



Joint FAO/IAEA Programme
Nuclear Techniques in Food and Agriculture

Food & Environmental Protection Newsletter



<http://www-naweb.iaea.org/nafa/index.html>

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To Our Readers



Photo: FAO / Saul Palma

When meeting people and discussing our work I am often asked for a simple explanation of what we do and the difference between Coordinated Research Projects and Technical Cooperation Projects I am going to take this opportunity to put something in writing – so here goes.

The Food and Environmental Protection Subprogramme's overall objective is to assist Member States to improve food safety and food control systems and to enhance international food trade through the use of nuclear and related techniques. The core work areas are: (i) food irradiation; (ii) food traceability and contaminant control; and; (iii) nuclear standards and emergency preparation and

response. Food irradiation encompasses the full range of post-harvest applications including phytosanitary, sanitary and food quality. The area of 'traceability and contaminants' is one of the subprogrammes largest and spans food forensics, authenticity and food contaminant control, both to improve laboratory capabilities, practices and methodologies, and also to encourage stakeholder involvement and good agricultural practice. The area of 'nuclear standards, emergency preparation and response' is largely normative; it aims to enhance inter-agency and external cooperation and collaboration for nuclear emergencies that could affect food and agricultural

production but also includes other radiation standards and guidelines.

As a technical entity our outputs include publications, technical meetings and workshops. For example, the 91 analytical methods published on our website¹, 25 technical publications² that were produced in 2014 in addition to our contributions to the IAEA Fukushima Report and Technical Volumes. We also arranged and hosted an International Symposium in November last year (Feature Article inside) and the subprogramme provided 21 courses or workshops for 514 participants both at events in our Member States and at the Food and Environmental Protection Laboratory (which also hosted a scientific fellowship and 3 interns during 2014).

At any one time, we are responsible for five or six Coordinated Research Projects (CRPs) which are strategic in nature and bring together institutions from different countries to collaborate on research topics to address a particular technical need of importance to our Member States. Each CRP typically consists of a network of 10 to 15 national research institutes from developing and developed countries. A CRP generally lasts for five to six years, during which up to four research coordination meetings are held to evaluate progress, coordinate and develop scientific research and develop technical documents, including the final reports of the research findings.

Research activities not only help to solve technical issues but they can also produce new technologies or techniques that can be transferred to Member States through the Agency's Technical Cooperation programme. In 2014 we provided technical support to 45 Technical Cooperation Projects (TCPs); a list of current TCPs is provided in this newsletter followed by articles on specific TCP events. Our technical officers work in conjunction with colleagues in the IAEA Department of Technical Cooperation to implementing these TCPs.

The TCPs differ from Coordinated Research Projects (CRPs) in that CRPs involve the development of new technologies, approaches or solutions to problems that confront our Member States, whereas TCPs involve the transfer of skills and knowledge and the provision of equipment and expertise in areas where nuclear techniques offer advantages over other approaches, or where nuclear techniques can usefully supplement conventional means.

The CRPs are funded from the regular budget of the Joint FAO/IAEA Division of Nuclear Techniques in Food and

Agriculture and TCPs are supported by the IAEA Technical Cooperation Fund. They are the two main delivery mechanisms for us to assist Member States in addressing issues and needs related to nuclear applications in food and environmental protection. We currently receive extra-budgetary funding also, from the US Government, secured through the Peaceful Uses Initiative³.

As regards staffing, and on a more personal note – we say thank you and a fond farewell to Mr Russell Frew who left us in June to return the University of Otago, New Zealand. We wish Russell every success for the future and look forward to working with him in future as a collaborator. We also say goodbye to Ms Yasmin Leithner and Ms Victoria Ochoa and wish them every success in their future careers after completing their internships at the laboratory. We also extend a warm welcome to Ms Agneta Krukke who joined as an intern in April. More about the work of Yasmin, Victoria and Agneta can be found in the report from the Food and Environmental Protection Laboratory in this newsletter.

Finally, I hope you enjoy reading the Newsletter and look forward to any thoughts you may wish to share with us. On behalf of the subprogramme, I would like to thank our numerous collaborators throughout the world for their assiduous support and very productive interactions.

