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Nuclear Techniques in Food and Agriculture

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To Our Readers

Photo courtesy of Ms Federica Camin from Italy

Food safety remains one of the priorities of the Joint FAO/IAEA Programme of Nuclear Techniques in Food and Agriculture. Indeed, at the 62th General Conference (GC62) of the International Atomic Energy Agency in September last year, the Agency was commended on its continued efforts in the development and application of nuclear and related techniques for food safety and control. Within the Food and Environmental Protection (FEP) subprogramme our focus is on techniques to: detect food residues and contaminants; combat food fraud; use ionizing radiation as a post-harvest food treatment; and ensure that appropriate standards and norms are in place regarding food and radiation safety. Our main objectives are to protect consumers and enhance food trade competitiveness in international markets. One of the main ways in which we strive to do this is by enhancing networks, for example networks of analytical laboratories to build and strengthen laboratory capacity for food safety and quality related work in Member States. The current FEP mandate and its overall objectives are also fundamental in the future strategic planning of programmatic activities targeted at helping Member States enhance and improve their food safety and food control systems.

Since the publication of our July Newsletter, we have successfully completed our programmatic and budgetary plan for the 2020–2021 biennium. Under the heading of Improvement of Food Safety and Food Control Systems, our plan is to continue to support and implement three projects: (1) food irradiation applications using novel radiation technologies; (2) traceability for food safety and to enhance international trade; and (3) preparation and response to radiological emergencies in food and agriculture. Of course, these will entail new tasks and associated performance indicators and detailed output expectations.

Central to the implementation of the FEP subprogramme are Coordinated Research Projects (CRPs). One of our current CRPs is on ‘Accessible Technologies for the Verification of Origin of Dairy Products as an Example Control System to Enhance Global Trade and Food Safety’ (D52038). This

CRP has successfully completed its research phase and has demonstrated the feasibility of using stable isotope and trace element (SITE) analysis combined with other nuclear and related techniques to establish the geographical origin and authenticity of liquid milk and/or powdered milk. This CRP raised awareness of SITE analysis and its wider applications to food traceability and authenticity in Member States. The project also illustrated the potential of SITE to reduce barriers to trade and enhance consumer confidence. The project enhanced the participating Member States capabilities in SITE analysis and also generated several new methods, in-house standard operating procedures, and training opportunities. A detailed report is provided in the Feature Article of this newsletter.

In addition to research and development, important achievements and successes were obtained with our colleagues in the Agency's Division of Technical Cooperation through the implementation of Technical Cooperation Projects (TCPs). These too are reported in detail in this issue of our newsletter. Many workshops and training events, were successfully organized in collaboration with counterparts from relevant Member States. Interregional training events were provided on: improving food safety laboratory competence; mycotoxins analysis in foods of significant consumer health and trade concern; and the analysis of toxic metals and related contaminants in foods with trade implications. Regional training courses were focused on analytical method development/validation and national residue monitoring of food contaminants in Africa and on analytical methods for veterinary drug and pesticide residues in animal products in the Asia and Pacific region. Support to capacity building remains among the top priorities in the implementation of TCPs in the field of food safety, which include further strengthening the capacity building within the food safety network RALACA, enhancing competence of food safety testing laboratories in the Asia and Pacific Region and strengthening Food Safety Asia networking and interregional capacity building on radionuclide testing in food and associated matrices. Several examples of supporting development and building technical capacities under national TCPs are also reported in this newsletter, such as: supporting multi-institutional efforts to improve food safety and control in Uganda; supporting food safety capacity building in Sudan; enhancing food safety laboratory capabilities in the Seychelles; building capacity to monitor marine biotoxins in foods in Morocco; and several others. In addition, various scientific visits, fellowships and expert missions were organized and instruments and facilities procured. These activities have made significant contributions to the strengthening food safety and food control systems, especially in the capabilities of analytical laboratories in Member States. Meanwhile, we have worked closely with project management officers at Technical Cooperation Department and counterparts in Member States in the review of concept notes and development of new TCPs for the next Technical Cooperation Programme Cycle, 2020–2021.

One of the ways in which we help facilitate Member States in their aims to produce and trade safe food and good quality products is through the use of the Codex Alimentarius international food standards, codes of practice and guidelines. In this regard, the FEP participates at Codex activities and meetings, such as the 41st session of the Codex Alimentarius Commission, held in Rome, Italy, 2– 6 July 2018. In response to requests from Member States and other international organizations, we have also provided technical assistance or participated in various technical activities on behalf of the Joint FAO/IAEA Division, which include the participation in a high-level dialogue on analytical sciences, food testing, laboratory management and laboratory standards and performance in Sub-Saharan Africa.

The latest results of R&D activities at the FEP Laboratory (FEPL) are also reported in this newsletter, including the development and validation of a multi-contaminant and multi-class method to ensure safe honey for consumers.

Concerning personnel news of the FEP Subprogramme, we would like to say thank you and a fond farewell to Ms Zora Jandrić who completed her work as a food safety specialist in July 2018. Zora's contributions to the Subprogramme and the laboratory outputs were highly appreciated, especially in the fields of food contaminant analysis, food authenticity and food origin testing. We wish her all the best for her career in the future. We also convey our heartfelt thanks and best wishes to Ms Amber Vaughan who completed a one-year internship in FEPL in September 2018, and Ms Melika Osmic who had been filling the position of Team Assistant for FEPL since November 2017 and completed her assignment in June 2018.

In closing, we all extend our warmest welcome to Ms Alina Mihailova, our new staff member. Alina joined the FEP subprogramme in November 2018 as an analytical chemist. Alina brings to the laboratory experience of many key analytical techniques applied to food authenticity testing and we hope that she will have a pleasant and productive time with the subprogramme. Meanwhile, we also warmly welcome two Chinese interns, Ms Jin Shunru and Ms Xu Xiao, who are both from Zhejiang University (Hangzhou, China) and funded by China. We look forward to working with them in various aspects of subprogramme at FEPL over the coming months.

Finally, I would like to take this opportunity to thank you, our dear readers, for your continued support and encouragement to the subprogramme and to extend my best wishes to you and your families for a happy, healthy and prosperous 2019.

Sincerely,

Zhihua Ye
Head, Food and Environmental Protection Section

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Feature Article

Coordinated Research Project on Accessible Technologies for Verification of Origin of Dairy Products concluded in Slovenia

Simon Kelly

The authenticity of dairy products is an age-old problem. For example, the dilution, or adulteration of milk with water has a long history. In a village called Wymondham only a few miles away from my home town the old water pump in the square is known affectionately as the "iron cow" referencing the alleged practice of diluting milk by market traders in the late 18th and early 19th centuries. Although nowadays these rather crude adulteration practices are less frequent, for many of our developing Member States they still pose a significant and potentially dangerous problems.

A recipe to fool the lactometer…

- 1 gallon (4.5 L) of water
- 2 oz (57 g) of sugar
- 1½ oz (43 g) of salt
- A dash of caramel
- Add to 4 gallons (18 L) of milk

The 'iron cow' in Wymondham market square, Norfolk, UK and a recipe to extend milk and fool the lactometer (a traditional instrument used to check the density and indicate the richness and purity of milk).

This was exemplified by the melamine in milk powder crisis in 2008, where a non-dairy product was used to manipulate the apparent protein content of milk powder, which ultimately led to a number of infant mortalities. Consequently, dairy products are a priority commodity due to their simple processing procedures, relative expensiveness, high level of trade, and use as an ingredient in sensitive products such as infant formula. When food safety is compromised it is imperative that a traceability system can rapidly and robustly identify the origin of the risk enabling it to be removed from the supply chain. These drivers led to the implementation of the five-year Coordinated Research Project (CRP D52038), "Accessible Technologies for the Verification of Origin of Dairy Products as an Example Control System to Enhance Global Trade and Food Safety", which started in 2013 and concluded at the final Research Coordination Meeting (RCM) and Stakeholders' Workshop this year.

The 4th and final RCM of the CRP was held at the Reactor Center, Jožef Stefan Institute (JSI) in Ljubljana, Slovenia from the 7 to 11 November 2018. The project participants attended from 15 Member States including Argentina, Austria, Bangladesh, China, Italy, Lithuania, Morocco, New Zealand, Poland, Russia, Singapore, Slovenia, Sri Lanka, United Kingdom and the USA. The meeting was formally opened by Professor Milena Horvat, Head of the Department of Environmental Sciences at JSI and Dean of the International School. Professor Horvat drew attention to the wide range of food authenticity projects being undertaken at the JSI and how CRP D52038 had played a major role in facilitating the research and method development that had subsequently been applied to many other Slovenian food products, for example, fruits and vegetables. She went on to highlight the links in activities between the CRP and the European Research Area (ERA) Chair, "ISO-FOOD", funded by the European Union's 7th Framework Programme. The Mission of the ERA Chair, held by Dr David Heath, is for the JSI to become a recognised Research and Education Centre for food analysis and characterisation using advanced analytical methods and development of food composition databases. The Focus areas of the ERA Chair are food safety, traceability and authenticity; metrology infrastructure and a repository of data and knowledge.

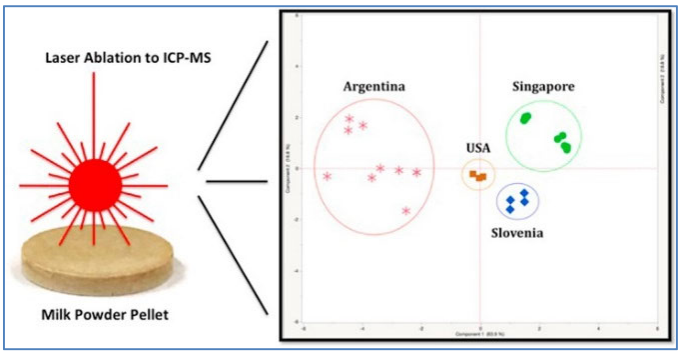
The participants in the final RCM of CRP D52038, "Accessible Technologies for the Verification of Origin of Dairy Products as an Example Control System to Enhance Global Trade and Food Safety", Ljubljana, Slovenia, 7 to 11 November 2018.

The D52038 RCM was chaired by Mr Russell Frew, University of Otago, New Zealand with Mr Lian Jie Bay, Agri-Food and Veterinary Authority, Singapore as the Rapporteur and Mr Simon Kelly (Food Safety Specialist, FEPL, Joint FAO/IAEA Division) as Scientific Secretary. Mr Kelly reflected on the significant achievements during the lifetime of the five-year project and concluded that despite many challenges, the Member State Contract Holders had achieved significant progress with the full support of the Agreement Holders. All 10 research contract holders and three research agreement holders were represented at the meeting with Ms Federica Camin in attendance as a meeting consultant to provide special input

on the implementation of isotopic techniques to control the authenticity of products within the dairy sector. Mr Micha Horacek, a seasoned isotope geochemist who previously published work on the origin of milk products, was present as an observer from the Francisco Josephinum Wieselburg, Austria.

The meeting included final research progress presentations from each of the contract holders and technical presentations from each of the agreement holders. The agreement holders, consultant and observer's technical presentations were on a range of topics of relevance to the contract holders. These presentations reinforced understanding of the principles of food traceability using nuclear and complementary techniques, as well as providing case studies of how the data generated can be applied in actual traceability situations (e.g. the Protected Denomination of Origin (PDO) cheeses Grana Padano and Parmigiana Reggiano). The insights provided by the agreement holders helped the contract holders formulate their final reports and outline their contributions to the forthcoming Technical Document.

One of the major achievements from the project was the joint publication of the development of a method for the elemental analysis of milk powders using laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS) and its potential use in geographic sourcing (Hoffmann et al., (2018), Talanta, 186, 670–677). In this study, the LA-ICP-MS method was developed for the analysis of solid milk powder and compared to k0-instrumental neutron activation analysis (k0-INAA) for a reference milk material (IAEA-153) as well as several authentic milk samples from different Member States in the project. The analytical figures of merit for both the LA-ICP-MS and the k0-INAA analysis were reported. Precision of ~ 10% RSD or better was achieved for most elements for both techniques and bias of ~ 10% was achieved for both techniques for most elements with LA-ICP-MS producing lower limits of detection (~ 1 mg/kg) for Sr. Principle component analysis (PCA) using Na, Mg, Ca, Rb, and Sr concentration data from representative authentic milk samples permitted separation of production origins from the United States, Argentina, Singapore, and Slovenia (shown in the Figure below). However, it was not possible to distinguish the large number and geographic distribution of samples from Russia from the samples from the United States and Slovenia.



Schematic of the elemental analysis of milk powders using laser ablation-inductively coupled plasma-mass spectrometry and subsequent Principle component analysis using Na, Mg, Ca, Rb, and Sr concentration data to separate different countries of origin (reproduced from Hoffmann et al., (2018), Talanta, 186, 670-677).

It was recorded at the meeting that the CRP had successfully demonstrated the feasibility of using stable isotope and trace element (SITE) analysis combined with other nuclear and related techniques to establish the geographical origin and authenticity of liquid milk and/or powdered milk produced in the Member States. The project also raised the awareness in Member States of SITE analysis and its wider applications to food traceability (production methods and geographical origin) and authenticity and its potential to reduce barriers to trade and enhance consumer confidence. Furthermore, the project enhanced the Members States capabilities in SITE analysis and generated several new methods, in-house standard operating procedures, and training opportunities. This has also resulted in a significant number of dairy authenticity and traceability datasets for the first time. Over the five years of the project the 10 research contract holder Member States generated 27 scientific publications in local and international journals; gave 21 oral communications related to the project; presented 23 poster communications; supported 8 PhD, 8 Masters and 4 Undergraduate students; trained 28 personnel; formed 10 new links to respective national dairy industries and 14 new academic links; generated 19 in-house standard operating procedures; and hosted 3 related workshops. The CRP has facilitated further investment by the Member States in SITE capabilities and helped leverage and secure new national funding.

The meeting concluded on the final day of the RCM with a stakeholder dissemination workshop event organised by Ms Nives Ogrinc (JSI), and her team, to present the outputs from the project. The stakeholder event was attended by Slovenian government officials, consumer groups, representatives of the dairy industry, retailers and researchers. The meeting was used to highlight the real-world applicability of the research conducted in CRP D52038 with examples from New Zealand, Slovenia, Singapore and the USA of nuclear techniques such as stable isotope analysis being applied in industry control systems and government surveillance and enforcement exercises.

Forthcoming Events

Research Coordination Meetings (RCMs) of FAO/IAEA Coordinated Research Projects (CRPs)

Second Research Coordination Meeting on Integrated Radiometric and Complementary Techniques for Mixed Contaminants and Residues in Foods (D52041–CR–2), Gaborone, Botswana, 25-29 March 2019.

