceability and extended discussion was held around the prioritisation for new CRM's and the procedure for developing them, including time to delivery and costs.

Mr Len Wassenaar from the Hydrology Division presented recent work on the tracking of the origin of insects and birds and how nuclear techniques, especially the measurements of the hydrogen isotope composition have made significant contributions into the field. Mr Len also presented early data from a new preparation system that allows organic samples to be rapidly prepared for hydrogen isotope measurements. This system greatly reduces the turn-around time for these measurements hence enhancing the capability for rapid response.

The state of the art for determining the point of origin and integrity of food was discussed at length. There has been considerable investment in the science but despite many studies that demonstrate its usefulness, there has been very limited uptake of this technology to date. The reasons for this include:

- The high cost to entry as a lot of background information needs to be collected using expensive (and often slow) analytical techniques.
- The interpretation of the data and the level of certainty attainable have been hampered by the limited availability of reference data lack of standardized, robust, and accessible multi-variate and spatial data analysis tools.
- Most of the stakeholders (regulators, producers) are unaware of the capabilities of this technology and so it has not gained widespread acceptance.
- The current bespoke nature of the technology requires a high level of expertise for implementation.

Recent developments in instrumentation (e.g. laser-based analysers for light isotopes and trace metals) reduce analytical costs considerably and may facilitate accessible systems and uptake. However, while a multi-isotope/element approach with sufficient data of high quality can provide very high levels of certainty in assigning origin, the more limited data obtained from the new technologies needs to be assessed/ verified to determine the fitness for purpose of these approaches.

The consultants agreed that a CRP in this area that focussed on a single commodity and developed an end-to-end system for determining the provenance would be an important and fruitful area for technical and scientific investigations. The presentations generated considerable discussion around the opportunities provided by recent developments in technology. Examples include the ability to determine the isotopic composition of individual component within a complex mixture using compound-specific analyses. Other analytical approaches such as Near Infrared Spectroscopy provide rapid and economical screening of samples hence reducing the numbers requiring the more expensive analyses. This provides advantages both in speed and cost. Major advances have also been made in the statistical tools available for interpretation of the data, especially the multivariate statistics and mapping tools. However, while many of the tools are available there is a dearth of data available and this is a large barrier to entry.

A CRP that concentrated on a single commodity would generate the data coverage to enable the appropriate statistical and mapping tools to be applied and refined. A CRP was also seen as a means of raising awareness of what the technology can offer, especially to policy-makers and end users. The CRP will bridge gaps by developing and demonstrating an end-to-end system for verification of origin using nuclear and complimentary techniques. Ultimately the users of this technology will be food producers, regulators and policy-makers within the member states. Thus the technology needs to be implementable as a whole system that is robust in the hands of people with a wide range of expertise (turn-key), does not impose undue costs and will be accepted by regulators and consumers in the markets. The example system will serve as a template for other commodities and the technology will be transferrable.

The consultants concluded that the results of this project will assist producers to better communicate the qualities and attributes of different food commodities. In addition, verifying the integrity of food can reduce trading blocks and prevent fraud in the form of false descriptions, counterfeits, substitutions and adulteration. Thus food safety and global trade will be enhanced.

Others to benefit from this project will be the analytical service and science providers in the participating countries who will receive training and experience in the development and implementation of the technologies. They will also benefit widely from the networking opportunities and interactions with international researchers.

Third Research Coordination Meeting of the Coordinated Research Project on Development of Radiometric and Allied Analytical Methods to Strengthen National Residue Control Programs for Antibiotic and Anthelmintic Veterinary Drug Residues; Nairobi, Kenya; 3–7 September 2012

Technical Officer: James Sasanya

The third research coordination meeting (RCM) for the coordinated research project (CRP) on the development of radiometric and allied analytical methods to strengthen national residue control programs for antibiotic and anthelmintic veterinary drug residues was held at the Methodist Guest House in Nairobi, Kenya, under the overall organization of Kenya Agricultural Research Institute (KARI), from 3–7 September 2012. Hosting this global meeting was timely for Kenya as it is embarking on a vision 2030 program to becoming a middle-income country with agriculture – to which the IAEA has contributed through capacity building – as a significant pillar. The meeting attracted participants including contract and

agreement holders from Austria, China, Kenya, Republic of Korea, Sri Lanka, Thailand, The Netherlands, Tunisia, Mongolia and the United States as well as conference presentations from Brazil and The United Kingdom.

Participants of the Third RCM in Nairobi, Kenya.

The main objective of the CRP is to assist National Reference Laboratories of FAO and IAEA member states in meeting the need for 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 compounds. The meeting was therefore held to review work done thus far, address possible bottlenecks and plan for the future as per the work plan.

Tremendous progress has been made and transferable technology developed. For example, in Thailand, work has involved the development of a microbiological screening method - for the detection of antimicrobial residues – that is inexpensive, reliable, practicable and affordable to developing countries in order to enable them establish simple residue monitoring programmes. A standard operating procedure (SOP) for the work done will be prepared and lessons learnt shared for the benefit of other FAO/IAEA member states. In Sri Lanka, an analytical method has been developed to detect residues of five sulphonamides at the maximum recommended residue limits. It is comparatively cheap, reliable and sensitive. A thin layer chromatographic (TLC) method will be developed to detect Oxytetracycline and Doxycycline in poultry. A simple and cost effective mechanical device for spotting samples on a TLC plate was developed by the researchers in Sri Lanka to minimize research/analytical costs. The technology is transferable to member states in need.

An improvised TLC spotter developed in Sri Lanka.

Aquaculture production systems that could potentially be sampled for the analysis of veterinary drugs and related chemical residues.

Application of an improvised TLC spotter in Sri Lanka.

In China, a simple and robust LC-MS/MS method has been developed for the detection of sixteen aminoglycoside residues in animal products. The method meets set performance criteria. In the Republic of Korea, focus has been on the development and application of LC-MS-MS techniques for residues of veterinary medicines (Cephalexin, Tylosin, Erythromycin, Streptomycin, Enrofloxacin, and Florphenicol) in environmental (soil, manure and ground/stream water) samples and other drugs in foods for human consumption. The method has also addressed problems of false positives and undesired signal overlaps ('cross talk').

In Kenya, work has included the development, validation and application of accurate, sensitive and affordable analytical methods for the detection and monitoring of veterinary drug residues in edible animal products using immunoassays. Antibodies of varying sensitivities have been produced in rabbits using Tetracyclines and Sulfonamides. Issues regarding low sensitivity and commercial availability of antibodies for a number of antibiotics are also being addressed. In Tunisia, pharmacokinetic studies to determine tissue distribution and elimination rate of the drug Flumequine in Sea bream involving use of ^{14}C-Flumequine are on-going. Sea bream fish will be used for whole body autoradiographic studies involving use of liquid scintillation counters and modelling, to determine Flumequine equivalents (radioactivity) in different organs over time.