Sincerely,

Carl M. Blackburn
Acting Section Head

¹The Food Contaminant and Residue Information System (FCRIS) is available at: <http://nucleus.iaea.org/fcris/Default.aspx/> or indirectly via: <http://nucleus.iaea.org/Home/index.html>.

²13 scientific publications (Journal Papers, Conference Abstracts); 8 monographs (international standards related to trypanocides and quality control – published by OIE); a food irradiation standard (Asia and Pacific Plant Protection Commission); 2 book chapters; and a IAEA Technical Report finalized on Good Practice in Food Irradiation.

³<https://www.iaea.org/newscenter/focus/peaceful-uses-initiative>

Staff

Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture

Name	Title	Email	Extension	Location
Qu Liang	Director	Q.Liang@iaea.org	21610	Vienna

Food and Environmental Protection Subprogramme

Name	Title	Email	Extension	Location
Carl M. Blackburn	Acting Section Head	C.Blackburn@iaea.org	21639	Vienna
James J. Sasanya	Food Safety Specialist (Veterinary Drug Residues)	J.Sasanya@iaea.org	26058	Vienna
Johannes Corley	Food Safety Specialist	J.S.Corley@iaea.org	21695	Vienna
Yves Hénon	Food Irradiation Specialist	Y.Hénon@iaea.org	21616	Vienna
Kyoko Viitaniemi	Team Assistant	K.Viitaniemi@iaea.org	26061	Vienna
Enrique Nacif	Team Assistant	E.Nacif@iaea.org	21641	Vienna
Andrew Cannavan	Laboratory Head	A.Cannavan@iaea.org	28395	Seibersdorf
Russell Frew	Food Safety Specialist (Traceability)	R.Frew@iaea.org	28326	Seibersdorf
Britt M. Maestroni	Food Scientist	B.M.Maestroni@iaea.org	28398	Seibersdorf
Zora Jandrić	Analytical Chemist	Z.Jandrić@iaea.org	28373	Seibersdorf
Aiman Abraham	Laboratory Technician	A.Abrahim@iaea.org	28327	Seibersdorf
Marivil Islam	Laboratory Technician	M.Islam@iaea.org	28394	Seibersdorf
Tamara Wimberger	Team Assistant	T.Wimberger@iaea.org	28267	Seibersdorf
Barbara A. Massinger	Team Assistant	B.Massinger@iaea.org	28259	Seibersdorf
Agneta Krukke	Intern	A.Krukke@iaea.org	28419	Seibersdorf

Food and Environmental Protection Section
 Vienna International Centre, Wagramer Strasse 5, PO Box 100, 1400 Vienna, Austria
 Tel.: (+) 43 1 2600 + Extension; Fax: (+) 43 1 26007; Email: Official.Mail@iaea.org

Food and Environmental Protection Laboratory
 FAO/IAEA Agriculture and Biotechnology Laboratories
 2444 Seibersdorf, Austria
 Tel.: (+) 43 1 2600 + Extension; Fax: (+) 43 1 26007; Email: Official.Mail@iaea.org

<http://www-naweb.iaea.org/nafa/fep/index.html>
<http://www-naweb.iaea.org/nafa/fep/fep-laboratory.html>
<http://www.fao.org/ag/portal/age-index.html>

Feature Article

FAO/IAEA International Symposium on Food Safety and Quality: Applications of Nuclear and Related Techniques, Vienna, Austria, 10–13 November 2014

Technical Officers: Zora Jandrić, Andrew Cannavan

Ensuring food supply integrity is of the utmost importance in relation to food security, safety and quality, consumer protection and international trade. Control measures throughout the entire food production and supply chain are essential to maintain and assure this integrity.



Symposium participants.

The fundamental purpose of the controls is to support food safety and quality, because both are essential and set the foundation for food security and consumer protection as well as facilitating both domestic and international trade.



Symposium participants.



Symposium participants.