Joint FAO, IAEA and Latin American and Caribbean Analytical Network (RALACA) Workshop on Quality Assurance and Quality Control Measures in Food Testing Laboratories, Vienna, Austria, 5 May 2019.

First Research Coordination Meeting on the Implementation of Nuclear Techniques for Authentication of Foods with High-Value Labelling Claims (INTACT Food) (D52042–CR–1), Vienna, Austria, 13–17 May 2019.

Consultancy Meeting on Depletion of Veterinary Pharmaceuticals and Radiometric Analysis of their Residues in Animal Matrices, Vienna, Austria, 15–19 July 2019.

Consultancy Meeting on the use of Low Energy Beams (LEB) and related nuclear applications for food safety and quality to enhance food security (SDG2), Vienna, Austria, 7–11 October 2019 TBC.

International Meetings/Conferences

The First FAO/WHO/AU International Conference on Food Safety, Addis Ababa, Ethiopia, 12–13 February 2019.

The International Meeting on Radiation Processing (IMRP), Strasbourg, France, 1–5 April 2019.

51st Session of the Codex Committee on Pesticide Residues, China, 8–13 April 2019 TBC.

Texas A&M University Collaborating Centre, 10th Annual Hands-on Electron Beam Workshop, College Station,Texas, USA, 15–19 April 2019.

FAO/WHO/WTO International Forum on Food Safety and Trade, Geneva, Switzerland, 23–24 April 2019.

13th Session of the Codex Committee on Contaminants in Foods, Indonesia, 29 April–3 May 2019.

7th Latin American Pesticide Residue Workshop (LAPRW), Foz do Iguazu, Brazil, 5–8 May 2019.

14th IUPAC International Congress of Crop Protection Chemistry, Ghent, Belgium, 19–24 May 2019.

42nd Session of the Codex Alimentarius Commission,Geneva, Switzerland, 7–12 July 2019.

Past Events

Regional Asia-Pacific Training on Analytical Methods for Veterinary Drug and Pesticide Residues in Animal Products, Quezon City, Philippines, 12–23 November 2018

James Sasanya

The training aimed at improving the use of reliable analytical methods for testing and monitoring residues of veterinary drugs, including related pesticides in foods of animal origin was hosted by the Bureau of Animal Industry Quezon City, Philippines, 12–23 November 2018. It attracted ~30 participants from Bangladesh, Indonesia, Jordan, Lebanon, Malaysia, Mongolia, Oman, Pakistan, Syrian Arab Republic, Thailand, Vietnam and the host country. The course covered among others, common guidelines for development and validation of analytical methods; screening and confirmatory analytical techniques; in-house; choice and use of stable isotope-labelled compounds; data analysis and computing method validation parameters; and cross-laboratory studies. The event also contributed to enhancing food safety networking in the region.

The event involved cooperation with Iowa State University's Veterinary Diagnostic Laboratory, USA and the Flanders Research Institute for Agriculture, Fisheries and Food, Belgium.

Technical Officer's Visit to the Institute of Quality and Standards for Agricultural Products (IQSAP), Zhejiang Academy of Agricultural Sciences (ZAAS), Hangzhou, China, 15–19 October 2018

Simon Kelly

Verifying food authenticity is a high priority for China: not only to protect consumers from fraud, but also to protect them from unintended food safety issues that are derived from clandestine food production activities in unlicensed or unsanitary conditions. Such practices carry inherent foodsafety risks; lead to the erosion of consumer confidence and potentially reduce international market access for Chinese food products. The Joint FAO/IAEA Division's Food and Environmental Protection Laboratory (FEPL) has initiated a collaboration with the Institute of Quality and Standards for Agricultural Products (IQSAP), Zhejiang Academy of Agricultural Sciences (ZAAS), to develop systems utilising advanced stable isotope techniques and an integrated and multidisciplinary approach, to confirm the authenticity and origin of Chinese agro-products.

In October 2018, Mr Kelly visited IQSAP at the invitation of the Deputy Director, Mr Yuan Yuwei, to discuss and review their activities in food authenticity and traceability. IQSAP is well equipped with nuclear and complementary instrumentation including elemental analyser, gas chromatography (GC) and liquid chromatography (LC) coupled to isotope ratio mass spectrometry (IRMS); GC-mass spectrometry (GC-MS); LC-MS; inductively coupled plasma-MS (ICP-MS) and multi-spectral imaging. In addition, the institute has a dedicated chemometrician investigating multivariate data treatment to confirm the geographical and production origin of foods. IQSAP are planning to develop food matrix stable isotope reference materials, specifically tea and rice and this is a further area of collaboration with FEPL who are also developing food matrix reference materials in association with Dr Arndt Schimmlemann at Indiana University through a Fulbright funded Fellowship.

Group photo of Mr Simon Kelly with staff from the team of Deputy Director General, Mr Yuan Yuwei, Institute of Quality and Standards for Agricultural Products, Zhejiang Academy of Agricultural Sciences, Hangzhou, China.

IQSAP has two significant national projects on rice and tea authenticity and is well placed through connections to their respective national testing centres to obtain authentic samples from the field. Currently, they have over 3000 authentic rice samples from five years of production. This is a critical aspect of food authenticity studies to ensure test-samples can be accurately assessed against database samples that represent sources of variability due to geographical origin, year and/or time of harvest, technological processing, storage conditions and so on. Furthermore, the IQSAP team has published research on organic crop authentication using nitrogen isotope analysis and completed stable isotope and trace element (SITE) studies on differentiation of wild versus farmed carp. Currently IQSAP is characterizing an 'added-value' garlic produced in Shandong province

"Jinxiang Da Suan", which is one of 10 Chinese foods registered in the European DOOR database with a protected geographical indication (PGI). In addition, IQSAP has offered to host TC Fellows and an arrangement has already been reached through Regional Cooperation Activity RAS5081 to host a regional training course in the application of multivariate statistics to food authentication for 20 participants from the Asia-Pacific region in April 2019.

The mission proved to be extremely valuable in: cementing collaborative links between FEPL and IQSAP ZAAS; and exploring new areas for collaboration in applied and adaptive research aimed at the use of nuclear techniques in food traceability and authentication to enhance food safety in China and facilitate international trade.

Mr Simon Kelly answering questions after giving a lecture on the application of stable isotope and trace element analysis to food authentication to the staff from the team of Deputy Director General, Mr Yuan Yuwei.

The Fifth and Final FoodIntegrity Project Consortium Meeting and International Conference, Nantes, France, 13–15 November 2018

Simon Kelly

"FoodIntegrity" (FI) is the short title of the EU-funded Seventh Framework Integrated Project "Ensuring the Integrity of the European food chain" that started in January 2014 and finished in December 2018. The final meeting of the project consortium and the associated 5th international conference took place at the Cités de Congrès, Nantes, France from 13th and 14th, and 15th November 2018, respectively. The Technical Officer, Simon Kelly is a leader of the workpackage 1 (Food Integrity Network) and the Food and Environmental Protection Laboratory actively participated in workpackage 2 (Knowledge Base); workpackage 10 (Industrial Integration) and workpackage 11 (Dissemination and Training). The main aim of the project was to build capabilities to fight food fraud and to assure the authenticity, safety and quality of European food and the integrity of its supply chains. It involved producers, industry, retailers, public administrators, control bodies, NGO's, analytical laboratories and researchers. The theme for the final conference was 'Delivering real world solutions'. The conference included parallel sessions on 'Complex foods: tools for food authenticity assessment', 'The lab comes to the factory', 'Transparency and trust in the food chain', 'Standardisation: new initiatives', 'Molecular biology approaches to food integrity', 'Available IT tools using data for food authentication', 'Organic food authentication' and 'Industry are the main victims of food fraud. A debate on a new paradigm', 'Targeted versus non-targeted: problems and solutions' and 'Will Blockchain really solve our food fraud problems?'. The Plenary sessions covered a 'Strategic look from the big players', 'Hot topics' and 'Forward look: future research and innovation needs for the food sector'. There was also an interactive workshop on 'Tools and needs for the future: gap analysis', poster sessions and a number of vendor workshops. The conference had approximately 300 participants from all over the world.

Mr Kelly participated in the organisation and implementation of the parallel session focusing on the authenticity of organic foods and gave an oral-presentation titled "Is it organic? What do existing analytical techniques have to offer and how close are we to implementing them?

Mr Peter Rinke (Sure, Global, Fair fruit juice industry association) introduces the speakers and panellists in the 'Organic Food Authenticity' parallel session.

Building Capacity to Monitor Marine Biotoxins in Foods in Morocco, 6–8 November 2018

James Sasanya and Daniela Battaglia

A national training course was conducted at the Office National de Sécurité Sanitaire des produits Alimentaires (ONSSA) laboratories in Agadir, from 6 to 8 November 2018 with focus on lipophilic marine biotoxins and using an EU chromatographic/mass spectrometric technique. Other alternative techniques were also introduced. The training focused on analytical method setup, including the calculation of the most critical performance criteria, complete sample pretreatment procedure, using uncontaminated oyster materials fortified with mixed lipophilic toxin standards to evaluate method efficiency, were implemented. The training also addressed legislation and fundamental issues on marine biotoxins control as well as the transition from biological assays to

chemical methods along with associated challenges of the transition.

The participants now have a better understanding of the critical aspects to consider on the analytical methods for reliability of test results; development of relevant the standard operation procedure for confirmatory analysis of lipophilic toxin and any new future method to develop. Further cooperation with the EU reference laboratory for marine biotoxins has been initiated. Agadir is now receiving reference material and related material from the EU laboratory and this will facilitate validation of the method according to EU requirements possibly this year. Agadir staff is also expected to share their experience in future with other scientists in the country or region.

Agadir laboratory personnel and the EURL marine biotoxin experts in Morocco.

24th Meeting of the Defra Authenticity Analytical Methods Working Group (AMWG), Nobel House, London, UK, 6 November 2018

Simon Kelly

The 24th Meeting of the UK's Department for Environment Food and Rural Affairs (Defra) – Food Authenticity Analytical Methods Working Group (AMWG) took place in Nobel House, London on 6 November 2018. This meeting is a peer review committee that advises on the science and methodology commissioned by Defra and provides a quality assurance function to ensure food authentication methods being developed are relevant and fit for purpose. The group is comprised of representatives from the UK National Competent authorities (Defra and the Food Standards Agency), food industry, enforcement bodies, consumer organisations and academia to ensure balance and focus. Mr Simon Kelly sits on the working group to advise on stable isotope methodology and to provide general input into the review of food authenticity analytical methods, quality control procedures, standard operating procedures sampling protocols, the direction of research requirements and intelligence on food fraud. The meeting reviewed a number of important issues and projects, including:

- Methods to the verify the claimed feeding regime for retail eggs.
- Quantification of Horse & Pork Meat Adulteration in other meats.
- Evaluation of quantitative molecular biology methods.
- Liquid chromatography targeted mass spectrometry method to determine the animal origin of gelatin – transfer to a high throughput, low cost platform with single lab validation.
- Expansion of the UK Food Authenticity Network to an International Platform.
- Codex and Surveillance Oral Update including CCFIC.
- Update on Research Priorities - Forward Look at rapid field deployable screening methods.

Mr Kelly also presented a paper on the importance of databases for food authenticity studies. Attendees of the AMWG 'Deep Dive' food authenticity workshop, held on 7 June 2018, highlighted databases as a key stumbling block for enabling methodology for authenticity testing. The long-term sustainability and curation of databases was considered to be the major specific obstacle that was highlighted by attendees in relation to databases. Mr Kelly explained the processes involved in setting up a robust food authenticity database and challenges faced in funding and maintaining such a database (Figure 1 below). He then went on to describe successful funding models and some of the barriers to sharing data especially that held in proprietary databases by commercial companies. Discussions with the working group members during the meeting also gave rise to a number of potentially beneficial collaboration opportunities. Defra are particularly interested in working with the FAO/IAEA Joint Division on rapid and field deployable screening methods for food authenticity and will send an observer to the next Research Coordination Meeting of CRP D52040 "Field-deployable Analytical Methods to Assess the Authenticity, Safety and Quality of Food" to be held from 10 to 13 December 2018 in Vienna.

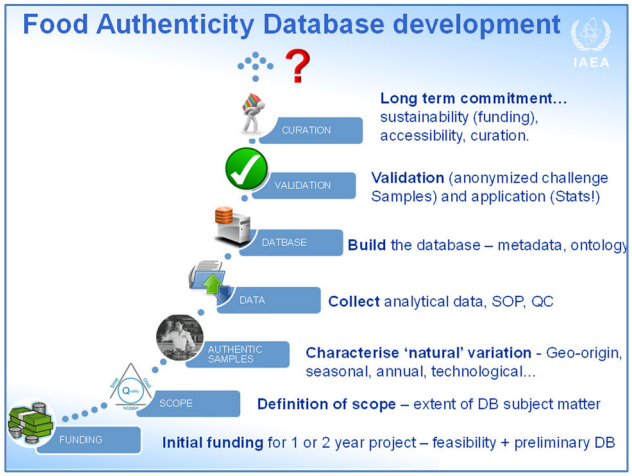


FIG. 1. Steps for consideration in the development of a food authenticity database.

Association of Analytical Communities (AOAC) Sub-Saharan Africa Section Inaugural Meeting, Pretoria, South Africa, 5–7 November 2018

Andrew Cannavan

The AOAC Sub-Saharan Africa Section is a sub-organisation of the AOAC INTERNATIONAL, a not-for-profit organisation based purely on the active volunteer work of scientists and like-minded stakeholders. The Section represents 46 African countries, creating an Africa-based platform where official control laboratories, regulatory authorities, industry, contract research organisations, technology providers and academia can work together to improve the standard and performance of analytical science within the region. It serves as an effective vehicle to drive the improvement of analytical competence and capabilities as well as the standards and performance of food testing labs in the region, and therefore shares many of the objectives of the Joint FAO/IAEA Division's Food and Environmental Protection subprogramme. This AOAC Section aims to achieve its goals through collaboration, training and education, analytical method development and harmonisation, and the extension of the scope of AOAC Official Methods (to include indigenous foods where required) and to serve as an independent and impartial scientific advisory body.

The AOAC Sub-Saharan Africa Section inaugural meeting was held in Pretoria, South Africa, from 5 to 7 November 2018, with vendor and technical workshops from 8 to 9 October 2018. The meeting had more than 100 participants, mainly from across Africa, with special interests in the analytical sciences, testing, laboratory management and laboratory standards and performance.