Sea bream used for Pharmacokinetic studies involving the use of ^{14}C-Flumequine.

Intraperitoneal administration of ^{14}C-Flumequine in pharmacokinetic studies.

In Brazil, two research projects on the development, standardization and application of a Dot-ELISA-Multiparametric assay method to detect Enrofloxacin and Ciprofloxacin drug residues in chicken meat are ongoing In this project polyclonal antibodies have been produced against Enrofloxcin using rabbits and immunization protocols evaluated and the method compared against commercial standards. A second project involves the development, standardization and validation of a radioimmunoassay kit for the determination of Florfenicol residues in fish. The method also involves comparison with other analytical techniques such as HPLC and LC-MS/MS followed by application in Brazilian official regulatory programs. In Mongolia, the investigation of natural sources of the antimicrobial Chloramphenicol is ongoing. Work includes detection of Streptomyces venezuelae and Chloramphenicol in relevant matrices and an attempt to correlate low concentrations of the drug in plants with residues in animal products.

Recent work done by developed Member States in this CRP includes new approaches in the detection of antibiotics in food, current challenges in food safety and quality research on various xenobiotics including naturally-occurring Thyreostats as well as current research and food safety regulatory developments at the US Food and Drug Administration of relevance to the other Member

States.

The third RCM also recognized the need for fundamental discussions on the challenges of meeting 'zero tolerance' regulatory limits of food chemical contaminants such as Chloramphenicol, especially where naturally occurring background levels may be detected.

The diverse scientific expertise and the work done under this CRP provides solutions to challenges that member state analytical laboratories encounter in efforts to protect local consumers and/or meeting safety requirements in global food markets.

Technical Cooperation Projects

Country/Region	Project Number	Title	Technical Officer
Afghanistan	**AFG5005**	**Study Food Irradiation as a Solution to Food Security**	**Blackburn, C.M. Byron, D.H.**
Angola	**ANG5009**	**Enhancing Veterinary Drug Laboratories for the Quality Control of Local Milk Production to Improve Public Health Checks**	**Sasanya, J.J. Cannavan, A.**
Belize	**BZE5005**	**Providing Technical Assistance and Training for Upgrading National Laboratory Capacity**	**Maestroni, B.M. Jandrić, Z.**
Benin	**BEN5008**	**Establishing Enhanced Analytical Capability to Comply with International Standards for the Evaluation and Control of Veterinary Drug Residues in Food of Animal Origin**	**Sasanya, J.J.**
Bolivia	**BOL1009**	**Introducing Radiation Processing Technology**	**Sabharwal, S. (NAPC) Blackburn, C.M.**
Botswana	**BOT5006**	**Establishing a Laboratory for Monitoring Residues of Veterinary Drugs in Food of Animal Origin to Protect Public Health and Enhance International Trade Through Utilization of Nuclear and Related Analytical Techniques**	**Sasanya, J.J. Jandrić, Z.**
Chile	**CHI1019**	**Establishing the Origin of Heavy Metal Contamination in Soil and Water**	**Fajgelj, A. (NAEL) Padilla A.R. (NAPC) Cannavan, A.**

Country/Region	Project Number	Title	Technical Officer
Chile	CHI5049	Determining Veterinary Residues and Contaminants in Agricultural and Animal Products for Human Consumption	Sasanya, J.J. Jandrić, Z. Cannavan, A.
China	CPR5018	Building Technological Capacity for Food Traceability and Testing of Pesticide Residues in Food	Cannavan, A. Frew, R.
China	CPR5021	Facilitating the Application of Electron Beam for Food Irradiation	Blackburn, C.M. Byron, D.H.
Costa Rica	COS1007	Establishing Gamma Irradiation Capabilities at the Costa Rican Insitute of Technology for the Use of Radiation Processing Technology	Blackburn, C.M. Byron, D.H.
Costa Rica	COS5029	Strengthening of Good Agicultural Practices for Food Safety and Security and Environmental Protection	Nguyen, M.L. Dercon, G.
Ecuador	ECU5027	Improving Food Security and Environmental Sustainability by Monitoring Wetlands as Indicators of Good Agricultural Practice in Palm Oil Production	Maestroni, B.M. Jandrić, Z.
Indonesia	INS5040	Supporting the National Mycotoxins Reduction Programme and Enhancing the National Reference Laboratory of the Indonesian Research Centre for Veterinary Science (BBALITVET)	Sasanya, J.J. Cannavan, A.
The Former Yugoslav Republic of Macedonia	MAK5007	Assessing and Enabling the Implementation of Food Irradiation Technologies	Blackburn, C.M. Byron, D.H.

Country/Region	Project Number	Title	Technical Officer
Malaysia	MAL5029	Applying Mutation Breeding and Optimized Soil, Nutrient and Water Management for Enhanced and Sustainable Rice Production	Lagoda, P. Nguyen, M.L. Nielen, S. Blackburn, C.M.
Mongolia	MON5019	Enhancing Analytical Equipment for Animal Disease Prevention, Diagnosis and Surveillance	Sasanya, J.J. Cannavan, A.
Montenegro	MNE5002	Upgrading Capabilities to Establish Effective Monitoring Systems for Residues in Food and Air Quality	Jandrić, Z.
Morocco	MOR5033	Using Nuclear Techniques to Support the National Programme for the Generic Improvement of Annual and Perennial Plants and to Develop Agricultural Production	Spencer, M.M. Nguyen, M.L. Blackburn, C.M.
Nicaragua	NIC5008	Improving Technical Capabilities for the Detection of Diseases and Residues in Agriculture	Viljoen, G.J. Sasanya, J.J.
Nigeria	NIR5037	Applying Nuclear and Related Techniques to Characterise Chemical Contaminants in Food for Risk Assessment and Management of Toxic Pollutants and Residues in Food, Feedstock and Water Resources through Training of Analytical Scientists	Sasanya, J.J. Maestroni, B.M.
Pakistan	PAK5048	Strengthening Capabilities to Monitor and Control Veterinary Drug Residues in Foodstuffs	Sasanya, J.J.