The need for methods to monitor and verify food safety and quality is evidenced by the ever growing list of food product recalls and incidents such as melamine, antibiotic and dioxin contamination. Food fraud (e.g. the adulteration of beef products with horse meat), the introduction of new technologies with potential food safety implications (e.g. nanotechnology) and environmental factors (e.g. climate change) further highlight the importance of continued refinement, development and innovation to improve food control measures. Effective techniques are necessary to help assess and manage risks and protect the consumer. These include food irradiation to treat food directly, as well as other nuclear and related technologies for tracing food products in order to verify their provenance or to detect and control contaminants.



Presentation by Mr Russell Frew at the Symposium.

To explore some of these challenges experienced by many Member States, an *International Symposium on Food Safety and Quality: Applications of Nuclear and Related Techniques* was held in Vienna, Austria, from 10 to 13 November 2014, under the auspices of the Food and Environmental Protection Subprogramme. The secretariat estimates that more than 300 people from 83 different

countries (including Permanent Representatives and staff members of representations, IAEA / EC / FAO / AFDB / UNIDO / WHO staff members, researchers, laboratory analysts, policymakers, regulators, food producers and others) attended the event. More than half of the participants were from developing countries. In addition 57 oral and 94 posters were prepared by numerous research institutions, and were presented and displayed during the Symposium. General information and resources were also made available to the public on the symposium website.⁴

The Symposium was of a scientific and technical nature with a focus on the importance of the application of nuclear techniques and conventional methods to ensure food safety and quality worldwide. The programme consisted of opening addresses, an opening session to set the scene and seven scientific sessions covering: food analysis and food control systems; food forensics; food irradiation and processing; emerging issues; food and feed safety – risk based monitoring; enhancing international trade; and developing country challenges. There were also three panel discussions.



Opening Session of the Symposium.

In the opening address session, three distinguished speakers (K. Aning, Deputy Director General, Head of Department of Technical Cooperation, IAEA; Q. Liang, Director of Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture, IAEA; and C. Krejci, Department Head, Food Law, Food Safety and Food Quality, Austrian Federal Ministry of Health, Austria) presented their views. Prof. Zhihua Ye (Institute of Quality Standard and Testing Technology for Agro-Products (IQSTAP), Chinese Academy of Agricultural Sciences, China) was appointed as Symposium Chair.

Keynote speakers of the opening plenary session highlighted the following aspects during their presentations:

- Nuclear and isotopic techniques for traceability and authenticity, and irradiation technology are key to ensuring the integrity of national and global food control systems. Cooperation and support from agencies such as FAO/IAEA are essential for the effective implementation of such systems.
- Food irradiation is safe and does not change the integrity of food.
- Risk communication is critical, but is challenging.
- Food safety is a component of global food security and a collaborative approach is required. There is no single solution; there are various options depending on country/region/situation.



Keynote speakers at the Symposium.

Key points raised during scientific and panel discussion sessions included:

- Currently, failure of food control systems is a large scale problem – e.g. 26 out of 28 EU Member States were affected by the horsemeat scandal. Good systems exist for food safety, but not food fraud. Even the best food control systems need continuous improvement; for example, the USA Food Safety Modernization Act. Policy makers play a key role.
- Food safety is a vital component of global food security. A collaborative approach is required to develop and implement effective systems for food safety, and contribute to food security. Feed safety is an integral part of food production and safe food.
- There is a growing trend and urgency towards the willingness of governments to change control systems.
- Provenance testing is essential to support the reputation of industry, but it is necessary to make industry aware of the verification techniques available and the benefit of applying them.
- Authenticity analysis is complex and requires the capability to handle and process very large data sets.

⁴<http://www-pub.iaea.org/iaea meetings/46092/International-Symposium-on-Food-Safety-and-Quality-Applications-of-Nuclear-and-Related-Techniques>

New regulations are needed that incorporate untargeted analytical methods.