Mr. Cannavan, head of the Joint FAO/IAEA's Food and Environmental Protection Laboratory, was invited to participate in a high-level dialogue, which included plenary speakers and a panel discussion to outline the economic imperative for food safety capacity building and its role as a prerequisite for trade and economic development. The purpose of the dialogue, was to provide a strategic view of the importance of food safety, food safety capacity building and public/private collaboration in a rapidly changing globalised economy. As a prelude to the dialogue, there were a selection of presentations designed to highlight key issues and themes associated with food safety, public health, trade and economic development to provoke thought and discussion. The panel discussion included seven panellists and was facilitated by Professor Samuel Godefroy, University Laval, Canada.

As a result of the dialogue, the audience gained a better picture of the food safety landscape in sub-Saharan Africa, which provided a platform for discussion and interaction on how to improve public health, regional trade and economic development in the region, through improved food safety, via effective capacity building.

The meeting continued with sessions covering topics such as analytical method implementation, validation, verification, quality control, performance and alignment and concluded with a session of young scientists' presentations.

Mr Cannavan participating in the expert panel session.

From the meeting presentations it was clear that there are opportunities to work in collaboration with the AOAC Sub-Saharan Africa Section to enhance laboratory capabilities for food safety testing in the region. Discussions were held with Dr Owen Fraser, President of this AOAC Section, on synergies and potential mechanisms to realise collaborative training efforts, especially in connection with the African Food Safety Network (AFoSaN).

During the meeting, Mr Cannavan also took the opportunity to visit the National Metrology Institute of South Africa (NMISA) facilities in Pretoria, along with Drs Paul Young and Sonia Bradley, representing the private sector (Waters Corporation). NMISA previously collaborated with IAEA in holding the African Food Safety Workshop in Pretoria in June 2018 (reported in the previous issue of this newsletter) and are keen to collaborate in further such training activities. Mr Cannavan engaged in discussions with Dr Jayne de Vos, Director of the NMISA Chemistry Department and with Dr Maria Fernandes-Whaley, Head of the Organic Analysis Section, on the potential for expanding the training activities of NMISA to cover training on the development of organic reference materials for indigenous foods to support food safety testing in Africa, and on enhancing the NMISA facilities to enhance future training capabilities. Discussions were also held with Mr Ephraim Moruke, laboratory manager of the Department of Agriculture, Forestry and Fisheries, on the provision of assistance and advice by the Joint FAO/IAEA Division on test methods for the control of fraudulent practices and food safety in honey and other products.

The meeting also provided the opportunity to catch up with a number of other contacts, former project associates and

trainees in previous and current IAEA projects and workshops.

Visit to NMISA in Pretoria, (L-R: S. Bradley, P. Young (Waters Corporation), Jayne de Vos, Director of NMISA Chemistry Department).

Participation in the AOAC Sub-Saharan Africa Section meeting was well worthwhile, enabling interaction with many stakeholders in food safety for the region. The AOAC platform provides a forum through which the collective knowledge, experience and capabilities of all participants can be considered as the principle resource and the key driver for the improvement in laboratory standards and analytical sciences. Cooperation and collaboration with the Joint FAO/IAEA Division programme should provide enhanced capacity building for food safety testing in sub-Saharan Africa.

Supporting African Union's Initiative to Establish Food Safety Tracking in Africa, Addis Ababa, Ethiopia, 24–26 September 2018

James Sasanya

The officer participated in a writeshop held at the African Union (AU) HQ in Addis Ababa, Ethiopia. This aimed at developing an African Food Safety Tracking Index (AFSI) and institutionalizing food safety tracking among Member States under a Biennial Review (BR) mechanism. African countries recognize the challenges of food safety control systems and that the continent should rise to levels commensurate to the international requirements and expectations.

The Joint FAO/IAEA Division was invited to provide technical support to this writeshop and was a follow-up of a successful African Food Safety Network Workshop the Food and Environmental Protection Section organized, in June 4–8 2018, and where stakeholders including the AU participated. Common areas of work were identified for future cooperation and participation in the writeshop was an example.

As a member of a team of 17 experts from 10 institutions in Africa and beyond, the officer contributed to brainstorming sessions where the following were agreed as indicators for food safety and possible inclusion in the BR: (i) Food safety systems, (ii), Health aspects of food safety and (iii) Trade aspects of Food safety. The officer led the team on systems including role of laboratories, and developed relevant parameters, their definition, data required and sources of such data.

The officer helped prepare reports and was asked to further support this AU initiative, among others through the African Food Safety Networking.

Participants at the AU writeshop.

An African Regional Training on Analytical Method Development/ Validation and National Residue Monitoring of Food Contaminants, Ouagadougou, Burkina Faso, 16–20 July 2018

James Sasanya

The event was hosted by the National Public Health Laboratory (LNSP) and attracted by 27 participants from 22 countries namely: Algeria, Botswana, Burkina Faso, Burundi, Cameroon, Chad, Côte d'Ivoire, Egypt, Ghana, Malawi, Mauritania, Mozambique, Namibia, Niger, Senegal, Seychelles, Sierra Leone, South Africa, Sudan, Tunisia, United Republic of Tanzania and Zimbabwe.

Training covered, among others, the development/ optimization, validation and use of analytical methods for testing residues of pesticides (including those used in animal production) in selected products; cost-effective sample preparation; interlaboratory sharing of experiences on method development/validation and national monitoring programmes/plans.

Radio receptor assay and complimentary techniques were used at the training and recommendations were formulated to continue supporting activities including proficiency testing, instrumentation maintenance and food safety regulation among others.

Systematic monitoring of contaminants was explained based on sanitary and phytosanitary requirements as well as the European Union model for exporting third countries. Regional experiences on monitoring of pesticide residues, heavy metals and microbiological contaminants and associated trade restrictions were shared.

The leadership of the host National Public Health Laboratory (LNSP) and the National Liaison Officer (NLO) appreciated the IAEAg role in supporting food safety related activities through strengthening of laboratories and establishing networks on the continent. The NLO emphasized that laboratories provide a key role in monitoring of food contaminants, hence the need to strengthen capacity for establishment of reliable analytical methods.

African regional food safety trainees in Burkina Faso.

The 41st session of the Codex Alimentarius Commission, Rome, Italy, 2–6 July 2018

Andrew Cannavan

The Codex Alimentarius was established in 1963 by the Food and Agriculture Organisation of the United Nations and the World Health Organisation (FAO and WHO) as the UN food standards body charged with protecting consumer health and ensuring fair practices in the food trade. The 41st session of the Codex Alimentarius Commission (CAC41) was held at FAO headquarters, Rome, Italy, from 2 to 6 July 2018. A new format was introduced for this meeting, which included, in addition to seven plenary sessions, eight side events on 'Food integrity and food authenticity: a way forward' (two workshops focusing on IGOs and NGOs), 'FAO and WHO capacity development activities'; 'Enhancing engagement in Codex – examples from Codex Trust Fund (CTF2) supported countries'; 'The burden of foodborne diseases: a need for national studies'; 'Facilitating safe trade: experiences and lessons learned from STDF work'; 'ePing, the new SPS & TBT notification alert system'; 'The International Food Safety Network (INFOSAN): Codex and recent major food safety events'; and 'The scientific basis of Codex Standards – how does it work?'. There was also a reception in support of World Food Safety Day.

Mr Cannavan, Head of the Food and Environmental Protection Laboratory (FEPL), represented the IAEA as an observer international organisation at the meeting, specifically with respect to the activities of the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture (the Joint Division), and attended all sessions and side events. In plenary session 6 Mr. Cannavan presented a summary of information document CAC/41 INF/6, "Information on Activities of the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture". This was of particular relevance to comments from the delegations of Senegal, Iran and Ghana during plenary and the side event on food integrity, on the lack of availability of analytical methods for food authenticity.

Between sessions, individual meetings were held with several delegates. Mr Mohammad Hossein Shojaee AliAbadi (Iran), chair of the working group on food integrity/food authenticity in the Codex Committee on Food Import and Export Inspection and Certification Systems (CCFIS), requested direct input from the Joint Division on a draft discussion paper on food integrity and food authenticity. Mr Kanat Balykbayev (Kazakhstan) was interested in networking, technical cooperation and coordinated research on the control of residues and contaminants in food and the environment. Ms Nuri Gras (Chile) discussed food authenticity issues and possible future collaboration to build capacity for testing in Chile.

The CAC41 report [1] was adopted in the final session of the meeting. Highlights included decisions on:

- Alignment of food additives and full integration into the General Standard for Food Additives
- New work on front of pack nutrition labelling
- Various contaminants
- Maximum residue limit for vet drugs and for pesticides
- Guidance for histamine control in the code of practice for fish and fishery products.

[1] http://www.fao.org/fao-who-codexalimentarius/meetings/detail/en/?meeting=CAC&session=41)

The work of the Joint Division remains highly relevant to the Codex Alimentarius Commission, and inputs to the development of Standards and assistance to Member Countries in building capacity to comply with the Standards are appreciated and valued.

CAC41 plenary session.

Metabolomics 2018 – 14th Annual Conference of the Metabolomics Society, Seattle, Washington, USA, 24–28 June 2018

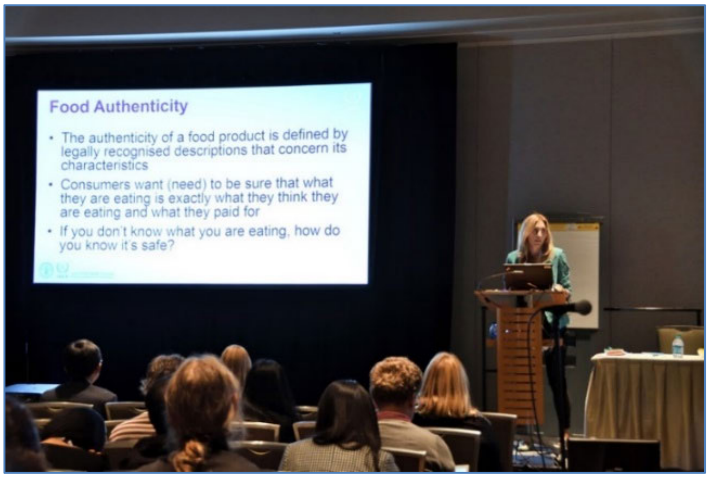
Zora Jandrić

The Metabolomics 2018 Conference was held at Washington Convention Centre in Seattle, USA. The conference featured an exceptional program that covered the full range of metabolomics research topics, with major scientific themes of system biology, big data, technology advances, translational science, plant metabolomics, the microbiome and the exposome, including environmental and nutritional metabolomics, which were reflected in the diverse parallel scientific sessions.

The conference was organised to discuss the current status of metabolomics in food sciences, the advantages and limitations of the current statistical data analysis and metabolomics databases, and to present results of recent applications in environmental and nutritional metabolomics, as well as plant metabolomics and new approaches to statistical untargeted data analysis. The following topics were covered: food and nutrition, big metabolomics databases and cloud computing, multiomics, metabolite profiling and modelling, biospecimens, sample preparation and quality, and metabolomics as a tool to assess food authenticity. The conference had more than 200 participants from more than 20 countries.

The food metabolome can be extremely complex, often comprising several thousands of chemical species. This provides the basis for the application of untargeted metabolomics to monitor the molecular fingerprints of foods in order to ensure authenticity and to detect unexpected contaminants or food fraud. In this regard, Ms. Zora Jandrić presented current applied research done in the Food and Environmental Protection Laboratory (FEPL) at Seibersdorf on a comprehensive strategy for identification of food origin. The research was carried out to provide analytical methodology on food authenticity and safety, using fast screening techniques (e.g. Fourier transform infrared - attenuated total reflectance spectroscopy, FTIR-ATR) and high resolution mass spectrometric techniques (ultra-high performance liquid chromatography − quadrupole time-of-flight mass spectrometry, UPLC-QtoF-MS), to support IAEA Member States in ensuring sustainable food systems. The oral presentation was followed by extended discussion with symposium participants. Ms Jandrić took the opportunity to discuss with participants some issues relevant to the complexity and challenges in ensuring food authenticity using a metabolomics approach, including challenges such as availability of authentic samples, data processing and accurate metabolite identification.

Participation in the conference offered an excellent way to network, discuss and share ideas with scientists and researchers from different countries interested in the rapidly developing field of metabolomics. Food authenticity has wide relevance to consumers and manufacturers. Recently, food adulteration has become a key food quality issue in IAEA Member States, with fraud and adulteration posing a growing challenge for food manufacturers. Because most adulterants are unknown, they are difficult to recognize using the targeted screening methods typically used in food laboratories. There is, therefore, an urgent need for methods that will screen food samples using non-targeted methods for contaminants, to provide proof of origin and to prevent deliberate or accidental undeclared adulteration of food samples. Confirming the authenticity of foods can prevent false description, substitution of cheaper ingredients, and adulteration, as well as incorrect origin labelling.



Ms Jandrić presenting the results of FEPL research at 'Metabolomics 2018'.

Coordinated Research Projects

CRP Reference Number	Ongoing CRPs	Project Officer
D52038	Accessible Technologies for the Verification of Origin of Dairy Products as an Example Control System to Enhance Global Trade and Food Safety	S. Kelly A. Cannavan
D52039	Development and Strengthening of Radio-Analytical and Complimentary Techniques to Control Residues of Veterinary Drugs and Related Chemicals in Aquaculture Products	J.J. Sasanya
D52040	Field-deployable Analytical Methods to Assess the Authenticity, Safety and Quality of Food	S. Kelly A. Cannavan
D52041	Integrated Radiometric and Complementary Techniques for Mixed Contaminants and Residues in Foods	J.J. Sasanya Z. Ye
D52042	Implementation of Nuclear Techniques for Authentication of Foods with High-Value Labelling Claims (INTACT Food)	S. Kelly
D61024	Development of Electron Beam and X-ray Applications for Food Irradiation (DEXAFI)	C.M. Blackburn

Update on the Development of Guidance for Radionuclides in Food in Non-Emergency Situations

Carl Blackburn

Previous newsletters have mentioned the importance of the 2016 publication Radionuclide Activity Concentrations for Food and Drinking Water (IAEA-TECDOC-1788). It resulted from a detailed examination of the different international standards relating to food and to drinking water. It serves as a reference source for the current standards in this area and the circumstances in which they are intended to apply and also offers technical advice. Its publication was the start of a project to meet IAEA Member States' requests "to develop principles for harmonized guidance on radionuclide activity concentration values in food and drinking water, in continued cooperation with relevant international organizations and national authorities". The FAO, the IAEA and the World Health Organization (WHO) have agreed to fully co-operate in implementing this on-going project.

IAEA radiation safety standards specify an annual dose of 'about one millisievert' for the ingestion of food and 'about one millisievert' for drinking water in non-emergency situations. These doses cannot be measured directly and competent authorities in Member States are required to set reference levels, i.e. radionuclide concentrations (becquerels per kilogram), that are equivalent to these annual doses. The WHO Drinking Water Guidelines provide guidance to national authorities in the case of drinking water, but there is no equivalent international guidance for food.