Country/Region	Project Number	Title	Technical Officer
Panama	PAN5021	Enhancing Analytical Capability to Evaluate and Control Use of Veterinary Drugs through Residue Monitoring and Diagnostic Toxicology	Sasanya, J.J. Cannavan, A.
Peru	PER5031	Improving and Strengthening Industrial Irradiation Techniques with an Emphasis on Agro-industrial Applications	Blackburn, C.M. Sabharwal, S. (NAPC)
Africa	RAF5067	Establishing a Food Safety Network through the Application of Nuclear and Related Technologies	Sasanya, J.J. Cannavan, A.
Asia	RAS5057	Implementing Best Practices of Food Irradiation for Sanitary and Phytosanitary Purposes	Blackburn, C.M. Byron, D.H.
Asia	RAS5061	Supporting Food Irradiation Technology to Ensure the Safety and Quality of Meals for Immuno-compromised Patients and Other Target Groups	Blackburn, C.M. Byron, D.H.
Asia	RAS5062	Building Technological Capacity for Food Traceability and Food Safety Control Systems through the Use of Nuclear Analytical Techniques	Frew, R. Cannavan, A.
Europe	RER5019	Establishing a Sustainable Network on Irradiated Food	Blackburn, C.M. Byron, D.H.
Latin America	RLA5053	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 (ARCAL CII)	Dercon, G. Maestroni, B.M.

Country/Region	Project Number	Title	Technical Officer
Latin America	RLA5059	Harmonizing Official Control Laboratories to Analyse Chemical Contaminants in Food and Feedstuffs (ARCALCXXVIII)	Sasanya, J.J. Cannavan, A.
Latin America	RLA5060	Harmonizing and Validating Analytical Methods to Monitor the Risk of Chemical Residues and Contaminants in Foods to Human Health (ARCALCXXVIII)	Sasanya, J.J. Maestroni, B.M.
Latin America	RLA 5061	Supporting Quality Management for the Assessment and Mitigation of Impacts of Contaminants on Agricultural Products and in the Environment (ARCALCXXIV)	Jandrić, Z. Maestroni, B.M.
Latin America	RLA9072	Supporting a Database of Values of Radioactivity in Typical Latin American Food (ARCALCXXIX)	Blackburn, C.M. Byron, D.H.
Sri Lanka	SRL5043	Supporting the Operation of A Gamma Irradiation Facility for Preservation of Food, Sterilization of Medical Products and Quarantine of Fruits	Blackburn, C.M. Sabharwal, S. (NAPC)
Sri Lanka	SRL8019	Technical Support for the Establishment and Operation of a Multi-Purpose Gamma Irradiation Facility	Blackburn, C.M. Byron, D.H.
Sudan	SUD5035	Establishing a Laboratory for Monitoring Veterinary Drug Residues and Prohibited Substances in Livestock and Livestock Products through Application of Nuclear and Related Techniques to Protect Public Health	Sasanya, J.J. Cannavan, A.

Country/Region	Project Number	Title	Technical Officer
Tajikistan	TAD5004	Improving Laboratory Capacity for Food Safety	Fesenko, S. Maestroni, B.M.
Uruguay	URU5025	Determining Pesticide and Antibiotic Residues in Food for Local and Export Consumption	Maestroni, B.M.
Uruguay	URU5027	Preparing for the Introduction of Irradiation Techniques	Blackburn, C.M. Byron, D.H.

Regional Asian Technical Cooperation Project (RAS5057) Workshop on Best Practices for Phytosanitary Applications of Food Irradiation; Jeongeup, Republic of Korea; 22–26 October 2012

Technical Officer: David H. Byron

The Regional Asian Technical Cooperation Project (RAS5057) Workshop on Best Practices for Phytosanitary Applications of Food Irradiation was convened in Jeongeup, Republic of Korea, from 22–26 October 2012, at the newly established (see July 2012 Newsletter) Korea Atomic Energy Research Institute (KAERI) / Advanced Radiation Technology Institute (ARTI) / IAEA Collaborating Centre for Radiation Processing for Environmental Remediation, Advanced Materials and Food Irradiation.

Participants of the RAS5057 Workshop in Jeongeup, Republic of Korea.

The purpose of the meeting was to review and finalize a Best Practice Manual for Phytosanitary Applications of Food Irradiation to assist producers, exporters, food irradiation processing facility operators and National Plant Protection Organizations (NPPO) by providing guidance on "best practices" when irradiating food for phytosanitary purposes. The Best Practice Manual (BPM) also provides advice and informative examples on the application of requirements in the Asia and Pacific Plant Protection Commission (APPPC) Draft Regional Standard for Phytosanitary Measures (RSPM) on the Approval of Irradiation Facilities, which is expected to be adopted in 2013. The RSPM is based on the Guidelines for the Audit and Accreditation of Irradiation Facilities used for Sanitary and Phytosanitary Treatment of Food and Agricultural Products which was developed under IAEA project RAS5050.

The Workshop objectives were to review and finalize the draft BPM with a view to it being endorsed at the close of the meeting and to establish effective mechanisms for the dissemination and practical application of the Manual by relevant stakeholders.

In addition to the finalization of the BPM, the meeting report (in publication) also includes (i) a written summary of the status, current legislation and bilateral or multilateral agreements related to phytosanitary (quarantine) irradiation treatments; (ii) a written summary of current inter-regional and international trade in irradiated produce, and; (iii) a record of the agreement on the mechanisms for effective dissemination and practical application of the Manual.

Participants of the RAS5057 Workshop at the Korea Atomic Energy Research Insitute.

The meeting reached the following conclusions:

- Although irradiated food exports are currently limited (intra and inter regional trade), the potential growth

of exports, foreign exchange and expansion of quarantine treatments is significant.

- Consumer education is the key for public awareness and acceptance of irradiated foods, including the dissemination of information on the safety of the technology, especially when compared with fumigation treatments and with the aim of reducing the need for pesticides.
- Countries of the region should strive to submit information to the IAEA to expand the newly revised databases on food irradiation facilities and food irradiation authorizations.
- While recognizing the current prevalence of the use of gamma technology for food irradiation, countries should also consider the potential use of machine based sources in the future development of the technology, especially to address public concerns with the use of radioactive sources.
- The BPM was considered and approved as a final draft document. However, in the interest of promoting discussion at the next RAS workshop regarding sanitary applications it was agreed that the document would be forwarded for their consideration.
- The workshop strongly supported the development of a single BPM covering both sanitary and phytosanitary uses based on the final draft BPM for phytosanitary purposes produced at the current meeting.
- While the expansion of regulations within the region is encouraging, the lack of bilateral agreements and harmonized approaches amongst countries remains an issue of concern.