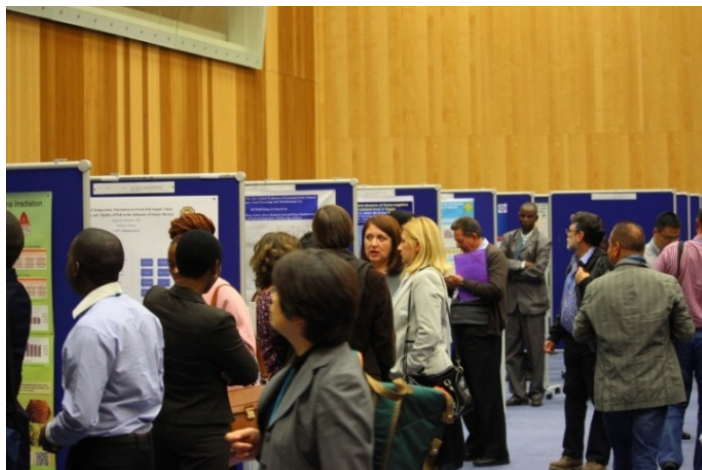
- There is a large range of food contaminants. However, in most developed countries the number of non-compliant samples is relatively low. This is not always true in developing countries.
- There is an urgent need for education and training in developing countries to enable them to implement monitoring and comply with food safety standards.
- Science-based food safety plans are important to build consumer confidence, and rapid alert systems are critical in alerting consumers of hazards.
- Active cooperation between government, private sector (producers, processors, and distributors), academia and consumers is needed to ensure food safety.

The symposium show-cased the areas of work covered by the Food and Environmental Protection Subprogramme and also provided a great opportunity for interdisciplinary networking between professionals from different backgrounds, national institutes, academia, industry, and international organizations, especially for representatives from developing countries. It provided a major avenue for dissemination of research results from a wide range of collaborators and scientists working in related fields, including those of FEPL.



Invited Speakers.

In the closing session, the authors of the best poster at the Symposium were presented with the David H. Byron Award, in recognition and acknowledgement of the contribution to capacity development globally in the field of food safety and security by the former Head of the Food and Environmental Protection Subprogramme. David H. Byron sadly passed away just before the symposium started, after a long battle with illness.



Discussions during a scientific poster session at the FEP Symposium.



Presentation of the David H. Byron Award for best poster by the Symposium Scientific Secretary, Mr Andrew Cannavan. The winning poster was 'Geographic determination of the growing origins of Jamaican and international coffee using multi-element analysis', by J. Antoine, L. Hoo Fung and C. Grant of the International Centre for Environmental and Nuclear Sciences, Jamaica.

Announcement

e-Learning Course on Food Irradiation



Technical Officer: Yves Hénon

An e-Learning Course on food irradiation is now available at <http://bit.do/iaeafoodirradiation>.



- To provide science-based information on food irradiation to the general public.
- To measure opinion and knowledge on food irradiation, before and after information has been provided;
- To serve as training material for professionals;
- To improve the practice of irradiator operators in developing countries and help them to comply with quality management standards such as ISO 14470.

Each lesson is followed by a summary and a quiz. A certificate can be obtained by students having taken all lessons and having passed a certain mark for all quizzes.

The course, created by the Food and Environmental Protection Section and the Nuclear Knowledge Management Section of the IAEA, is an output of TC Project RAS 5057 'Implementing Best Practices of Food Irradiation for Sanitary and Phytosanitary Purposes'.

Intended for self-study, this course is the most comprehensive learning instrument currently available on food irradiation as it contains practical examples of best practices, videos (embedded or on the web), pdf files, slides presentations, documents and reference articles. It was designed to achieve several functions:



Forthcoming Events

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

Third RCM on the Implementation of Nuclear Techniques to Improve Food Traceability. 26–30 October 2015, Kampala, Uganda.

First RCM on the Development of New Applications of Machine Generated Food Irradiation Technologies. 19–23 October 2015, Vienna, Austria.

Consultants' Meetings

Consultants Meeting to develop a new CRP; the use of irradiation to control foodborne parasites in non-animal origin foods such as fruits and vegetables. 7–11 September 2015, Vienna, Austria.

Technical Workshops/Courses

FAO/IAEA Training Workshop on “Food Safety, Quality and Traceability” 19–23 October 2015, Dakar, Senegal.