Several expert meetings have been held to consider radionuclides in food, natural radioactivity in food and radioactivity in specific instances, such as in aquaculture products and to initiate the development of basic principles underpinning future guidance. For example, at the end of 2017 a Steering Group of experts, with representation from international organizations and national authorities, was established. It agreed an approach to develop harmonized guidance on radionuclide activity concentration values in food and drinking water in non-emergency situations. A workplan for 2018 was agreed and has been implemented. To the extent possible, future guidance for food will follow the approach in the WHO Guidelines for Drinking Water Quality (i.e. address both naturally-occurring and artificially-produced radionuclides). The scope is different to that of CODEX STAN 193-1995, where the Codex Alimentarius Guideline Levels apply to radionuclides contained in foods destined for human consumption and traded internationally, and which have been contaminated following a nuclear or radiological emergency.

One of the main tasks for 2018, was to re-evaluate data published in 2000 by the United Nations Scientific Committee of the Effects of Atomic Radiation (UNSCEAR). The FAO, the IAEA and the WHO have used these data on natural radionuclides in food in the UNSCEAR 2000 Report in conjunction with up-to-date cluster diet information to assess the range of individual doses from natural radionuclides in world diets. The WHO Global Environment Monitoring System (GEMS) cluster diets defined 17 different diets that together provide an overview of the different diets world-wide and are used when assessing

dietary intake of various chemicals according to internationally accepted methodologies.

Another major task over 2018 was to undertake a literature review of natural radioactivity in food for the period 1998 to 2017 to gather published data since the UNSCEAR 2000 evaluation. The literature review protocol is compatible with the process used by UNSCEAR and has been discussed and agreed by the FAO, the IAEA, UNSCEAR and the WHO, as well as by the members of the Advisory Group. The IAEA, and the FAO working with the assistance of the IAEA library, completed the task of compiling a comprehensive database of the appropriate publications and the reported activity concentration data for different natural radionuclides of significance in food. At the time of writing, these data are being used by the WHO in conjunction with the GEMS/Food cluster diet data to assess the range of individual doses in world diets for comparison with the assessment based on the UNSCEAR 2000 data.

The results of both these evaluations were to inform the development of guidance for radionuclides (both naturally-occurring and artificially-produced) in food at the second meeting of the Steering Group of experts in December 2018.

Call for Research Proposals for a New CRP: Implementation of Nuclear Techniques for Authentication of Foods with High-Value Labelling Claims (INTACT Food, CRP D52042)

Simon Kelly

Research proposals are invited for participation in a new IAEA Coordinated Research Project (CRP) titled "Implementation of Nuclear Techniques for Authentication of Foods with High-Value Labelling Claims". This five-year project aims to safeguard consumers and reputable producers; to ensure regulatory and ethical compliance; to stimulate domestic markets; and to reduce barriers to international trade.

Brief Summary

Numerous foods are sold at premium prices because of high-value labelling claims related to specific production methods, unique characteristics and origins. Origin-linked products can be part of a virtuous circle of sustainable quality based on the preservation of local resources and other factors described in the FAO-SINERGI guide "Linking people, places and products". Furthermore, these claims include agricultural, geographic, ethical and nutraceutical labelling specifications that add value to the products. In order to protect consumers (and reputable proeducers) from fraud, and potential unintended food safety issues, standardised analytical methods are required to confirm such claims. Several nuclear, isotopic and related techniques have proven suitable for confirming a wide range of high-value labelling claims such as free-range, organic, Halal, natural versus synthetic, wild versus farmed, Geographical Indication, etc. The overall objective of this CRP is to enable developing (and also developed) countries to protect and promote food products with high-value labelling claims by development and application of nuclear and related techniques. The project thereby aims to safeguard consumers and reputable producers; ensure regulatory and ethical compliance; stimulate domestic markets and reduce barriers to international trade.

Background Situation Analysis

Premium foods with added value chains are the most susceptible to economically motivated adulteration and fraud because they are often sold at higher prices. However, high-value food property labelling claims are also providing opportunities for the local food producers to take advantage of domestic and global markets (e.g. Madagascan Vanilla, Chinese herbal medicine, South African organic avocados, Indian organic rice etc.). These labelling claims are not only focusing on high monetary profits but also have to comply with the plethora of agricultural, ethical, natural and geographic specifications that are implicit when the claim is made on the food label. Nuclear and complementary techniques can be used to verify that the characteristics of the food meet the labelling claims and consequently consumer expectations and regulatory compliance.

Participation

CRPs provide an opportunity to work with and learn from colleagues around the world on common research topic. The results of the research carried out are published in an IAEA Technical Document, and peer reviewed papers or symposia proceedings wherever possible. Applications for participation in this CRP are invited before 28 February 2019.

Information on the IAEA Coordinated Research Programme and how to apply for research contracts and research agreements can be found at the Coordinated Research Activities Website[2].

Contact

Further information about the project is available from Mr Simon Kelly (S.Kelly@iaea.org).

[2] http://www-crp.iaea.org/default.asp.

Technical Cooperation Projects

Country/Region	Project No.	Title	Technical Officer
Algeria	ALG5030	Contributing to the Implementation of the National Agricultural Development Programme Through Strengthening Soil, Water and Nutrient Management Practices Including Food Safety Using Nuclear and Related Techniques	J.J. Sasanya
Angola	ANG5014	Upgrading Laboratory Services for Control of Food Quality for Human and Animal Consumption	J.J. Sasanya Z. Ye
Bahrain	BAH5001	Determining Pesticide and Mycotoxin Residues in Water and Food	J.J. Sasanya Z. Ye
Bahrain	BAH5002	Establishing a National Quality Control Standard for Foodstuffs and Fishery Products	J.J. Sasanya Z. Ye
Bangladesh	BGD5031	Strengthening Capacities to Monitor and Control Veterinary Drug Residues in Foods of Animal Origin	J.J. Sasanya
Bangladesh	BGD5032	Building Capacity in Improving Food Safety Using Nuclear and Other Complementary Analytical Techniques	S. Kelly Z.Ye
Benin	BEN5011	Strengthening National Capabilities to Improve the Safety and Competitiveness of Exportable Food Products	J.J. Sasanya
Botswana	BOT5017	Enhancing Capabilities for Inter-institutional Monitoring of Chemical Food Contaminants Using Nuclear/Isotopic and Complementary Analytical Techniques	J.J. Sasanya A. Cannavan
Cameroon	CMR5023	Strengthening Laboratory Capabilities to Monitor Contaminants in Fisheries Products	J.J. Sasanya

Country/Region	Project No.	Title	Technical Officer
Colombia	COL5025	Improving Capacity to Diagnose Residual Pesticides and other Contaminants in Exotic Tropical Fruits to Make Food Exports More Acceptable on the International Market	J.J. Sasanya
Costa Rica	COS5032	Enhancing the Capacity to Control Contaminants and Residues of Veterinary Medicines and Pesticides in Foodstuffs of Animal Origin Using Nuclear and Conventional Analytical Techniques	J.J. Sasanya
Costa Rica	COS5033	Assessing and Implementing Biochar Use in Climate Smart and Environmentally Friendly Pineapple Production Using Isotopic Techniques	C.M. Blackburn A. Cannavan M. Zaman
Costa Rica	COS5036	Improving Analytical Capacity to Monitor Food Contaminants and Veterinary Drug Residues Using Nuclear/Isotopic and Complementary Techniques	J.J. Sasanya
Cuba	CUB5019	Strengthening National Capacity for Monitoring Heavy Metals to Improve Soil and Food Quality Using Nuclear and Related Techniques	C.M. Blackburn J.J. Sasanya S. Kelly
Cuba	CUB5022	Promoting Food Safety through the Mitigation of Contaminants in Fruits for Human Consumption	C.M. Blackburn J.J. Sasanya
Ecuador	ECU5028	Consolidating Food Security and Environmental Sustainability in Palm Oil Production Using Nuclear Applications	B.M. Maestroni A. Cannavan J.J. Adu-Gyamfi
Ecuador	ECU5030	Reducing Post-Harvest Losses of Native Potatoes and other Fresh Foods by Irradiation	C.M. Blackburn
Egypt	EGY5026	Establishing a National Reference Laboratory Applying Nuclear/Isotopic and Related Techniques in the Analysis of Food Contaminants	J.J. Sasanya

Country/Region	Project No.	Title	Technical Officer
Fiji	FIJ5002	Increasing Trade and Export Capacities of Selected Value Chains within the Agro-Food Sector through the Adoption of an Appropriate Quality Infrastructure	C.M. Blackburn Z. Ye
Guatemala	GUA0010	Building Capacity and Enhancing Nuclear Technology	B.M. Maestroni
Haiti	HAI5006	Increasing Productivity and Exportability in the Agricultural Sector through Soil and Water Management and Food Safety Monitoring	C.M. Blackburn J.J. Adu-Gyamfi J.J. Sasanya
Iraq	IRQ5021	Developing Food Safety and Assurance System Using Nuclear and Other Related Technologies	J.J. Sasanya A. Cannavan S. Kelly
Cambodia	KAM5004	Strengthening National Capability for Food and Feed Safety	D. Battaglia J.J. Sasanya
Lebanon	LEB1010	Establishing an Isotopic Ratio Mass Spectrometry Laboratory Dedicated to Authentication and Provenance for Supporting the National Fraud Repression Scheme	M. Groening Z. Ye
Libya	LIB5012	Using Nuclear and Complementary Techniques for Monitoring Agrochemical Residues in Food Products and the Environment	J.J. Sasanya
Malaysia	MAL5030	Strengthening National Technical Capability in Food Traceability of Edible Birds Nest through the Application of Nuclear and Related Technologies	A. Cannavan S. Kelly
Marshall Islands	MHL7001	Developing a National Radioactivity monitoring Capacity	J.J. Sasanya I. Osvath (NAEL)
Mauritius	MAR5024	Building Capacity to Analyse Veterinary Drug Residues and Related Chemical Contaminants in Animal Products	J.J. Sasanya
Mauritania	MAU5005	Strengthening of Laboratory Capacity to Monitor Natural, Chemical and Microbial Food Contaminants	J.J. Sasanya

Country/Region	Project No.	Title	Technical Officer
Mongolia	MON5024	Enhancing Food Safety Analytical Capabilities for Veterinary Drug Residues and Related Contaminants Using Isotopic Techniques	J.J. Sasanya D. Battaglia Z. Ye
Montenegro	MNE5004	Strengthening Technical and Institutional Capacities of the National Reference Laboratory for Food and Feed Control	Z. Ye A. Cannavan
Morocco	MOR5037	Enhancing Control of Chemical Food and Feed Contaminants, Animal Disease Diagnosis and Trade in Fresh Fruits	D. Battaglia J.J. Sasanya C.M. Blackburn
Namibia	NAM5015	Developing Capacity of the National Standard Institution and Agro-Marketing and Trade Agency in the Areas of Food Safety	B. Maestroni A. Cannavan
Niger	NER5020	Building Capacity at the Central Laboratory (LABOCEL), Niamey, for Control of Food Products of Animal Origin	J.J. Sasanya
Niger	NER5022	Strengthening Nuclear / Isotopic and Complementary Laboratory Capabilities for Monitoring Contaminants in Food, Feed and Water	D. Battaglia J.J. Sasanya
Nigeria	NIR5039	Enhancing Dietary Exposure Assessment of Chemicals in Food	J.J. Sasanya
T.T.U.T.J of Palestinian A.	PAL5010	Strengthening Capability to Monitor Contaminants in Food and Related Matrices through Nuclear and Complementary Analytical Techniques	J.J. Sasanya
Oman	OMA5003	Strengthening National Capabilities in Food Safety and Food Traceability	B.M. Maestroni J.J. Sasanya Z. Ye
Panama	PAN5024	Developing Analytical Capabilities for the Detection of Chemical Contaminants in Food and the Quality of Agrochemicals	B.M. Maestroni

Country/Region	Project No.	Title	Technical Officer
Panama	PAN5025	Expanding and Strengthening the Phytosanitary Surveillance System for Fruit Fly, Emphasizing Exotic Species of Quarantine Importance, and Exploring the Use of Nuclear Techniques for Post-Harvest Treatment as a Complementary Action	W.R. Enkerlin Hoeflich C.M. Blackburn
Senegal	SEN5038	Strengthening Laboratory Capabilities for Analysing Veterinary Drug Residues and Contaminants in Food	J.J. Sasanya A. Cannavan
Seychelles	SEY5010	Strengthening Laboratory Capabilities to Enhance Food Safety Using Nuclear and Complimentary Analytical Techniques	J.J. Sasanya
Sierra Leone	SIL5016	Strengthening Laboratory Capabilities to Evaluate and Monitor Levels of Mycotoxins, Toxic Metals and Related Contaminants in Foods	J.J. Sasanya
Sri Lanka	SRL5048	Strengthening National Capability for Food and Feed Safety	A.Cannavan
Sudan	SUD5039	Enhancing the Capacity to Monitor Pesticide and Veterinary Residues in Food Using Nuclear and Complementary Techniques	J.J. Sasanya
Syria	SYR5024	Enhancing Capabilities to Monitor Naturally-Occurring and Synthetic Anabolic Hormones and other Veterinary Drug Residues in Foods	J.J. Sasanya
Thailand	THA5056	Strengthening Food Safety Laboratory Capacities	J.J. Sasanya D. Battaglia
Uganda	UGA5040	Strengthening Multi-Sectoral Food Contaminant Monitoring Programmes Through the Effective Use of Nuclear, Isotopic and Complementary Techniques	D. Battaglia J.J. Sasanya
Tanzania	URT5033	Establishing the Feasibility of an Irradiator Facility	C.M. Blackburn

Country/Region	Project No.	Title	Technical Officer
Viet Nam	VIE5022	Promoting Interlaboratory Comparison and Accreditation in Testing Chemical Contamination for Food Safety	B.M. Maestroni Z. Ye
Zambia	ZAM5030	Establishing a National Mycotoxins Monitoring Programme	J.J. Sasanya
Zambia	ZAM5032	Strengthening and Expanding Analytical Capacity to Monitor Food Contaminants using Nuclear/Isotopic and Complementary Tools	J.J. Sasanya
Africa	RAF1006	Facilitating the Commercial Application of Irradiation Technologies	S. Sabharwal (NAPC) C.M. Blackburn
Africa	RAF5067	Establishing a Food Safety Network through the Application of Nuclear and Related Technologies	J.J. Sasanya A. Cannavan
Africa	RAF5078	Establishing a Food Safety Network through the Application of Nuclear and Related Technologies, Phase II	J.J. Sasanya D. Battaglia
Asia	RAS5071	Strengthening Adaptive Climate Change Strategies for Food Security through the Use of Food Irradiation (RCA)	C.M. Blackburn
Asia	RAS5078	Enhancing Food Safety Laboratory Capabilities and Establishing a Network in Asia to Control Veterinary Drug Residues and Related Chemical Contaminants	J.J. Sasanya D. Battaglia G. J. Viljoen
Asia	RAS7026	Supporting the Use of Receptor Binding Assay (RBA) to Reduce the Adverse Impacts of Harmful Algal Toxins on Seafood Safety	M.Y. Dechraoui Bottein (NAEL) A. Cannavan
Asia	RAS5081	Enhancing Food Safety and Supporting Regional Authentication of Foodstuffs through Implementation of Nuclear Techniques (RCA)	S. Kelly Z. Ye
Latin America	RLA5066	Increasing the Commercial Application of Electron Beam and X-ray Irradiation Processing of Food	C.M. Blackburn

Country/Region	Project No.	Title	Technical Officer
Latin America	RLA5069	Improving Pollution Management of Persistent Organic Pollutants to Reduce the Impact on People and the Environment (ARCAL CXLII)	B.M. Maestroni J.J. Sasanya
Inter-Regional	INT5154	Improving Food Safety through the Creation of an Interregional Network that Produces Reliable Scientific Data Using Nuclear and Isotopic Techniques	J.J. Sasanya D. Battaglia

Design of Latin American Technical Cooperation Regional Project for 2020–2021, Vienna, Austria, 29 October –2 November 2018

Britt Maestroni, Daniela Battaglia and James Sasanya

From 29 October to 2 November 2018 the FEP and FEPL Technical Officers (TOs) participated in a meeting organized by the IAEA Technical Cooperation Division for

Latin America and the Caribbean (TCLAC) on the design of regional projects for 2020–2021. This meeting was organized as follow up to the approval by the Technical Coordination Board (OCTA) of the Regional Cooperation Agreement for the Promotion of Nuclear Science and Technology in Latin America and the Caribbean (ARCAL) (OCTA), including several regional project proposals, three of which in the thematic area of food safety. These were selected to move to the design phase from an initial list of 11 proposals addressing food safety and submitted to the IAEA by Latin American countries.