The following recommendations were also reached:

- Member countries of the region were strongly encouraged to consider and apply the finalized and agreed BPM in their national programs and regional trading initiatives.
- The IAEA should consider the publication and distribution of the comprehensive (sanitary and phytosanitary) BPM after its consideration at the next RCA workshop and final agreement at the mid-term project review meeting.
- Member states should continue to promote and develop the use of phytosanitary applications of food irradiation for produce of interest in the region, including the development of research and the elaboration of bilateral agreements amongst its member states.
- The group encourages the holding of national and regional train-the-trainer workshops, seminars and meetings to discuss the application of international standards and the operation of irradiation facilities on the basis of the finalized BPM. The active participation of regulators, scientists, operators, exporters/importers and consumers was strongly encouraged.

The next Regional Asian Technical Cooperation Project RAS5057 Workshop on Best Practices for Sanitary Applications of Food Irradiation is tentatively scheduled to be held in Shanghai, People's Republic of China, from 6–10 May 2013.

First Coordination Meeting of the AFRA Regional Project RAF5067 and Training on Nuclear and Related Analytical Techniques for Food Safety; Dar Es Salaam, United Republic of Tanzania; 27–31 August 2012

Technical Officer: James Sasanya

The first coordination meeting for this food safety project attracted participants from twelve countries including Algeria, Botswana, Cameroon, Egypt, Ethiopia, Mauritius, Namibia, Nigeria, Tunisia, Uganda, United Republic of Tanzania and Zimbabwe as well as an observer from South Africa. The IAEA was represented by the project Technical Officer, James Sasanya. A representative of CHARM and an external expert from Turkey installed a radio-receptor analytical tool and participated in laboratory demonstrations.

The project intends to strengthen existing national laboratory capacity to support an integrated approach to food hazard control, and to establish a harmonized regional network of laboratories that will use a holistic approach, involving various stakeholders, to enhance food safety in Africa for consumer protection and trade in foodstuffs.

Participants and guests at the first coordination meeting in Dar Es Salaam, United Republic of Tanzania.

Laboratory demonstrations included use and maintenance/troubleshooting of Radio-Receptor-Assay techniques. In principle, the technique uses ^{3}H and ^{14}C tagged drug tracers with broadly specific binding agents in a receptor assay format on which the participants practiced. The technique is routinely complimented by tools such as the High Performance Liquid Chromatography also

demonstrated at the meeting. The analysis of food pathogens to assess potential consumer exposure to both chemical and microbial hazards was also demonstrated.

A radio receptor assay package at TFDA in Tanzania for screening veterinary drug residues and other natural contaminants in foods.

Counterparts participate in the radio receptor assays experiments.

Local TFDA staff demonstrating the analysis of chemical food contaminants by HPLC to compliment radio rector assay techniques.

Samples analyzed for chemical contaminants were also tested for the presence of microbial hazards as demonstrated to participants by a local lecturer.

Demonstrating the analysis of foods sample for the presence of microbial hazards in Tanzania. Portions of the same samples were simultaneously tested for chemical contaminants.

The participants also had an opportunity to interact with farmers to understand different farming systems and feed handling/storage conditions that could contribute to risk of consumer exposure to chemical food contaminants in foods.

A poultry faming system at a model farm visited by the meeting participants.

More analysts at TFDA were also trained on the use of radio-receptor assay techniques and will now train other analysts and strengthen laboratory capacity in the country and the sub-region and hopefully TFDA could become a training hub for food safety control. The tool is now being used to monitor selected food contaminants in foods in Tanzania.

The RAF5067 food safety project, the first one of its kind in the region, will strengthen laboratory networking and equip national laboratories to address food safety concerns in the AFRA region based on application of nuclear and related analytical techniques. This network may also provide a foundation for interregional laboratory networks.

First Coordination Meeting of the TC Project RAS5062 on Building Technological Capability for Food Traceability and Food Safety Control Systems Through the Use of Nuclear Analytical Techniques; Fuzhou City, China; 7–10 August 2012

Technical officer: Russell Frew

Producing safe and high quality food is a prerequisite to ensure consumer health and successful domestic and international trade, and is critical to the sustainable development of national agricultural resources. Traceability systems play a key role in assuring food safety. Analytical techniques that enable the provenance of food to be determined provide an independent means of verifying 'paper' traceability systems and also help to prove authenticity, to combat fraudulent practices, and to control adulteration, which are important issues for economic, religious or cultural reasons.

The capability to certify food origin or authenticity is of significant economic importance to many stakeholders in developing countries. For example, some food products can be marketed using labels (e.g. GI, Geographic Indication) that are based on standards of identity or composition related to a very specific production area. This adds value to such products in terms of marketability and increased export value. Basmati rice from India and Pakistan, for example, is defined by its cultivar and also by its area of production. Genomic techniques can easily confirm the cultivar of Basmati rice, while isotopic and elemental fingerprinting is essential to determine the geographical origin. Isotopic parameters have recently been added to the PDO (Protected Denomination of Origin) technical specification of certain kinds of cheese and other food commodities are undergoing similar characterization.

The IAEA project RAS5062 on Building Technological Capability for Food Traceability and Food Safety Control Systems Through the Use of Nuclear Analytical Techniques further strengthens the National Project Teams of each MS to respond to the need of the industries in the region to enhance food safety through improved traceability systems. The objective of the project is to help developing countries ensure food safety and control and to combat fraudulent practices in trade by implementing sustainable analytical tools that permit independent verification of paper based traceability systems for food commodities. The activities and work plan are designed to advance the capability of the region in utilizing nuclear techniques in systems for verifying the origin of food products. Beneficiaries will include decision-makers in the agricultural sectors of the respective countries, regulators in food control authorities, local farmers and the national and international food trade.

Participants of the RAS5062 First Coordination Meeting, Fuzhou City, China.

The first project coordination meeting was organized to discuss, formulate and agree on the national and regional work plans of RAS5062. The Meeting was held in cooperation with the Government of China through the Chinese Acadamy of Sciences and was attended by 13 participants from Member States. In addition, Mr Qu Liang, Director, Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture, Mr Russell Frew, Technical Officer, IAEA, and 4 participants from the host country also attended. Participating countries to the Meeting were Bangladesh, Cambodia, China, Indonesia, Malaysia, Mongolia, Myanmar, Pakistan, Philippines, Singapore, Sri Lanka, Thailand and Vietnam.

The meeting was opened by Prof Qiyong Weng, vice present of Fujian Academy of Agricultural Science, at the Chinese Acadamy of Sciences, Fuzhou City. He delivered the inaugural speech and emphasized the importance of regional cooperation in enhancing capacities of the member states for effective application of food safety and traceability.