FAO/IAEA Workshop for Young Scientists on “Workshop on the Food Safety – Challenges for Developing Countries”. 3 November 2015, Prague, Czech Republic.

FAO/IAEA Training Workshop on “Food Safety, Quality and Traceability”, 9–20 November 2015, Ho Chi Minh City, Viet Nam.

International Meetings/Conferences

38th Session of the Joint FAO/WHO Codex Alimentarius Commission, 6–11 July 2015, Geneva, Switzerland.

52nd North American Chemical Residue Workshop. 18–23 July 2015, Florida, USA.

Hot Topics in Microbiology Conference. 8 October 2015, Chipping Campden, UK.

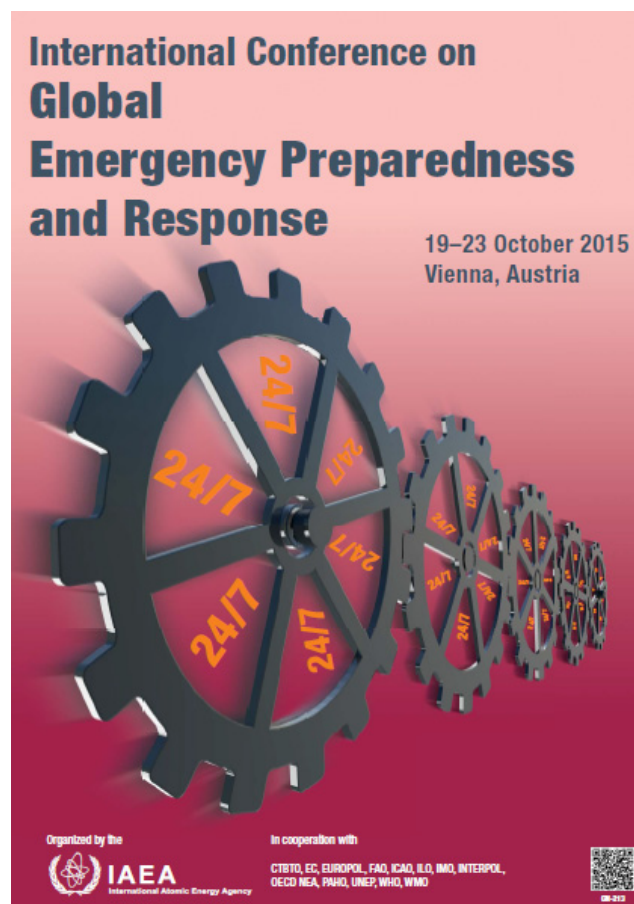
The 18th Inter-Agency Committee on Radiation Safety (IACRS). 17 November 2015, Gasperich, Luxembourg.

39th Meeting of the Radiation Safety Standards Committee (RASSC). 7–11 December 2015, Vienna, Austria.

International Conference on Global Emergency Preparedness and Response (CN-213), IAEA Headquarters, Vienna, Austria, 19–23 October 2015

Technical Officer: Carl M. Blackburn

This conference is being organized by the IAEA in cooperation with the FAO and 13 other international organizations in order to provide an opportunity to exchange information and share experiences in emergency preparedness and response, discuss challenges, and identify key priorities in further improving readiness for nuclear and radiological incidents and emergencies. Topics will include protective and other actions related to food and agricultural products. Further information, on-line registration and the call for papers is available online at <http://www-pub.iaea.org/iaea meetings/45986/International-Conference-on-Global-Emergency-Preparedness-and-Response>



FAO/IAEA Workshop on Food Safety – Challenges for Developing Countries, Prague, Czech Republic, 3–6 November 2015

Technical Officer: Andrew Cannavan

Implementing effective laboratory testing and food control systems is challenging, especially for developing countries, and requires strong networking, human resource development, research and capacity building. To help Member States in this regard the Joint FAO/IAEA Division will hold an FAO/IAEA Workshop on 'Food Safety – Challenges for Developing Countries' on 3 November 2015, in conjunction with the seventh International Symposium on Recent Advances in Food Analysis (RAFA), from 3 to 6 November 2015.