The three projects proposals were:

1. Strengthening the regional collaboration of official laboratories to address emerging challenges for food safety - its overall objective being to improve food safety through effective and risk based policies to ensure public health and environmental protection in the LAC region. Twelve Member States expressed interest in participating;
2. Improving regional testing capabilities and monitoring programmes for residues/contaminants in foods using nuclear/isotopic and complementary techniques; and
3. Applications of radio-analytical and complementary techniques to promote the development of aquaculture in Latin America and the Caribbean.

The technical officers together with the designated project coordinators (DTMs), ARCAL National Coordinators, ARCAL Thematic Area Coordinators, the project management officers (PMOs) and experts had the opportunity to work together, refine and finalize the design of regional projects being presented for 2020-2021 technical cooperation projects cycle. The logical framework approach (LFA) was used as a basis for the design. The LFA is essentially a sequence of analytical steps comprising the following: a) a situation analysis that reviews project context and relevance; b) a stakeholder analysis that covers counterpart mandate and vision, end users and any other organizations, group or institution having an interest or being affected by the project; c) a problem analysis that examines the problem in detail from the perspective of different stakeholders; and d) an objectives analysis where the project team decides on the scope of the project. On the basis of these analyses, the project team formed by the DTMs, the TOs and the PMOs and coordinated by one ARCAL leader, prepared for each project a logical framework matrix (LFM) that summarized the project and showed the logical linkages between the project elements (activities, outputs, outcomes, overall objectives). The process also included the preparation of a suitable work plan including a first draft budget

The participation of the Technical Officers to this meeting was important to provide the ARCAL Member States technical advice and guidance, crucial for the proper design of the selected regional projects.

The revised project proposals are currently in the programme cycle management framework (PCMF) web site for further refinement. Finalized proposals will need to go through final approval by the OCTA in May 2019 and by the IAEA Board of Governors in November 2019. Finally, the officially approved projects will be active in January 2020.

Promoting Interlaboratory Comparison and Accreditation in Testing Chemical Contamination for Food Safety in Vietnam, 15–18 October 2018

Britt Maestroni

Ms Britt Maestroni (FEPL) undertook a mission to Vietnam from 15 to 18 October to discuss all aspects related to the implementation of IAEA technical cooperation project (TCP) VIE5022 and to assess the current laboratory capacity of Quatest 3, located in Bien Hoa, Vietnam. The focus of the project is on "Promoting Interlaboratory Comparison and Accreditation in Testing Chemical Contamination for Food Safety", addressing mycotoxin contamination of food products. In a meeting in Ho Chi Minh City, Ms Maestroni provided the Acting Director of Quatest 3, Mr Truong Thanh Son, with a brief update on the discussions and the work carried out with the staff of Quatest 3 during the mission in Vietnam.

The Vietnamese team, the international expert and Ms Maestroni (second right).

Quatest is the Quality Assurance and Testing Institution belonging to the Directorate for Standards, Metrology and Quality, which is directly under the Ministry of Science and Technology of Vietnam. Since 1975 Quatest has been providing conformity assessments to the Directorate. There are four Quatest centres in Vietnam, all of which carry out similar testing. Daily meetings were held at the Quatest 3 centre located in Bien Hoa with 4-8 of the staff members who are implementing TCP VIE5022. Ms Maestroni, accompanied by the mycotoxin expert, Ms Veronica Lattanzio, visited the laboratory facilities and held daily meetings to discuss the different technical and scientific aspects related to the implementation of the project. The workplan of the project was revised, project activities were planned, and deliverables were identified and included in the meeting report. Ms Maestroni contributed to presentations on the importance of the analytical laboratory in the context of food control systems and on sampling and sample preparation, and helped the expert in addressing a variety of technical issues arising from the discussion sessions. Topics covered by the international expert included international guidelines and regulations for consumer protection and international trade, mycotoxin analysis for food and feed, method validation requirements and confirmatory methods for mycotoxin analysis. Meeting the project counterparts in person was very valuable and helped to establish mutual trust. Visiting the laboratory facilities and understanding the work flow and processes was also very important and helped in getting an understanding of the institutional needs and challenges.

It was noted that significant progress had been made at analytical testing level by two of the staff of Quatest 3 who, in 2015, participated in a FAO/IAEA training workshop on "Food Safety, Quality and Traceability" held in Hanoi and Ho Chi Minh city.

Interregional Training on Improving Food Safety Laboratory Competence, Gaborone, Botswana, 15–19 October 2018

James Sasanya

An IAEA interregional training course on competence of food safety testing laboratories was hosted by the Botswana National Veterinary Laboratory (BNVL) in Gaborone from 15 to 19 October 2018 and attended by 35 staff mainly from food testing laboratories in Angola, Argentina, Benin, Bolivia, Botswana, Chile, Costa Rica, Cuba, Ecuador, Egypt, Guatemala, Honduras, Indonesia, Mongolia, Morocco, Mozambique, Nigeria, Pakistan, Paraguay, Seychelles, Singapore, Sri Lanka, Tanzania, Tunisia, Turkey, Uganda, Uruguay and Venezuela.

Interregional trainees in Botswana.

The course aimed at advancing testing laboratory practices by boosting staff competence and ensure test results generated are credible. Recent changes in requirements for testing and calibration laboratories were covered including sampling procedures for monitoring contaminants in foods and feeds. The explicit role of sampling in the risk analysis process was addressed and its particular importance to mycotoxin analysis emphasized.

The trainees also gained an in-depth understanding of the new standard's guidelines and effective quality management needed to facilitate the process of accreditation. Experiences and relevant documents were shared among the participating countries, and knowledge exchanged.

Supporting Multi-institutional Efforts to Improve Food Safety in Uganda, 8–10 October 2018

James Sasanya

The officer undertook a mission to Uganda under TCP UGA5040 to support a number of institutions involved in food safety control, namely Uganda National Bureau of Standards (UNBS); Ministry of Agriculture Animal Industry and Fisheries, National Animal Disease Diagnostics and Epidemiology Centre (NADDEC); National Drug Authority (NDA), Dairy Development Authority (DDA) and the Directorate of Government Analytical Laboratory (DGAL).

On one of Directorate of Government Analytical Laboratories visited.

The various stakeholders were visited, on-site guidance provided and individual needs identified. Plans for the 2020–2021 technical cooperation project cycle that would include establishing or strengthening regional/food safety laboratories were discussed. Potential synergies were explored with an EU-supported beef monitoring programme and the prospective project. The officer assessed ongoing work including human resource development and its application to greater national good and training others from elsewhere (such as Eritrea, Seychelles, Sierra Leone and Tanzania) including hosting of regional training courses.

The officer held a stakeholder meeting attended by a number of institutions where strategies for effective project implementation, collaboration and ensuring greater impact were discussed. He also visited the FAO office implementing an epidemiological surveillance project relevant to food safety and control systems in the country.

Interregional Capacity Building on Radionuclide Testing in Food and Associated Matrices, Sidi Thabet, Tunisia, 24–28 September 2018

James Sasanya

An interregional training was organized in Sidi Thabet, Tunisia, from 24 to 28 September 2018 under the TCP INT5154 and attended by nine participants from Argentina, Mongolia, Indonesia and the host country.

A range of topics was addressed including: basic concepts in radioactivity; sampling and sample preparation for gamma and alpha spectrometry analysis; international comparison measurements; and proficiency tests as well as data interpretation and reporting. The participants learnt and shared experiences on instrument calibration and maintenance, QA/QC of radiation analytical laboratories and good practices in laboratory, safety and waste disposal.

The participants conducted practicals including: separation of uranium radionuclide applied to a water sample which was then prepared and measured by gamma spectrometry; and spontaneous deposition of polonium applied on a fish sample.

Expectations from the trainees include: participation in proficiency test programmes for radionuclide measurements in fish and water; development of a national monitoring program plan for food, starting with fish samples and water samples; preparation of a documented plan for sampling; and application of the Procedure of Po-210 determination in fish that was used at this training course.

Practical session at the INT5154 training in Tunisia.

Enhancing Competence of Food Safety Testing Laboratories in Asia-Pacific and Strengthening Food Safety Asia Networking, Bogor, Indonesia 24–28 September 2018

James Sasanya

A training course "General Requirements for competence in food testing laboratories" was organised in Bogor, Indonesia from 24 to 28 September 2018 under the framework of a regional project RAS5078. The objectives were to: (1) promote good practices and confidence in operation of food safety testing laboratories in RAS5078 Member States; (2) enhance human resource capabilities, including training of trainers; (3) enhance quality management in food safety laboratories; and (4) promote collaboration among counterpart institutions.

Thirty-nine participants from 19 countries from the Asia Pacific region and some of Central Asia Regional Economic Cooperation (CAREC), namely: Azerbaijan, Bangladesh, Georgia, Jordan, Kazakhstan, Kyrgyzstan, Lebanon, Malaysia, Mongolia, Oman, Pakistan, Papua New Guinea, Philippines, Syrian Arab Republic, Thailand, Turkmenistan, Uzbekistan, Vietnam and the host country.

The Secretary of Indonesian Agency for Agricultural Research and Development, Ministry of Agriculture and the Director of Indonesian Research Center for Veterinary Science, Indonesian Agency for Agricultural Research and Development, Ministry of Agriculture honored the event.

RAS5078 trainees in Indonesia.

Participants appreciated the training and support to enhance their capabilities, as well as collaboration under the Food Asia Network which is helping with information, knowledge and expertise sharing, including benchmarking and effective use of instrumentation, a major challenge to some countries. The event contributed to expanding and strengthening of the network.

Strengthening Food Safety Capabilities in Manama, Bahrain, 9–13 September 2018

James Sasanya

The officer travelled to Manama, Bahrain to support food and environmental safety projects BAH5001 and BAH5002. A broad area of work including analysis of metals, radionuclides, pesticide and veterinary drug residues as well as mycotoxins and food microbiological hazards were reviewed and guidance provided. This included among others the analysis and interpretation of data from method validation studies for residues in foods, as well as assessment of various data sets for fitness. The officer gave a lecture on uncertainty of measurement and its application to routine analysis.

One of the Public Health Laboratories visited.

The officer held multi-stakeholder meeting to discuss testing and monitoring of the various contaminants, involving: Chemistry as well as Food Control and Environmental sections of the public health laboratory; the supreme council of environment as well as Bahrain Fisheries Directorate and Veterinary services and Agriculture & Marine Resources. Matters of manpower, existing instrumentation (including radio-receptor assay techniques) at partner institutions and how to ensure optimum use of available capabilities were also addressed.

The officer also met the Director, Public Health Laboratory and Undersecretary Assistant of Public Health to discuss capacity building in the country. The Managers appreciated the IAEA support and encouraged further cooperation to establish more state-of-the-art instrumentation (including ICP-MS) that will broaden analytical capabilities, increase throughput and improve turnaround time.

Interregional Training Course on Mycotoxins Analysis in Foods of Significant Consumer Health and Trade Concern, Chile, 3–7 September 2018

James Sasanya

The course was held from 3 to 7 September 2018 at the Servicio Agrícola y Ganadero (SAG), Chile and attended by 15 participants from Venezuela, Nigeria, Botswana, Benin, Uruguay, Egypt, Cameroon, Sri Lanka, Cuba, Bolivia, Guatemala, Uganda, South Africa, Costa Rica, and Indonesia, as well as number of local participants from the host country.

Interregional trainees on mycotoxin analysis.

The course objective was to enhance analytical testing capabilities of IAEA Member States across regions for more effective monitoring and collection of occurrence data on mycotoxins in foodstuffs and feedstuffs with major public health and trade implications.

Training included hands-on training, lectures and discussions on analysis of selected mycotoxins with specific focus on: Development and validation of analytical methods by conventional/confirmatory and screening techniques including radio receptor assay; sampling and sample preparation; reliable mechanisms for collection of occurrence mycotoxin data; application of quality control and assurance principles in mycotoxin testing laboratories; analysis of food/feed samples for selected mycotoxins; and data processing and reporting.

Participants shared respective experience on methods of sampling for the official control of levels of mycotoxins based on the "Novel integrated strategies for worldwide mycotoxin reduction in food and feed chains" developed under the MycoRed project (EU, FP7).

Interregional Training Course on Analysis of Toxic Metals and Related Contaminants in Foods with Trade Implications, Guayaquil, Ecuador, 13–28 August 2018

James Sasanya

A 10-day training course was organized (13–28 August) at the Ministry of Aquaculture and Fisheries, Subsecretary of Quality and Food Safety in Guayaquil, Ecuador. The aim was to provide guidance through practicals, theory and discussions on toxic metals and pesticides on collection and interpretation on analytical data as sharing of relevant methods and experiences. There were 22 participants, 20 of them from Botswana, Cameroon, Chile, Costa Rica, Guatemala, Indonesia, Mongolia, Paraguay, South Africa, Turkey, Uruguay and the host country. The event benefited from collaboration with the Export Inspection Council of India (EIC), Ministry of Commerce and Industry, Export Inspection Agency (EIA) Kochi and Kolkata as well as the US Department of Agriculture, Foreign Agricultural Service (USDA-FAS).