Mr Qu Liang also welcomed the participants. Each of the participants from Member States presented a report from their country. These reports provided information on the status of food safety and traceability in their country highlighting particular challenges, analytical capacity and capability gaps, and priorities for national work programmes. A common theme was the difficulties faced by the member states in enforcing regulations concerning food authenticity.

The Member States in South East Asia represent a rapidly growing region in terms of consumption and exports of food. There is an urgent need for tools to verify the integrity of their food. This project will enhance MS's by providing training on how to develop a system for verifying food origin, including training in the technical aspects of analysis and data interpretation. The first training course will be held in Malaysia in early 2013.

Food and Environmental Protection Laboratory, Seibersdorf

Sustainability of Capacity Building Activities to Improve Food Safety and Quality through Nuclear Technology and Networking

Technical Officer: Britt Maestroni

The Food and Environmental Protection Laboratory was successful in a bid for extra-budgetary funding under the Peaceful Uses Initiative (PUI), the objective of which is to support the IAEA in facilitating greater access for Member States to the peaceful uses of nuclear technology. Several training courses and workshops were held in the first year of this 3 year project, with more than 90 developing country scientists being trained in various aspects of food safety control. Examples of PUI funded training programs include the following:

FAO/IAEA regional workshop on Integrated Analytical Approaches for Food Traceability and Contaminant Control; Montevideo, Uruguay; 5–9 November 2012

Technical Officer: Britt Maestroni

A regional workshop on Integrated Analytical Approaches for Food Traceability and Contaminant Control was held in Montevideo from 5–9 November with the participation of 14 representatives from 8 countries in Latin America and the Caribbean, namely Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Uruguay, a representative from the 'Andean project' (FAO TCP/RLA/3212) of the Food and Agriculture Organization (FAO), two regional experts from Ecuador and Argentina, local lecturers from the Intedencia Municipal de Montevideo and the local faculty of Chemistry. Ms. Maestroni participated in the workshop as technical officer to coordinate the regional activities on food safety and to promote the central role of the analytical laboratory in the national food safety monitoring programs.

The presentations given at the workshop covered aspects related to the farm to fork food chain, including good agricultural practices, linkages of laboratory services to producers, pesticide registration and formulation control, quality assurance and quality control measures, analytical strategies and matrix effects, sampling programmes and biomonitoring, examples of the use of bioassays in water and sediment quality monitoring, and the role of nuclear technologies. Special emphasis was given to the role of the analytical laboratories in the farm to fork food chain.

A working group style was adopted for the meeting, which included several discussion sessions. Three working days were spent on laboratory practice on: (1) analytical work at the bromatology laboratory demonstrating the AOAC QuEChERS (Quick, Easy, Cheap, Effective, Rugged, Safe) method for the analysis of six representative pesticides (chlorpyrifos, procimidione, L-cyhalotrin, azoxistrobin, trifuralin and fenbuconazol) in lettuce and a mixed matrix, with the objective of identifying and measuring matrix effects; (2) demonstration of the use of bioassays (Daphnia magna, Vibrio Fischeri, Selenastrum and Hydra) for testing soil, sediment and water samples; and (3) biological water monitoring and taxonomic identification of the microcatchment area Canada del Dragon. The outputs of the workshop were 3 short documents that summarize the work done in individual laboratory sessions and include some recommendations for future work under the 'Red Analitica Latino America y El Caribe' (RALACA) laboratory network.

The meeting recommended that the FAO/IAEA Food and Environmental Protection Laboratory should continue its efforts in capacity building activities to train laboratory staff in the required areas to be able to reach accreditation in the near future and to ensure regional food safety and environmental sustainability. To further expand the RALACA network it was suggested that a regional coordinator should be selected for each thematic area, such as analytical chemistry, nuclear techniques, bioassays, biomonitoring, and food traceability. Each coordinator would be responsible for summarizing, taking appropriate actions, and following up on each thematic area, taking advantage of the various meetings organized in Latin America and the Caribbean. This would allow a streamlined approach to identifying opportunities in Member States as well as issues/challenges that would require regional backup and a targeted solution.

The three working groups drafted the following conclusions:

(1) The group on analytical chemistry noted that QuEChERS was still a new method for some participants. The data produced in the practical sessions confirmed that there were some matrix effects, but generally of fairly low magnitude and therefore not considered as such according to current European legislation. It was agreed that all participants will participate in a joint exercise on the evaluation of matrix effects for the chlorpyrifos-lettuce combination using the laboratories' own procedures. Results shall be sent to the Uruguayan coordinator by 15 December 2012.

(2) The group on bioassays discussed the way forward on the use of specific tests for microcatchment monitoring. Argentina will concentrate on Daphnia, Brazil on Daph-

nia, Hydra, possibly Selenastrum, Costa Rica on Hydra, Selenastrum, possibly Daphnia, and El Salvador on Selenastrum and possibly Daphnia. All participants will present the results at the next possible meeting.

Under the RALACA network, one of the first initiatives of this group will be to prepare training videos to illustrate the methodology for the cultivation of the organisms as well as for toxicity testing.

A further initiative of the group would be to expand the use of bacteria (Vibrio fischeri) to run toxicity tests on complex samples, and to test for the toxic effects of veterinary drugs in water (an emerging risk).

(3) The group on biomonitoring discussed the implementation of biomonitoring as a rapid alert tool to identify misplacement of pesticides in the environment. The recommendation to the IAEA was to further develop this area and consider biomonitoring as a screening option in the integrated analytical toolbox.

The group also discussed the issue of adopting multimetric criteria for collecting and compiling information, to be able to run advanced modelling including bayesian type of approaches. As to advanced statistical modelling, all the workshop participants identified the lack of knowledge in this area and invited the IAEA to consider the organization of a capacity building event that could target modelling and risk analysis.

Other very specific recommendations, such as preparation of macroinvertebrates field identification guides (e-guides) for non-destructive testing were also discussed.

Feedback from the participants indicated that the capacity building event was well received, 65% of the participants indicated that the workshop was excellent, 35% that it was good.

Participants of the workshop can access all the documents and the presentations at the FAO/IAEA elearning web site: http://elearning.iaea.org/ATutor/go.php/176. Registration is required.

Inter-Regional Train-the-Trainers Course on Radiotracers Techniques for Food Contaminant Control; 27 September–5 October 2012; Seibersdorf, Austria

Technical Officer: Britt Maestroni

An international workshop on Radiotracer Techniques for Food Contaminant Control was held at the Food and Environmental Protection Laboratory (FEPL) in Seibersdorf, Austria, from 27 September–5 October 2012. The workshop had 15 participants, representing nine countries including Argentina, Brazil, Chile, China, Colombia, Ecuador, Lebanon, Nicaragua, Panama, Paraguay, Spain, and Uruguay. External lecturers were Mr J. Chin Pampillo, Dr R. Correll, Dr A. Nordgaard.