The purpose of the workshop is to provide information and guidance on research and capacity building in the field of food control systems. The workshop will also provide opportunities for developing country scientists to network and potentially develop working collaborations with participants in RAFA. This networking will enhance the sustainability of the control systems in Member States and will help to harmonize the approach to food safety control internationally.

The workshop will focus on challenges in planning and implementing food control systems, especially with regard to the research and testing requirements for analytical laboratories. Invited experts will give lectures on key aspects of relevance especially to developing countries, which will stimulate discussion in a 'question and answer' session.

Participants are expected to attend the RAFA symposium, one of the biggest and most important events in the world focusing on food analysis, which will address in greater detail and extend the topics covered in the workshop, and will offer excellent opportunities for networking.

Application for registration for the workshop through the Joint FAO/IAEA Division is open to regulators and analysts from Member Countries of FAO or IAEA. The analysts should come from laboratories authorized by Governments to perform analyses for official control of food, thereby facilitating international trade and the provision of safe food supplies at the national level.

The workshop will also be open to participants registered for the RAFA symposium.

The note verbale and the prospectus will be sent to governments in July 2015 and further information will be

available on the FEP web pages, <http://www-naweb.iaea.org/nafa/fep/index.html>.

FAO/IAEA Training Workshop on Food Safety, Quality and Traceability (TR-51293), Ho Chi Minh City, Viet Nam, 9–20 November 2015

Technical Officer: Britt Maestroni

The Joint FAO/IAEA Division, in collaboration with UNIDO and the Global Food Safety Partnership (GFSP) will hold a workshop on "Food Safety, Quality and Traceability" in Viet Nam from 9 to 20 November 2015.

The workshop will focus on food safety and quality and discuss protection of the integrity of the food supply chain as a holistic process, involving multiple stakeholders. It will discuss the central role played by the analytical laboratory in providing end product testing and advice for the implementation of good agricultural practices, thus contributing to enhanced food safety and security and increasing agroexports in South East Asia. The workshop will bring together experts in these fields to present contemporary applications for food safety and quality and discuss future perspectives and opportunities, and will provide a forum for interdisciplinary networking between all stakeholders in the farm to fork food chain. A component of laboratory analytical training will be provided.

The course is open to laboratory managers from Member Countries of FAO or IAEA. The applicants should come from laboratories authorized by governments to perform analyses for official control of food, thereby facilitating international trade and the provision of safe food supplies at the national level.

The note verbale and the prospectus will be sent to governments in July 2015 and further information will be available on the FEP web pages, <http://www-naweb.iaea.org/nafa/fep/index.html>.

EuroResidue VIII Conference on Residues of Veterinary Drugs in Food, Egmond aan Zee, The Netherlands, 23–25 May 2016



Dear Colleague,

On behalf of the EuroResidue Conference Foundation, and the Scientific- and Organising Committees, it is our pleasure to invite you to EuroResidue VIII, which will be held 23 to 25 May 2016 in Egmond aan Zee, The Netherlands.

The EuroResidue Conferences are intended to include all aspects of the control of residues of veterinary drugs. Special emphasis is placed upon recent developments related to the detection and determination of residues in food, feed and other relevant matrices, pharmaceutical and toxicological studies, and veterinary drug registration and regulation. Previous EuroResidue Conferences were held in 1990, 1993, 1996, 2000, 2004, 2008 and 2012. The last "Ghent" meeting (the 7th International Symposium on Hormone and Veterinary Drug Residue Analysis, which is complementary to the EuroResidue series) took place in 2014.

Once again, the intention is to bring together experts and interested persons from various scientific disciplines to enable them to discuss developments and problems in the field of residue analysis and control, and to debate and exchange ideas and opinions. The program includes keynote lectures, oral and poster presentations, workshops and a display of commercial products.

The conference venue has meeting facilities, participant accommodation, restaurants and bars all under a single roof and offers excellent opportunities for informal contacts and networking. Conference participants can breathe fresh sea air at the Dutch seaside only 100 meters from the venue, allowing the opportunity to clear the head after long, inspiring days.