Topics included analytical methods for inorganic arsenic, methyl mercury, cadmium and lead as well as selected pesticides of trade significance, in a range of matrices including fruits, fish, cocoa and rice. Work also included method validation and performance criteria; procedures for pesticide residues and analysis in food according to EU's SANTE/11813/2017. Instrumentations covered included Atomic Absorption Spectroscopy and Inductive Coupled Plasma (ICP) Mass Spectrometry and ICP-Optical Emission Spectrometry (OES).

Interregional trainees on elemental analysis and related contaminants in Ecuador.

In addition to the practical knowledge gained, relevant literature was provided including Standard Operating Procedures and a software for method

development/validation parameter calculation, among others.

Some interregional food safety trainees at a shrimp farm.

Food Safety Capacity Building in Sudan, 12–16 August 2018

James Sasanya

The officer undertook a mission to Sudan under TCP SUD5039 to support food safety activities and promote collaboration among sister institutions in the country. These include Agricultural Research Council (ARC) in Wad-Medani; Central Veterinary Research Laboratory (CVRL); National Food Research Centre (NFRC); Sudan Atomic Energy Commission (SAEC); Sudanese Standards and Metrology Organization (SSMO); and the University of Khartoum's Centre of Excellence, Pesticides and Plant Health (PPH); and the Pesticide Centre.

During the meeting with the Honorable Minister of State for Agriculture and Forestry Mr El Sadig Fadl-Allah, discussion focussed on capacity building, cooperation and sustainability in food safety and security. The Minister appreciated the IAEA support and reiterated the importance of food safety to the country for safeguarding local consumers and addressing challenges in trade. He pledged support to local institutions to ensure impact and sustainability.

A seminar was held at the SSMO to enhance awareness on the role of nuclear techniques in food safety. Twenty participants from the various collaborating institutions attended. These institutions are keen on excellence. For instance, SSMO's chemistry laboratory which is in very good condition is advancing a process of accreditation.

The officer noted that capacity built is benefiting the country in a number of ways. This was evident during a visit to Sabaloga cattle, sheep and goat abattoir, one of the 5 large slaughter houses in Khartoum and it benefits from analytical services provided by the CVRL. The abattoir is critical to sampling for residue monitoring. Up to fifteen graduate students are also benefiting from capacity built at the CVRL. They also contribute to implementation of food safety activities throughout the country including the abattoir and certain food collecting centers.

During a courtesy visit to the FAO Representative in Sudan, synergies were explored with FAOR pledging support.

SSMO, one of the laboratories visited.

Enhancing Food Safety and Laboratory Capabilities in Victoria, Seychelles, 16–20 July 2018

James Sasanya

The officer visited Victoria, Seychelles under TCP SEY5010 to support food and environmental safety as well as related activities at the Seychelles Public Health Laboratory, the Pharmaceutical Quality Control (QC) laboratory and Soil Agricultural Agency (SAA).

The officer helped boost the performance and confidence of the chemistry section of the public health laboratory in the use of analytical instrumentation for contaminants such as mycotoxins and pesticide/veterinary drug residues in matrices (e.g. nuts, spices and milk). Two analytical methods for some of these contaminants were optimized and may be for routine testing henceforth. This is timely since in the recent past, the country had to outsource certain tests overseas to confirm what local screening techniques including radio receptor assays had determined. This is a major bottle neck that can now be tackled with establishment of such methods and upcoming set up of more state-of-the art instrumentation.

The officer assisted the QC and SAA laboratories find some solutions to instrumentation and human resource development needs; these are now being addressed under the TCP.

The officer met the Commissioner and Director General, Public Health who shared comprehensive national health plans including expansion of the public health laboratory to include a new isolation, infectious diseases, chemistry and food microbiology units. For this, continued the IAEA

support to establish state-of-the-art analytical tools was welcomed.

The National Liaison Officer appreciated cooperation with the Agency to build capacity for local testing of food and environmental contaminants and emphasized the importance of food safety to the country and how this will be a critical component of the new Country Programme Framework. While meeting other stakeholders, the Officer identified an opportunity to partner with the UN Coordination Office in Seychelles, such as through an ongoing strategic partnership framework due for review.

Analysts at the Seychelles Public Health Laboratory.

First Training Course of the Regional Cooperative Agreement (RCA) "Enhancing Food Safety and Supporting Regional Authentication of Foodstuffs through Implementation of Nuclear Techniques" (RAS5081), Dunedin, New Zealand, 25 June–6 July 2018

Simon Kelly

The first Regional Training Course of the RCA RAS5081 on "The Fundamentals of Using Nuclear Techniques for Verifying Food Authenticity" took place in the Chemistry Department at the University of Otago, Dunedin, New Zealand from 25 June to 6 July 2018. In addition, the training was attended by 22 participants from 12 Member States: Bangladesh, Cambodia, Fiji, Indonesia, Korea, Lao P.D.R., Mongolia, Myanmar, Nepal, Sri Lanka, Thailand and Vietnam. The Host Country Organizer was Mr Russell Frew (University of Otago, NZE) and the expert trainers were Mr Kiri McComb (University of Otago, NZE), Ms Karyne Rogers (Geological and Nuclear Sciences, New Zealand) and Mr Simon Kelly (FEPL, IAEA).

Nuclear techniques have been shown to be very effective in authenticating food products (i.e. detection of fraudulent mislabelling or counterfeiting), and in discriminating foods from different geographical origins. These techniques have the potential to provide independent verification of information-based traceability systems and provide information on the integrity of the food product itself. For example, isotope analysis of the foodstuffs can provide an indication of point of origin, production claims and serve in the detection of adulteration.

The overall aim of the two-week regional training course was for the participants to gain a basic knowledge of, and experience in, the main nuclear and complementary techniques used to confirm the authenticity and origin of foodstuffs. The course provided theoretical and hands-on training in Isotope Ratio Mass Spectrometry (IRMS); Atomic Absorption Spectrophotometry (AAS); Inductively Coupled Plasma – Mass Spectrometry (ICP-MS) and Infrared Spectroscopy. The course consisted of whole-group lectures, and laboratory sessions on a small-group rotational basis.

As the application of stable isotopes and trace elements is relatively new in the area of food traceability, the course was one of the mechanisms to further strengthen and highlight their applicability as useful tools in a system for verification of origin and authenticity of food. The Training focused on collecting high-quality isotopic and trace elemental data. It also provided a strong foundation for Member States that are new to the topic and relevant nuclear analytical techniques, as well as an opportunity to network and establish collaborations.

Participants in the first regional training course at the University of Otago, Chemistry Department receiving training in the preparation of food samples for trace element analysis by Inductively Coupled Plasma – Mass Spectrometry from expert trainer Mr Kiri McComb.

Improving Pollution Management of Persistent Organic Pollutants to Reduce the Impact on People and the Environment, Santo Domingo, the Dominican Republic 4–8 June 2018

Britt Maestroni

Ms Britt Maestroni travelled to Santo Domingo, the Dominican Republic, from 4 to 8 June to participate in the intermediate coordination meeting of IAEA technical cooperation project RLA5059 on "Improving Pollution Management of Persistent Organic Pollutants to Reduce the Impact on People and the Environment". The meeting was attended by 16 people from 13 countries. The official opening of the meeting was hosted by the Dominican Republic's Vice-Minister of Nuclear Energy, Dr Angelita Peña, represented by Dr Giselle Corporan, and the national counterpart, Dr Agripina Ramirez Sanchez. Ms Maestroni, as the project technical officer, and the project management officer (PMO) welcomed the participants and thanked them for the organization of the meeting. Ms Maestroni discussed the importance of integrated monitoring and the management of analytical results to achieve outcomes, and the importance of networking and sharing information; the PMO emphasized the importance of pioneering communication component of the project, stating that the results will be very valuable for future IAEA projects. The PMO presented an overview of the TC programme and shared information on the preparation of the 2020–21 TC programme cycle.

Ms Maestroni contributed to and coordinated the discussion sessions, including a presentation on RALACA and one at the local university on food safety (with about 40 students), and the assignments for the preparation of the project report, while providing substantial technical contribution to the writing up of the draft project report. The regional project coordinator, Ms Patricia Gatti from Argentina, presented projects antecedents, objectives, expected results and current workplan. Each participating national project coordinator presented the main achievements so far in their country and highlighted challenges and opportunities for achieving expected results. The meeting participants then addressed specific parts of the intermediate project report in small groups. On the final day the report was consolidated.

Ms Maestroni and the PMO visited the laboratory facilities of the host institute, the Instituto de Innovacion en Biotecnologia e industria (IIBI). The meeting helped the project counterpart to gain stronger support for laboratory activities. It was noted that most of the countries had developed sufficient capacity for the sampling aspects and considerable analytical capacity, progressing well with the validation of methods for detection of persistent organic pollutants (POPs). It was suggested that laboratories should implement, as a minimum, limit of quantification equal to 10 µg/kg and limit of detection equal to 1 µg/kg or better to be able to report contamination findings at low levels. A communication component was built into the project from the design phase. The communication activities were targeted towards hospitals and doctors and focused on getting support from the local authorities around the study areas. The main messages were on the activities and the project objectives only. The project counterparts have declared their commitment to transfer appropriate information to all stakeholders, including the "human-milk donating mothers". The RALACA network of analytical laboratories was further enhanced within the framework of this project and an ad-hoc committee on risk analysis was created during the meeting. This committee, formed by the counterparts from Mexico and the Costa Rica, will have the task of analysing software available on the market and will provide help in a training workshop in 2019 aimed at carrying out exposure assessment and, if the data are available, a complete risk analysis.

The meeting considered that RALACA plays a vital role in ensuring the sustainability of analytical activities in the region and helping with the transfer of information, data, analytical tools and methodologies to the entire Latin American and Caribbean region.

The meeting participants visiting the laboratory facilities at IIBI.

The RLA5060 meeting participants.

Developments at the Food and Environmental Protection Laboratory

Visit of the Federal President of Austria, HE Mr Alexander Van der Bellen, to the IAEA Laboratories in Seibersdorf, 10 October 2018

Andrew Cannavan

On 10 October, President Van der Bellen, along with a party of distinguished guests visited the IAEA laboratories in Seibersdorf.

Mr Cannavan describes the work of FEPL to President Van der Bellen.

The Presidential party was greeted by the IAEA Deputy Directors General of the Department of Nuclear Sciences and Applications, the Department of Management and the Department of Safeguards, along with other senior staff. Visits were made to the Safeguards Environmental Sample Laboratory, and to the Animal Production and Health and Insect Pest Control laboratories of the Joint FAO/IAEA Division.

A reception was then held for the President in the new Insect pest Control Laboratory building, constructed under the ReNuAL project, with a number of distinguished guests including the Mayor of Seibersdorf and representatives of several Austrian institutes which collaborate closely with the IAEA laboratories. These included the University of Natural Resources and Life Sciences (BOKU), the Austrian Agency for Health and Food Safety Ltd. (AGES), the Technical University of Vienna, the Medical University of Vienna,, the Austrian Institute of Technology (AIT) and Androsch International Management Consulting GmbH. Each of the collaborating institutes discussed with president Van der Bellen their successful collaborations with the IAEA laboratories. Mr Cannavan, Head of the Food and Environmental Protection Laboratory, had the opportunity to describe the work of the laboratory and the Food and Environmental protection subprogramme, including collaborations with BOKU, AGES and AIT, and the importance of that work globally and to Austria.

President Van der Bellen's visit offered an opportunity to demonstrate the far-reaching work of the IAEA laboratories as well as the valuable and productive collaborations with Austrian institutes that benefit both Austria, as the host nation, and many countries on a global scale. The coordinators of the visit received had excellent feedback from the Austrian mission concerning the President's impression of the visit.

Capacity Building within RALACA: an Update

Britt Maestroni

Since June 2018, the Red Analíca de Latinoamérica y el Caribe (RALACA) network has continued its capacity building activities through monthly webinars targeting different topics in the area of food safety and environmental sustainability. The webinars are an excellent tool to raise awareness about new topics and discuss analytical issues and methods among peers. The number of participants attending the webinars has been increasing from 4 to 5 to more than 12 participants per session.

On 7 August, Dr Gustavo Venegas, from CCHEN, Chile, discussed scientific communication and the importance of proper information channels. On 28 August, Dr Andres Perez, from UDELAR, Uruguay, discussed an analytical method for pesticide residues in fish tissue and the role of fishes into environmental biomonitoring. On 11 September, Dr Pedro Enriquez from SAG, Chile, discussed mycotoxins and mycotoxicosis in animal production. On 2 October, Dr Silvina Niell, from GACT, Uruguay, discussed the role of bees as indicators of agrosystem sustainability.

The presentations are freely available on the RALACA web site[3].

The first issue of the RALACA newsletter, August 2018, can also be accessed[4].

[3] http://www.red-ralaca.net/e-learning-2

[4] http://www.red-ralaca.net/images/pdfs/Newsletter_Vol_1.pdf

A Multi Contaminant Method for Honey: from Method Development to Validation

Britt Maestroni and Marvil Islam

The FEPL hosted two fellows from Palestine for the period 1 August until 14 September. They worked in the laboratory to initiate the development and validation of a multi-contaminant and multi-class analytical method for honey samples. The work on honey is not new for FEPLwhere previous studies concentrated on metabolomics approaches to distinguish floral varieties for proof of authenticity, and authenticity of manuka honey using compound specific stable isotope analysis. The current study complements previous work by enabling testing for the presence of contaminants in floral honey and therefore contributing to the safety of honey.

It is well known that bees are indicators of environmental contamination since they can carry into the hive all the different pollutants and agrochemicals they encounter in the agricultural fields. In addition, the use of antimicrobials (either authorized in certain countries or un-authorized as in the European Union) to combat honey bee diseases is quite frequently encountered. The issue of authorization for antimicrobial uses is also not harmonised among IAEA Member States. For the above reasons there is a need to develop and validate a multi-contaminant and multi-class method to help identify ensure safe honey for consumers.

A literature review indicated that honey can be contaminated with various types of contaminants including pesticides, veterinary drugs, heavy metals and even mycotoxins. Since many different classes of analytes exist within each of these types of comtaninants, analysis becomes a real challenge. The physico-chemical properties of the various analytes can differ significantly and therefore they pose a challenge for the detection technique.