Sampling for decision-making was the main topic of the first two days of the workshop. A theoretical background was presented on statistics, graphics preparation, presentation of results, defining decision rules, random/composite/systematic/stratified sampling, and chain of custody, and a practical exercise was carried out to better understand the differences between the types of sampling approaches. During the remaining days of the workshop the main topic was the use of radiotracers in food safety control. Lectures focussed on laboratory safety, basics of radiotracers including the theory of atoms and nuclear reactions, measurement units, radiotracer use in the control of food contaminants, autoradiography, liquid scintillation counting, bound residues, and the use of the biological material oxidizer.

The theoretical concepts presented were applied in the laboratory practical sessions. Participants were divided into groups and assigned different laboratory exercises ranging from estimation of sample processing uncertainty in apple using 14C-chlorpyrifos to estimation of the performance of the QuEChERS and the ethyl acetate modified QuEChERS methods in apple, carrot and fish using 14C-chlorpyrifos and 14C-DDT.

Participants in the Inter-Regional Train-the-Trainers Course on Radiotracer Techniques for Food Contaminant Control; 27 September–5 October 2012, Seibersdorf, Austria.

The participants were satisfied with the training: 69% of the participants indicated that the workshop was excellent and 31% that it was good, and would help them professionally. Participants indicated that there is a need for a longer training course on sampling, to be able to identify and optimize the best option in each laboratory; they also recommended dedicating more time in any training activity to the analysis and discussion of the results, which is a common issue in all laboratory work. In a brainstorming session, the participants recommended to the FAO/IAEA to consider the planning and implementation of a series of workshops on method validation, instrument maintenance and troubleshooting, preparation for accreditation, and to facilitate the participation of laboratories in inter-laboratory studies/proficiency testing either by producing reference materials or supporting regional laboratories in the organization of inter-laboratory studies.

Participants of the workshop can access all of the presentations at the FAO/IAEA eLearning web site: http://elearning.iaea.org/ATutor/go.php/174. Registration is required.

FAO/IAEA/OIRSA/BAHA Regional Workshop on Food Safety: From Farm to Fork; 27–31 August 2012; Belize City, Belize

Technical Officer: Britt Maestroni

A regional workshop on Food Safety: From Farm to Fork was held in Belize City from 27–31 August with the participation of 24 representatives from 11 countries in Latin America and the Caribbean, namely Belize, Panama, Guatemala, El Salvador, Nicaragua, Honduras, Costa Rica, Mexico, Uruguay, Chile, Dominican Republic, Venezuela, and representatives of the food safety programs from member countries of the Organismo Internacional Regional de Sanidad Agropecuaria (OIRSA) as well as the FAO/IAEA technical officer. The workshop was jointly organized by the FAO/IAEA in collaboration with OIRSA and the Belize Agricultural Health Authority (BAHA). External lecturers were Dr P. Aysal, Dr E. Carazo, Dr E. Franklin, Dr O.Garcia Suarez, Dr N. Gibson, Mr M. Ortega, Dr C. Sepulveda, and Mr F. Tzib.

The presentations given at the workshop covered aspects related to the farm to fork food chain, with interventions on good agricultural practices, pesticide registration, compliance with Codex Alimentarius maximum residue limits, quality assurance and quality control measures, ISO17025 requirements and advanced analytical strategies, including the use of nuclear and related techniques. Special emphasis was given to the role of the analytical laboratories in the farm to fork food chain. Opportunities were given to all participants to give short presentations about their laboratory and their activities, and to request advice in discussion sessions for some of the challenges.

In Latin America and the Caribbean the main challenges related to analytical laboratory operations are lack of accredited institutions, lack of state of the art analytical instrumentation, unstable human resources, lack of financial freedom, high level of daily bureaucracy and the gap between the decision making and the analytical laboratory operations.

The meeting recommended that the FAO/IAEA Food and Environmental Protection Laboratory continues its efforts in capacity building activities to train laboratory staff in the required areas to be able to reach accreditation in the near future, as well as continuing the efforts at country level to make decision makers aware of the central role played by the analytical laboratories in the food safety programmes. Issues relating to networking, knowledge and technology exchange were also discussed at length.

Discussion topics included the suggestion to create a network of laboratories having, as a main objective, information exchange between laboratory analysts either belonging to private laboratories serving governments, or national laboratories and research centers. The workshop participants also prepared some recommendation to their governments, to promote food traceability programs to ensure food quality and safety and to accept advice on the necessity to update and bring up to state of the art standards the national analytical infrastructure.

The workshop was very successful, partly due to the fact that OIRSA supported a number of experts working in the good agricultural practices area as well as laboratory analysts. This combined audience allowed the interchange of ideas on food safety programmes with a special emphasis on fruit and vegetable production in Latin America and the Caribbean. Feedback from the participants indicated that the capacity building event was well received; 75% of the participants indicated that the workshop was excellent, 21% that it was good and 4% that it was average.

Participants of the workshop can access all of the presentations at the FAO/IAEA elearning web site: http://elearning.iaea.org/ATutor/go.php/173. Registration is required.

Participants of the FAO/IAEA Workshop on Food Safety: from Farm to Fork, Belize City, 27–31 August 2012.

FAO/IAEA Workshop on Food Safety: From Farm to Fork; 29 June–2 July 2012; Seibersdorf, Austria

Technical Officer: Britt Maestroni

A regional workshop on Food Safety: From Farm to Fork was held at the Food and Environmental Protection Laboratory (FEPL) from 29 June–2 July 2012. 21 scientists from 11 countries (Albania, Argentina, Bangladesh, Brazil, Chile, Ghana, India, Malaysia, Mexico, Taiwan, Uruguay) attended the workshop, which was held immediately following the European Pesticide Residues Workshop (EPRW, reported elsewhere in this issue of the newsletter), taking advantage of the attendance of many developing country scientists at EPRW. Several external lecturers participated, including Dr A. Ambrus, Dr K. Banerjee, Dr E. Carazo, Dr J. Guerrero, Dr S. Lehotay, Mr D. Roberts, Dr A. Valverde.

Participants of the FAO/IAEA Workshop on Food Safety: From Farm to Fork, Seibersdorf, 29 June–2 July 2012.