We hope to see you all in May 2016 at EuroResidue VIII.
Yours sincerely,

Aldert Bergwerff, *EuroResidue Foundation, Saskia Sterk, Organising Committee*
Andrew Cannavan, *Scientific Committee*

Sunday 22 May: Pre conference workshop
Sunday 22 May: Get-together party
Monday 23 May: Congress and excursion
Tuesday 24 May: Congress and dinner
Wednesday 25 May: Congress closing and farewell lunch

Venue

Hotel Zuiderduin

Egmond aan Zee, the Netherlands. This hotel is located 30 km from Amsterdam Airport. Transport between airport and hotel will be arranged. www.zuiderduin.nl

Presentations

Abstracts are invited for consideration for oral or poster presentation on residues of pharmacologically active compounds, such as antibiotics, growth promoters, parasiticides and disinfectants, in food of animal origin and other relevant matrices. The central theme of the conference will be on modern approaches in the control of residues, advances in analytical methods and the application of such methods in inspection and control. Within this context, the Scientific Committee would also welcome contributions on: aspects of residue depletion (including metabolites); 'omic' technologies; robotics; hyphenated techniques; developments in screening and confirmatory analysis; legislative aspects; monitoring based on risk analysis and epidemiological information; and the environment as a source of residues in food producing animals.

Oral and poster contributions are considered to be of equal status. The Scientific Committee will decide on acceptance and on the manner of presentation. Abstracts, not exceeding 200 words, should be submitted via the EuroResidue website, using the format supplied. Authors of accepted abstracts will be invited to submit full manuscripts for publication in the symposium proceedings. Full manuscripts will be considered for inclusion in the proceedings only when the registration fee is received.

Registration Fees

Early registration € 615 (Until 2016.03.01)

Late registration € 665 (After 2016.03.01)

1 day registration € 200

The full registration fee includes proceedings, get-together party, refreshments, three lunches, an evening meal, an excursion and a congress dinner.

Accommodation

A single room, including breakfast, with private bathroom and WLAN, can be booked via the EuroResidue website. The rate for a single room is 90 euro per night. More information on extra nights and double rooms can also be found on the registration EuroResidue website under 'registration'.

Registration

Conference registration and hotel reservations can be made on the EuroResidue website.

Cancellation policy

Cancellation must be in writing and send to the Registration Office. Cancellation before March 1st 2016, will give you reimbursement of the registration fee minus € 50 handling charges. After this date there will be no fee refunded.

Further Announcements

A second circular will be published in February 2016. It will contain the complete meeting program, including the planned social events.

Contact and information

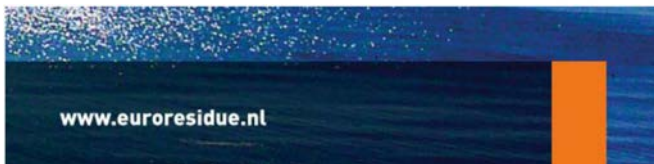
EuroResidue VIII

Telephone: +31 (0)40 2132222

P.O. Box 957, NL-5600 AZ Eindhoven, the Netherlands

E-mail: euroresidue@congressservice.nl

Website: www.euroresidue.nl



Past Events

The 47th Meeting of the Codex Committee on Pesticide Residues, Beijing, China, 13–18 April 2015

Technical Officer: Johannes Corley

The Technical Officer (TO) represented the Joint FAO/IAEA Division at the 47th Session of the Codex Committee on Pesticide Residues (CCPR) in Beijing China, from 13 to 18 April 2015. He reported on its activities during the past year. These included assisting member nations through Coordinated Research Projects and capacity building in the area of food safety and security, assisting Codex/CCPR in developing a document on acceptable performance criteria for methods of analysis and hosting the Food Contaminant and Residue Information System (FCRIS) database.



Joint FAO/IAEA Division representative at the 47th CCPR.