From an initial list of 51 molecules identified as possible contaminants of honey, thescope of honey testing was narrowed to 35 analytes, including pesticides, veterinary drugs and one marker of authenticity that was identified in previous work. A generic and versatile sample preparation technique such as the QuEChERS was needed to be compatible with both gas chromatographic and liquid chromatographic detection system. During method development several variations of the QuEChERS method were tested and decisions to opt for one modification or another were based on the recovery of the selected representative analytes in the honey extract. Extraction using ethyl acetate or acetonitrile was also compared. Method development required an understanding of the interactions between the analytes and the honey matrix. Honey is a very complex matrix and contains large amounts of sugars, enzymes and proteins. The goal of the sample preparation step is to decrease the number of co-extractives while concentrating the analytes of interest. In this method, despite all efforts to reduce matrix co-extractives, the matrix effects are still very high in the acetonitrile extracts, as can be shown in Figures 1 and 2 for two very different analytes, furazolidone (a veterinary drug belonging to the nitrofurans), and carbendazim (a benzimidazole pesticide). The matrix effects for both furazolidone and carbendazim were estimated to be of the order of 420%. The method optimization work is still ongoing. Preliminary data indicate that the method can be validated at 0.01 mg/kg level employing a sensitive liquid chromatography-mass spectrometry instrument, which was kindly donated to FEPL by the Shimadzu corporation. Although not yet fully validated, the method was successfully applied to test the contamination level of three honey samples originating from Palestine.

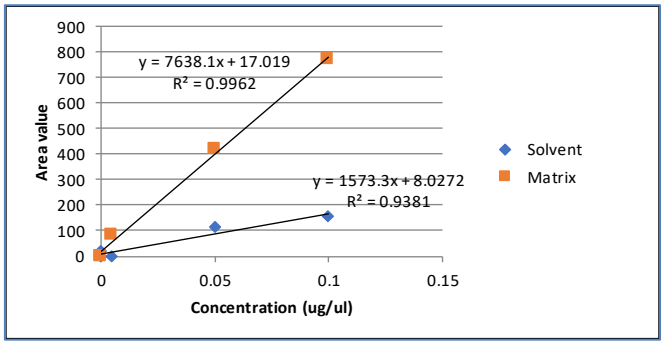


FIG. 1. The difference in the slope for the regression lines for the solvent calibration and the matrix matched calibration demonstrates the matrix effects for furazolidone.

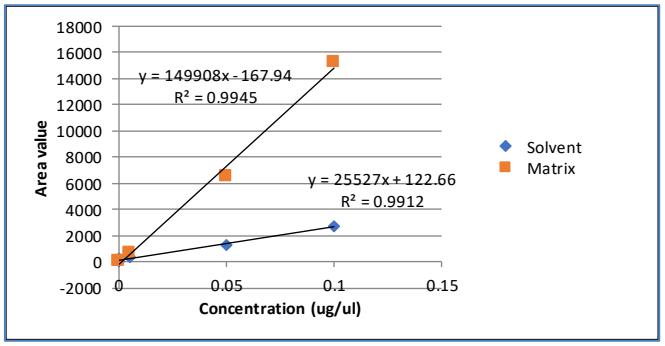


FIG. 2. Matrix effects for carbendazim in honey.

'FoodIntegrity' Training and Exchange Programme

A training and exchange programme was implemented as one of the activities of Work package 11 (Dissemination and Knowledge Transfer) of the project 'FoodIntegrity: Assuring quality and authenticity in the food chain' (https://secure.fera.defra.gov.uk/foodintegrity/index.cfm), which was funded under the European Union's Seventh Framework Programme. The FEPL participated in the training and exchange programme by holding two training courses on analytical methodology for verification of the authenticity of food, one on metabolomics and the other on stable isotope analysis. The FEPL also benefitted from the exchange programme through the participation of

Ms Marivil Islam in the course 'Feedomics: untargeted analysis of foods' at Queen's University Belfast, UK, from 21 to 25 May 2018, and Ms Zora Jandrić in a course on 'Metabolomic fingerprinting / profiling based on high resolution mass spectrometry for food, nutraceuticals & feed authentication' at UCT Prague, Czech Republic, from 11 to 15 June 2018.

Metabolomics for Verifying the Authenticity of Food, FEPL, Seibersdorf, Austria, 4–8 June 2018

Zora Jandrić

Global food policies require that food put on the market is authentic and safe, which includes the requirement that the label declaration matches the contents of the package. During recent decades conventional approaches such as targeted analysis of markers have been used for food authentication. Although this traditional method is still used, new approaches that complement the existing methodologies, such as untargeted metabolomics, are emerging in food authentication applications. The main advantage of metabolomics applications in food authentication is untargeted nature, which can enable the detection of emerging food fraud issues or previously unknown adulterants.

The training workshop on metabolomics for verifying the authenticity of food was attended by five scientists from institutes in Belgium, the Czech Republic, Indonesia, Spain and UK. The purpose of this workshop was to introduce untargeted and targeted metabolomics approaches and share knowledge on their use of in the area of food authentication, and to discuss the current limitations and future potential of the technique. Various topics were covered, such as the importance of authentic samples in untargeted analysis, sample preparation, data pre-processing, quality control, chemometrics and modelling. The course included hands-on training in the laboratory as well as on data analysis using sophisticated statistical tools, such as principle components analysis (PCA), (orthogonal) partial least squares discriminant analysis ((O)PLS-DA), soft independent modelling by class analogy (SIMCA), data-driven (DD)-SIMCA, one class classification). The training course was a great success, it was an excellent opportunity to exchange views and knowledge among the participants, and to raise awareness of the benefits and challenges of a metabolomics approach for food authenticity and safety applications. Future collaboration and cooperation with the participants were also discussed.

Stable Isotopes for Verifying the Authenticity of Food, FEPL, Seibersdorf, Austria, 27–31 August 2018

Simon Kelly

Premium foods with added value chains are the most susceptible to economically motivated adulteration and fraud (e.g. organic) but also offer developing countries export advantages in global markets (e.g. Madagascan vanilla, Columbian coffee, Taliouine saffron (Morocco), Darjeeling tea (India). Stable isotope analysis is an established method to detect the adulteration of foods with cheap ingredients, such as extending honey with sugar syrups, and is now being applied more widely to help verify added-value labelling claims such as organic versus conventional agriculture, wild versus farmed fish, natural versus synthetic flavours and country of origin production claims.

The training workshop on stable isotope analysis for verifying the authenticity of food was attended by four scientists from institutes in Denmark, Malaysia and Poland and an intern from the UK. The five-day course included lectures and hands-on laboratory sessions covering an introduction to food fraud and the application of isotope ratio mass spectrometry (IRMS); setting up the elemental analyser EA and IRMS for analysis; routine EA-IRMS operation; EA and IRMS fault finding and maintenance; preparation of honey protein following the Association of Official Analytical Chemists methodology; calibration, data processing and analysis; quality control, proficiency testing; and ion-source dismantling and cleaning. The quality of the training course provided by FEPL was independently assessed by the Food Integrity Project work package 11 "dissemination" team and received an overall "excellent" rating by the attendees.

Training on metabolomics for food authenticity in FEPL.

'FoodIntegrity' trainees fitting combustion and reduction tubes to in an elemental analyser.

'FoodIntegrity' trainees dismantling and cleaning a Nier-type electron impact ion source.

Fellows/Scientific Visitors in FEPL

FEPL hosted two scientists from Palestine for six-week fellowships during August and September 2018, Ms Bashaer Nassar, a Laboratory Supervisor from the Palestine Polytechnic University/College of Applied Science and Mr Ali Jahajha, Quality Assurance Coordinator for the Central Public Health Laboratory of the Palestinian Ministry of Health. Ms Nassar and Mr Jahajha were trained under technical cooperation project PAL5010, 'Strengthening Capability to Monitor Contaminants in Food and Related Matrices through Nuclear and Complementary Analytical Techniques', on sample preparation, analytical method development using liquid chromatography – tandem mass spectrometry, and method validation for the multi-analyte analysis of chemical residues in honey. A short report of the method development is included elsewhere in this issue of the newsletter.

In late November – early December, Mr Husham Nasreldin Mustafa Hussan, a chemist from the Pesticide Residue Analysis Laboratory, Crop Protection Research Centre, Agricultural Research Corporation, Sudan was hosted by FEPL for a scientific visit on the analysis of pesticide and other agrochemical residues in agricultural products. The visit was organised under technical cooperation project SUD5039, 'Enhancing the Capacity to Monitor Pesticide and Veterinary Residues in Food Using Nuclear and Complementary Techniques'.

FEPL Staff

There have been several changes in the staffing in FEPL since the last edition of this newsletter.

Ms Zora Jandrić initially joined FEPL as a consultant to carry out her PhD research in 2009. She obtained her doctorate in 2011 and subsequently competed successfully for the post of analytical chemist, finishing her 7-year maximum period as a professional staff member in July 2018.

During her time in FEPL, Zora made vital contributions to the laboratory outputs in the fields of food contaminant analysis, food authenticity and food origin testing. Zora's work on food contaminant control included method development for natural food contaminants such as tropane alkaloids and for residues of veterinary drugs and pesticides in food, and included method validation and transfer to Member State scientists through training and preparation of method protocols and standard operating procedures. Zora also pioneered FEPL's research on metabolomics using high resolution mass spectrometry for food authenticity and geographical origin, including the associated chemometrics and data modelling required to analyse and interpret the results of metabolomics analysis. Further work on food authenticity testing included molecular fingerprinting using near-infrared and Fourier transform infrared spectroscopy as portable, field-deployable screening techniques. Zora is first author or co-author of a number of peer-reviewed publications arising from her work in FEPL, in the field of analytical food chemistry, environmental chemistry and food control. She has presented FEPL research activities at a number of international conferences, the most recent being an oral presentation at the 'Metabolomics 2018' conference in Seattle, Washington, USA, which is reported elsewhere in this issue of the newsletter.

In addition to her research and laboratory work, Zora trained interns, contributed to the QA/QC system in FEPL, provided input for the technical management of technical cooperation projects, and acted as assistant scientific secretary for the FAO/IAEA's "International Symposium on Food Safety and Quality: Applications of Nuclear and Related Techniques" held in Vienna in 2014, taking on many organizational and administrative tasks for that successful event. As a follow up, she was a guest editor of a special issue of the journal "Food Control" dedicated to the symposium and related research.

Zora's contributions to the work and outputs of the Joint FAO/IAEA Division were recognised with

a Departmental Merit Award in 2014. Her inputs to FEPL, the FEP subprogramme and the Joint FAO/IAEA Division will be sorely missed, and we wish her all the best for the next steps in her career.

Ms Melika Osmic, who had been filing the position of Team Assistant for FEPL since November 2017, completed her assignment in June 2018. We thank Melika for her assistance during that period and wish her the best for the future.

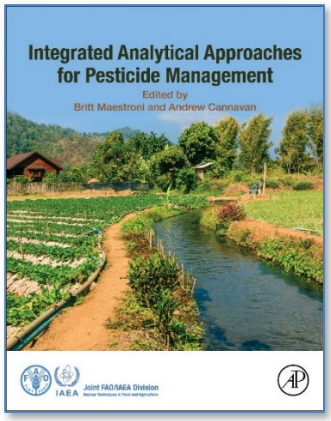
Ms Amber Vaughan completed a one-year internship in FEPL in September 2018. During her time in FEPL, Amber was involved in a number of projects and, as well gaining experience and knowledge, made significant contributions to work on food authenticity testing using various stable isotope and spectroscopic analytical techniques. Amber also helped in demonstrating portable testing methods developed in FEPL at the Austrian "Long Night of Research" in April 2018. The FEPL staff wish Amber all the best in her future career.

FEPL welcomed two trainees from China in the latter part of 2018. In October, Ms Shunru Jin, commenced an internship and she was joined in November by Ms Xiao Xu, who will undertake a fellowship in FEPL. Both are funded by China, and will work in various aspects of FEPL work over the coming months.

Announcements

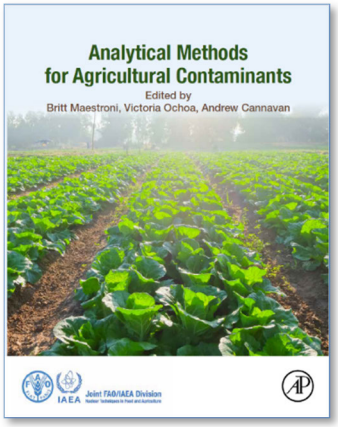
New Books from FEPL on Integrated Analytical Approaches for Pesticide Management and Associated Analytical Methodology

Two new books were published by Elsevier/Academic Press in late 2018:



Integrated Analytical Approaches for Pesticide Management provides proven laboratory practices/examples and methods for the measurement of pesticide residues on crops and the identification and monitoring of indicators of contamination in the environment, allowing continuous assessment of the effectiveness of agricultural management practices in the field. This preventative approach reduces reliance on expensive end-product testing. This is a practical and useful reference to anyone in a laboratory setting needing a systematic way to detect and control agricultural contaminants for a safe food supply.

https://www.elsevier.com/books/integrated-analytical-approaches-for-pesticide-management/maestroni/978-0-12-816155-5



Analytical Methods for Agricultural Contaminants gives an insight into good laboratory practices and examples of methods used in individual specialist laboratories. The manual will be useful for laboratory analysts, managers, researchers and students. The book will enable stakeholders in the agri-food industry to appreciate the importance of proven, reliable data and the associated quality assurance approaches for end-product testing.

https://www.elsevier.com/books/analytical-methods-for-agricultural-contaminants/maestroni/978-0-12-815940-8

A limited number of hard copies are available from the FEP section for interested developing country scientists, on a first-come, first-served basis.

IUPAC 2019

The 14th IUPAC International Congress of Crop Protection Chemistry will be hosted by Ghent University during May 19-24, 2019 in Ghent, Belgium. The programme of the congress is available online at https://iupac2019.be/call-for-abstracts/

The FEPL will be involved in the scientific programme of theme No. 6 on food quality and safety. Subtopics discussed will include: International Trends in Food Production, Food Trade, Food fraud, Food authenticity and novel Foods; New approaches to sampling and monitoring; Modern analytical techniques to detect and control residues in food and feed; MRL and International guidelines/standards/regulations for consumer protection; and Advances in Dietary Risk Assessment and Decision Making.

FAO/IAEA/RALACA Workshop on Quality Assurance and Quality Control Measures in food testing laboratories

The FEPL is planning a one-day workshop on "Quality Assurance and Quality Control Measures in food testing laboratories" on 5th May 2019 in Foz do Iguazu, Brazil. This workshop targets participants already planning to attend the 7th Latin American Pesticide Residue Workshop, from 5– 8 May 2019 (http://www.laprw2019.com.br/index.html). The workshop will focus on analytical methods and technologies to ensure food safety and will represent a forum for interdisciplinary networking between all stakeholders in the farm to fork food chain. The workshop is open to analysts from official food control laboratories in Member Countries of FAO or IAEA from the Latin American and Caribbean region. The deadline for nominations is 25 March 2019.