The objective of the workshop was to give some general advice and guidance to developing country scientists to assist in setting up contaminant/residue monitoring programmes for food, with a special focus on pesticides. The workshop covered various aspects related to farm to fork food safety systems, with lectures on sampling, good agricultural practices, advanced analytical methodologies for residue analysis, targeted and untargeted screening, method validation, quality control procedures for pesticide residue analysis, requirements of the ISO17025 standard with a focus on uncertainty, data interpretation and monitoring aspects. Practical demonstrations were held at the FEPL with a focus on advanced analytical instrumentation such as high resolution/accurate mass mass spectrometry, method validation using the QuEChERS (Quick, Easy, Cheap, Effective, Rugged, Safe) multiresidue procedure, and radiotracer techniques.

Sampling training exercise at the Seibersdorf laboratories.

Feedback from the participants indicated that the capacity building event was well received, 58% of the participants indicated that the workshop was excellent, 38% that it was good and 4% that it was average. The participants indicated that there was a good balance between theoretical and practical aspects. Participants recommended the inclusion in future workshops of topics such as risk assessment, data analysis and advanced interpretation, food safety regulations, re-validation of methods, and screening methods. It was also proposed that a 'tips and advice café' would be useful, in which participants could communicate analytical challenges and exchange tips and suggestions for addressing the issues with other scientists.

Laboratory practical to support Food Safety: From Farm to Fork

Participants of the workshop can access most of the presentations at the FAO/IAEA eLearning web site: http://elearning.iaea.org/ATutor/go.php/171. Registration is required.

Regional Workshop on Liquid Chromatography Coupled to Mass Spectrometry and Control of Contaminants in Food; Panama City, Panama; 16–27 April 2012

Technical Officer: Britt Maestroni

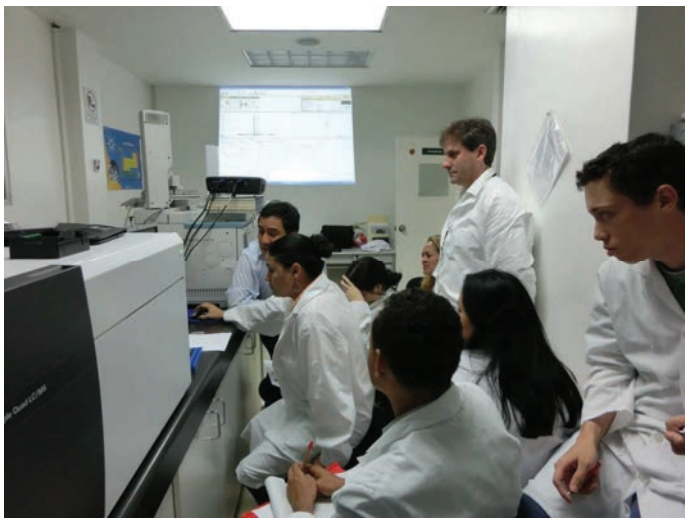
The workshop on Liquid Chromatography Coupled to Mass Spectrometry (LC-MS/MS) and Control of Contaminants in Food was held in Panama City, Panama, from 16–27 April 2012 at the laboratory Laboratorios de Residuos Tóxicos en Carnes y Control de Residuos de Plaguicidas en Plantas y Productos Vegetales belonging to Ministerio de Desarrollo Agropecuario de Panama (MIDA). The training course was attended by eighteen scientists from seven countries (Dominican Republic, Nicaragua, Guatemala, Costa Rica, El Salvador and Honduras; Panama and Uruguay). The workshop was jointly organized by the FAO/IAEA in collaboration with Organismo Internacional Regional de Sanidad Agropecuaria (OIRSA) and the MIDA. Training was facilitated by three expert consultants; Mr P. Knittl, Dr O. Lucas and Ms R. Ventocilla.

Participants of the regional workshop on liquid chromatography coupled to mass spectrometry and control of contaminants in food, Panama City, Panama, 16–27 April 2012.

The presentations given at the workshop covered various aspects related to theory and calibration of the triple-quadrupole mass spectrometer (MS), optimization of the MS conditions, routine maintenance, matrix effects, quantification and use of internal standards, confirmation criteria, pesticide residue analysis in food by liquid chromatography-tandem mass spectrometry (LC-MS/MS), veterinary drug residue analysis by LC-MSMS, and quality control and quality assurance in contaminants/residues analysis according to ISO 17025. Priority was given to the practical sessions, which were coordinated and implemented by the three experts and covered the following areas; sample preparations by the QuEChERS method (Quick, Easy, Cheap, Efficient, Rugged, Safe), instrument software, data processing and evaluation of results.

For the practical session the participants were divided into two groups, each of which prepared and presented a report on the quantification of pesticide residues in the selected matrix (orange or pepper). In addition to the practical and theoretical sessions, the participants prepared and gave group presentations on validation of analytical methods for pesticide residue analysis, proficiency testing in pesticide residue analysis, reporting of pesticide residue results, and uncertainty of measurements in pesticide residue analytical methods. This activity generated an interchange of opinions and experiences between the participants and helped to strengthen and improve their knowledge on these subjects, which are important in the demonstration of the technical competence of analytical laboratories to support food control.

Feedback from the participants indicated that this workshop enhanced participant's skills and knowledge on the use of LC-MSMS and the QuEChERS multiresidue methodology for pesticide residue analysis in food to support official control of food safety and to facilitate international trade. An output of the workshop is a manual on basic procedures for operation and optimization of the LC-MSMS. The manual, which is in Spanish, can be downloaded from the FAO/IAEA eLearning web site (URL below). Participants of the workshop can also access all of the presentations at the FAO/IAEA eLearning web site: http://elearning.iaea.org/ATutor/go.php/175 (registration is required).



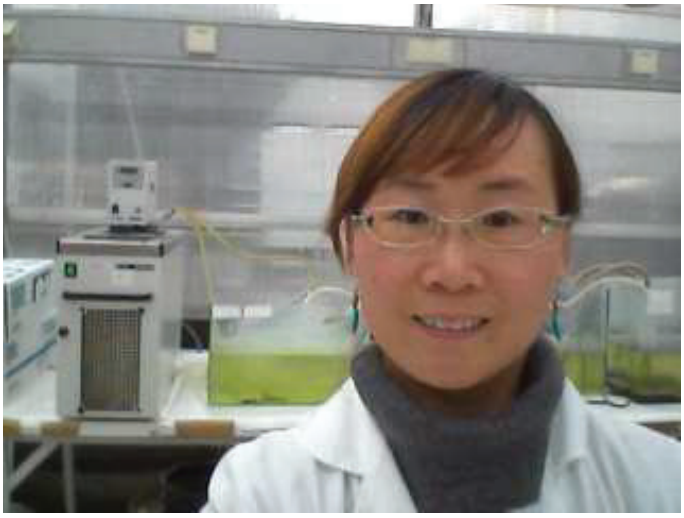
Workshop participants carrying out data processing for pesticide residue analysis at the MIDA Laboratory.

Scientific Visitors

The FEPL hosted six scientific visitors for a period of two weeks under the regional technical cooperation project RLA5060 Harmonizing and Validating Analytical Methods to Monitor the Risk of Chemical Residues and Contaminants in Foods to Human Health. Mr Oscar I. Guardado Aguilar and Mr Cipriano A. Lopez Lezama from Nicaragua, Ms Brenda I. Checa Orrego and Ms Maddala A. Serrano Cortez from Panama, and Ms Silvia C. De Colombo and Ms Laura G. Mereles from Paraguay received training on the use of radiotracers in pesticide residues analysis, method optimisation, uncertainty estimation, the use of stable isotopes in isotope dilution assays, and pesticide adsorption measurements in soils. The training period included participation in the FAO/IAEA interregional train-the-trainers course on Radiotracer Techniques for Food Contaminant Control, which is reported separately in this issue of the newsletter.

Cost-free expert

Ms Yao Minna, from the College of Food Science, Fujian Agriculture and Forestry University, China, joined the Food and Environmental Protection Laboratory (FEPL) in July 2012 for a 6-month period as a cost-free expert. Her work in FEPL focussed on bio-monitoring techniques as indicators of food and environmental contamination, especially pesticides toxicity testing. She also assisted in other FEPL activities, including the preparation and implementation of a train-the-trainers workshop on the use of radiotracer techniques in food contaminant control, and the development of extraction procedures for analytical methods to trace food origin and adulteration using liquid chromatography–tandem mass spectrometry and elemental analyser–isotope ratio mass spectrometry.



Ms Yao Minna at the FEPL in Seibersdorf.

Publications

McComb, K. and Frew, R. Using new analytical approaches to verify the origin of honey. New Analytical Approaches for Verifying the Origin of food. Brereton, P. (Ed). Woodhouse Publishing, *in press*.

Ehteshamrad, E. Baisden, W.T., Keller, E.D., Hayman, A.R., Van Hale, R. and Frew, R.D. (2012). Correlation between precipitation and geographical location of the δ^2H values of the fatty acids in milk and milk powder. Geochimica Cosmochimica Acta, *in press.*

Jandrić, Z., Rathor, M.N., Švarc-Gajić, J, Maestroni, B.M., Sasanya, J.J. and Cannavan, A. (2012). Simultaneous determination of natural toxins in feed by liquid chromatography-tandem mass spectrometry. Book of abstracts of the 4th International Feed Safety Conference – Methods and Challeneges, Beijing, China, 11–13 September 2012, 103.

Jandrić, Z., Abrahim, A., Rathor, N. and Cannavan, A. (2012). Assessment of fruit juice authenticity using UPLC/QToF MS and MarkerLynx data evaluation. Book of abstracts of the 1st European Workshop on Ambient Mass Spectrometry and Related Mass Spectrometry-Based Techniques in Food/Natural Products Control: Safety, Authenticity, Forensics, Metabolomics, Prague, Czech Republic, 18–20 June 2012.

Maestroni, B., Nario, A., Nordgaard, A., Ramiro Castro, C., Carazo, E. and Guang-Guo, Y. (2012). Integrated analytical approaches to assess indicators of the effectiveness of pesticide management practices at a catchment scale. Book of abstracts of the 9th European Pesticide Residues Workshop, Vienna, Austria, 25–28 June 2012, 308.

Byron, D.H. and Cannavan, A. (2012). Activities of the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture Relevant to Codex Work (CAC/35 INF/7). Thirty-fifth Session of the Joint FAO/WHO Codex Alimentarius Commission, Rome, Italy, 2–7 July 2012.

Byron, D.H. and Cannavan, A. (2012). Activities of the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture Relevant to Codex Work (CX/CF 12/6/6). Sixth Session of the Codex Committee on Contaminants in Foods, Maastricht, the Netherlands, 26–30 March 2012.

Byron, D.H. and Cannavan, A. (2012). Activities of the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture Relevant to Codex Work (CX/PR 12/44/4). Forty-fourth Session of the Codex Committee on Pesticide Residues, Shanghai, China, 23–28 April 2012.

Byron, D.H., Cannavan, A. and Sasanya, J.J. (2012). Activities of the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture Relevant to Codex Work (CX/RVDF 12/20/3 Add.1). Twentieth Session of the Codex Committee on Residues of Veterinary Drugs in Foods, San Juan, Puerto Rico, 7–11 May 2012.

Cannavan, A., Patel, R., Sasanya, J. and Byron, D.H. (2012). Establishment of national residue control programmes for antibiotics and anthelmintic veterinary drug residues in developing countries. Proceedings of the EuroResidue VII Conference on Residues of Veterinary Drugs in Food, Egmond aan Zee, the Netherlands, 14–16 May 2012, 921-926.

Islam, M.D., Haberhauer, G., Kist, A., Rathor, N., Gerzabek, M. and Cannavan, A. (2012). A multi-class liquid chromatography-tandem mass spectrometry method for anthemintics in soil and water. Proceedings of the Euro-Residue VII Conference on Residues of Veterinary Drugs in Food, Egmond aan Zee, The Netherlands, 14–16 May 2012, 573-579.

Dabalus Islam, M., Haberhauer, G., Gerzabek, M. and Cannavan, A. (2012). A liquid chromatography-tandem mass spectrometry method for the determination of anthelmintics in alfalfa plants. Food Additives and Contaminants: Part A, 29, 1679-1688.

Cooper, K.M., Whelan, M., Kennedy, D.G., Trigueros, G., Cannavan, A., Boon, P.E., Wapperom, D. and Danaher, M. (2012). Anthelmintic drug residues in beef: UPLC-MS/MS method validation, European retail beef survey and associated exposure and risk assessments. Food Additives and Contaminants, 29, 746-60.

Samsanova, J.V., Cannavan, A. and Elliott, C.T. (2012). Screening methods for the detection of chloramphenicol, thiamphenicol and florfenicol residues in foodstuffs. Critical Reviews in Analytical Chemistry, 42, 50-78.

Impressum

Food and Environmental Protection Newsletter Vol. 16, No. 1, January 2013

The FEP Newsletter is prepared by the Food and Environmental Protection Section, Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture and FAO/IAEA Agriculture and Biotechnology Laboratory, Seibersdorf.

International Atomic Energy Agency
Vienna International Centre, PO Box 100, 1400 Vienna, Austria
Printed by the IAEA in Austria, January 2013

13-00641