Publications

2018

Cáceres, T., Maestroni, B., Islam, M. and Cannavan, A. (2018). Sorption of 14C-carbofuran in Austrian soils: evaluation of fate and transport of carbofuran in temperate regions. Environmental Science and Pollution Research Journal, in press.

Maestroni, B., Ghanem, I., Correll, R., Abu Alnaser, A., Islam, M., Cesio, V., Heinzen, H. and Cannavan, A. (2018). Required withholding period for vine leaves following spraying with pesticide. Journal of Health and Environmental Research, in press.

Kelly, S. (2018) Is it Organic? What do existing analytical techniques have to offer and how close are we to implementing them? Book of abstracts of the, 5th FoodIntegrity Conference, Assuring the integrity of the food chain: delivering real world solutions, Nantes, France, 14– 15 November 2018, 94.

Pöpping, B., Buck, N., Bánáti, D., Brereton, P., Calancha, M., Gadanho, M., Gendel, S., Kelly, S., Leseur, C., Menzel, M., Morling, A., Saner, S., Spink, J. and Wiggers, V.-D. (2018). Guidance document towards food authenticity, an initiative of ILSI Europe. Book of abstracts of the, 5th FoodIntegrity Conference, Assuring the integrity of the food chain: delivering real world solutions, Nantes, France, 14– 15 November 2018, 75.

Maestroni, B., Ferris, I.G., Correll, R., Kohlmann, B., Nordgaard, A., Kookana, R.S. and Cannavan, A. (2018). Generic guidelines on integrated analytical approaches to assess indicators of pesticide management practices at a catchment scale. Black-box monitoring and the laboratory's role in fostering good agricultural practice. In: Integrated Analytical Approaches for Pesticide Management, Maestroni, B and Cannavan, A. (Eds.) Academic Press, London, UK, pp 7–25.

Mabit, L., Fulajtar, E., Toloza, A., Ochoa, V. and Maestroni, B. (2018). Implementation and optimization of soil sampling: some practical guidance and considerations. In: Integrated Analytical Approaches for Pesticide Management, Maestroni, B and Cannavan, A. (Eds.). Academic Press, London, UK, pp 47–61.

Ochoa, V. and Maestroni, B. (2018). Pesticides in water, soil and sediments. In: Integrated Analytical Approaches for Pesticide Management, Maestroni, B and Cannavan, A. (Eds.). Academic Press, London, UK, pp 133–145.

Maestroni, B. and Cannavan, A. (Eds.). (2018). Integrated Analytical Approaches for Pesticide Management. Academic Press, London, UK. ISBN: 9780128161555.

Jandrić, Z., Centonze, V., Islam, M., Cannavan, A. and Frew, R. (2018). A comprehensive strategy for identification of food origin. Book of abstracts of Metabolomics 2018: 14th Annual Conference of the Metabolomics Society, Seattle, Washington, 24–28 June 2018, 19D.

Kelly, S., Brodie, C., & Hilkert, A. (2018). Isotopic-Spectroscopic Technique: Stable Isotope-Ratio Mass Spectrometry (IRMS). In: Modern Techniques for Food Authentication, Da-Wen Sun (Ed.). Academic Press, MA, USA, pp. 349–413.

Maestroni, B. (2018). General requirements for food safety analysis. In: Analytical Methods for Agricultural Contaminants, Maestroni, B., Ochoa, V. and Cannavan, A. (Eds.). Academic Press, London, UK, pp 5–22.

Maestroni, B., Ochoa, V. and Cannavan, A. (Eds.) (2018). Analytical Methods for Agricultural Contaminants. Academic Press, London, UK. ISBN: 9780128159408.

Maestroni, B., Vazquez, A.R., Avossa, V., Goos, P., Cesio, V., Heinzen, H., Riener, J. and Cannavan, A. (2018). Ruggedness testing of an analytical method for pesticide residues in potato. Accreditation and Quality Assurance, 23, 303-316. Available online at https://doi.org/10.1007/s00769-018-1335-7.

Blackburn C. M., Forward to Food Chemistry, Function and Analysis No. 4. Food Irradiation Technologies: Concepts, Applications and Outcomes. Royal Society of Chemistry (2018). ISBN 978-1-78262-708-1. http://pubs.rsc.org/en/content/chapterpdf/2017/9781788010252-fp005?isbn=978-1-78262-708-1&sercode=bk

Cannavan, A. (2018). The global perspective of food fraud. Quality Assurance and Safety of Crops and Food, 10, supplement1 – Food Fraud, 2nd International MoniQA Symposium on Food Fraud Prevention and Effective Food Allergen Management, Vienna-Vösendorf, Austria, 7–8 June 2018, S3.

Maestroni, B., Abu Alnaser, A., Ghanem, I., Islam, M., Cesio, V., Heinzen, H., Kelly, S. and Cannavan, A. (2018). Validation of an analytical method for the determination of pesticide residues in vine leaves by GC-MS/MS. Journal of Agricultural and Food Chemistry, published online 7 June 2018, DOI: 10.1021/acs.jafc.8b00453.

Cannavan, A., Jandrić, Z., Islam, M. and Kelly, S. (2018). Rapid screening techniques for extra virgin olive oil authentication. Book of abstracts of the Belfast Summit on Global Food Integrity (ASSET 2018), Belfast, UK, 28–31 May 2018, 131.

Cannavan, A., Abrahim, A. and Kelly, S. (2018). Rapid isotope analysis of non-exchangeable hydrogen in sugar molecules derivatised with MBTFA, using GC-chromium/high-temperature-conversion-IRMS. Book of

abstracts of the Belfast Summit on Global Food Integrity (ASSET 2018), Belfast, UK, 28–31 May 2018, 179.

Maestroni, B., Ghanem, I., Correll, R., Alnaser, A., Islam, M., Cesio, V., Heinzen, H. and Cannavan, A. (2018). Assessment of the withholding period for organophosphorus pesticides applied to vine leaves. Book of abstracts of the 12th European Pesticide Residue Workshop, Munich, Germany, 21–25 May 2018, 204.

Loewy, M., Nario, A., Carazo, E., Masis, M. and Maestroni, B. (2018). Networking strategies to ensure food safety and environmental quality in Latin America and the Caribbean. Book of abstracts of the 12th European Pesticide Residue Workshop, Munich, Germany, 21–25 May 2018, 267.

2017

Jandrić, Z. and Cannavan, A. (2017). Authentication of fruit juices by metabolomics using UPLC-QToF MS. In Fruit Juices: Extraction, Composition, Quality and Analysis, Eds. Rajauria, G. & Tiwari, B.K. Academic Press, MA, USA, pp. 779–804.

Bennett, K.A., Kelly, S.D., Tang, X. and Reid, B.J. (2017). Potential for natural and enhanced attenuation of sulphanilamide in a contaminated chalk aquifer. Journal of Environmental Sciences. Available on line at https://doi.org/10.1016/j.jes.2017.08.010

Rajapaksha, D., Waduge, V., Padilla-Alvarez, R., Kalpage, M., Rathnayake, R. M. N. P., Migliori, A., Frew, R., Abeysinghe, S., Abrahim, A., and Amarakoon, T. (2017). XRF to support food traceability studies: Classification of Sri Lankan tea based on their region of origin. X-ray Spectrometry, 46: 220–224. doi: 10.1002/xrs.2748.

Kelly, S. (2017). The power of stable isotope fingerprints in authenticity control and fraud prevention. Book of abstracts of the 8th International Symposium on Recent Advances in Food Analysis, Prague, Czech Republic, 7−10 November 2017, 68.

Kelly, S. (2017). Improving accessibility to food authentication and traceability methods in developing countries: the activities of the Joint FAO/IAEA Division's Food and Environmental Protection Laboratory. Book of abstracts of the 8th International Symposium on Recent Advances in Food Analysis, Prague, Czech Republic, 7−10 November 2017, 94.

Donarski, J., Camin, F., Fauhl-Hassek, C., Kelly, S., Posey, R. and Sudnik, M. (2017). Sampling guidelines for building and curating food authenticity databases. Book of abstracts of the 8th International Symposium on Recent Advances in Food Analysis, Prague, Czech Republic, 7−10 November 2017, 135.

Cahill, S., Desmarchelier, P., Fattori, V., Bruno, A. and Cannavan, A. (2017). Global perspectives on antimicrobial resistance in the food chain. Food Protection Trends, *in press*.

Kelly, S.D. and Mihailova, A. (2017) Organic food authenticity, in *Food Forensics: Stable Isotopes as a Guide to Authenticity and Origin*, Eds. Carter, J. & Chesson, L. CRC Press – part of the Taylor and Francis Group. ISBN-10: 149874172X.

Maestroni, B., Abu Alnaser, A., Islam, M., Ghanem, I., Cesio, V., Heinzen, H. and Cannavan, A. (2017). Development and validation of a method for the determination of selected pesticide residues in vine leaves by GC-MS/MS. Book of abstracts of 6th Latin American Pesticide Residue Workshop Food and Environment, LAPRW2017, San José, Costa Rica, 14−17 May 2017, 137.

Caceres, T., Maestroni, B., Rathor, N., Islam, M. and Cannavan, A. (2017). Determination of DDT soil sorption coefficients using ^{14}C-DDT. Book of abstracts of 6th Latin American Pesticide Residue Workshop Food and Environment, LAPRW2017, San José, Costa Rica, 14−17 May 2017, 201.

Maestroni, B., Kelly, S. and Cannavan, A. (2017). Food safety as a vital component of food security. Book of abstracts of ILSI Europe's Annual Symposium 2017, Brussels, Belgium, 30−31 March 2017, 13.

Camin, F., Boner, M., Bontempo, L., Fauhl-Hassek, C., Kelly, S., Riedl, J., & Rossmann, A. (2017). Stable isotope techniques for verifying the declared geographical origin of food in legal cases. Trends in Food Science & Technology. (published online 5th Jan 2017). http://www.sciencedirect.com/science/article/pii/S0924224416302771.

Blackburn C.M. (2017) Preparing for and Responding to a Nuclear or Radiological Emergency. Averting Risks to the Food Chain, FAO Rome, ISBN 978-92-5-109539-3, 100103. http://www.fao.org/3/b-i6538e.pdf.

Cannavan, A., Jandrić, Z. and Sasanya, J. (Eds.) (2017) FAO/IAEA International Symposium on Food Safety and Quality: Applications of Nuclear and Related Techniques, Vienna, Austria, 10–13 November 2014. Food Control, 72, Part B (published on line Dec 2016). http://www.sciencedirect.com/science/journal/09567135/72/part/PB

Jandrić, Z. and Cannavan, A. (2017). An investigative study on differentiation of citrus fruit/fruit juices by UPLC-QToF MS and chemometrics. Food Control, 72, Part B, 173-180 (published online Dec 2016). https://pubag.nal.usda.gov/pubag/article.xhtml?id=5431195

Jandrić, Z., Islam, M., Singh, D.K. and Cannavan, A. (2017). Authentication of Indian citrus fruit/fruit juices by untargeted and targeted metabolomics. Food Control, 72, Part B, 181-188 (published online Dec 2016). https://pubag.nal.usda.gov/pubag/article.xhtml?id=5431192

Jandrić, Z., Frew, R.D., Fernandez-Cedi, L.N. and Cannavan, A. (2017). An investigative study on discrimination of honey of various floral and geographical

origins using UPLC-QToF MS and multivariate data analysis. Food Control, 72, Part B, 189-197 (published online Dec 2016). https://pubag.nal.usda.gov/pubag/article.xhtml?id=5431190

Ben Mansour. A., Bakke, M.J., Guerbej, H., Berriche, Z., Samaali, M., Shaikh, B., Sasanya, J., Horsberg, T.E. (2017). Disposition of 14C-flumequine in sea bream (Sparus auratus) after single intraperitoneal administration. Food Control,72, Part B, 198-204 (published online Dec 2016).https://pubag.nal.usda.gov/pubag/article.xhtml?id=5266395&searchText=subject_term%3A%22half+life%22&searchField

Chen, T., Chen, G., Yang, S., Zhao, Y., Ha, Y. and Ye, Z. (2017). Recent developments in the application of nuclear technology in agro-food quality and safety control in China. Food Control, 72, Part B, 306-312 (published online Dec 2016). https://pubag.nal.usda.gov/pubag/article.xhtml?id=5431187

Reports

2018

Blackburn, C.M. (2018). 12th Session of the Codex Committee on Contaminants in Food, Utrecht, The Netherlands, 12–16 March 2018.

Ye, Z. (2018). Activities of the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture Relevant to CCPR work (CX/PR 18/50/4). 50th Session of Codex Committee on Pesticide Residues of Joint FAO/WHO Food Standards Programme, Haikou, China, 9–14 April 2018.

Anonymous (2018). Information on Activities of the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture. 41st Session of the Joint FAO/WHO Codex Alimentarius Commission, Rome, Italy, 2–6 July 2018. http://www.fao.org/fao-who-codexalimentarius/sh-proxy/en/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FMeetings%252FCX-701-41%252FInformation%2Bpaper%252Fif41_06e_IAEA.pdf

2017

Ye, Z. (2017). Information on Activities of the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture Relevant to Codex work (CAC/40 INF/01). 40th Session of the Joint FAO/WHO Codex Alimentarius Commission, Geneva, Switzerland, 17−22 July 2017; available at: http://www.fao.org/fao-who-codexalimentarius/sh-proxy/en/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FMeetings%252FCX-701-40%252FINF%2Bpapers%252Fif40_01e_IAEA.pdf

Blackburn, C.M. (2017). FAO Report to the 4th Emergency Preparedness and Response Standards Committee (EPReSC), Vienna, Austria, 6−8 June 2017.

Blackburn, C.M. (2017). 11th Session of the Codex Committee on Contaminants in Food, Rio de Janeiro, Brazil, 3−7 April 2017. http://www.fao.org/fao-who-codexalimentarius/sh-proxy/es/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FMeetings%252FCX-735-11%252FWD%252Fcf11_04e.pdf

Ye, Z. (2017). Activities of the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture Relevant to CCPR work (CX/PR 17/49/04). 49th Session of Codex Committee on Pesticide Residues of Joint FAO/WHO Food Standards Programme, Beijing, China, 24−29 April 2017. http://www.fao.org/fao-who-codexalimentarius/sh-proxy/en/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FMeetings%252FCX-718-49%252FWD%252Fpr49_04e.pdf

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