The Joint FAO/IAEA Division was very active during the past year, assisting and advising member nations in building capacity to ensure safety of their agricultural produce using nuclear, isotopic and related techniques. The use of nuclear and isotopic techniques greatly enhances data quality, making analyses rapid and economical, both important factors for modern food safety monitoring programmes.

Outcomes included forging sustainable networks of food control laboratories, assistance to Member Countries with research and development on uses of nuclear and related techniques and fostering the exchange of scientific and technical information through Coordinated Research Projects and Technical Cooperation Projects, increased capacity in Member Countries for monitoring and complying with local and international food safety standards. The TO also reported on the International Symposium on Food Safety and Security hosted at IAEA

Headquarters in Vienna, Austria which was also attended by several of the CCPR delegates.

The Joint Division provides assistance in the development of acceptable performance criteria for methods of analysis both during the sessions and as part of an electronic working group of the CCPR. Furthermore, in hosting the “Food Contaminant and Residue Information System” (FCRIS database), the Joint Division provides analytical methods for residues of pesticides, veterinary drugs and other chemical contaminants, information on physical, chemical and toxicological properties of pesticides and veterinary drugs and links to other databases, providing valuable information to scientists and laboratories involved in food safety and national regulatory and scientific advisory bodies. The information is especially valuable to developing countries that are building capacity in their countries for food safety monitoring.

The TO also visited the Chinese Academy of Agricultural Sciences (CAAS) and the food safety laboratories there. Prof. Ye Zhihua of the CAAS and his team presented on the food safety research activities and capabilities at the Academy. As discussed with Prof. Ye, there is good potential for collaboration with the Food and Environmental Protection Section, both in conducting food safety analysis training and in future Coordinated Research Projects.

The chairman of the 47th CCPR and several country delegate spoke about the importance of Joint Division activities in the area of food safety and security and their impact on developing countries having their own capacity to monitor for residues in food commodities. They also expressed a strong desire for these and other similar projects to be continued. Several member nations strongly encouraged the continuation of the FEP’s capacity building activities in the area of food safety, traceability and monitoring, they also praised the FCRIS database hosted by the Joint Division. FEP assistance has resulted in several successful food safety monitoring programmes in developing countries, increased cooperation between developed and developing countries in the area of food safety and directly and indirectly led to the creation and increase in high skill jobs in participating nations, increased exports of agricultural produce and therefore increased farmer income and GDP, better use of pest control agents and veterinary drugs and increased production of safe and nutritious food for consumers in developing countries.

Fifth Latin American Pesticide Residue Workshop, Santiago, Chile, 10–13 May 2015

Technical Officer: Britt Maestroni

The fifth workshop in the series of biennial Latin American Pesticide Residue Workshops (LAPRW) covered a wide range of topics including methods of analysis for pesticides, sample preparation and clean up procedures, guidelines on analytical quality control and validation, pesticide regulations, environmental risk assessment and monitoring programmes for pesticide residues. The first General Meeting of the “Red Analítica de Latino America y el Caribe” (RALACA – see following article) and several vendor workshops were also included in the agenda.



LAPRW participants: from left to right, Mr P. Enriquez (CCHEN, Chile), Mr C. Sepulveda (Agrolab, Mexico), Ms N. Gras (Chair Fifth LAPRW, Finet, Chile), Ms B. Maestroni (TO, FAO-IAEA, Austria), Mr H. Beldomenico (PRINARC, Univ. Santa Fe, Argentina), Ms A. Nario (CCHEN, Chile).

Over 350 delegates from more than 30 countries took part in this event. The TO is from the Food and Environmental Protection Laboratory (FEPL) and gave an oral presentation entitled ‘*Method validation for pesticide residue testing: are there still issues and challenges to tackle?*’.

Her presentation included results of a survey of RALACA members and the conclusions from a technical workshop held a week earlier on method validation for pesticide residue testing and focused on current issues and challenges for method validation in the Latin American and Caribbean countries. To summarize, apart from technical analytical challenges, such as method optimization, matrix effects, instrumental analysis and availability of equipment and instrumentation, current challenges to analytical laboratories include the calibration and maintenance of instruments, validation of the sample processing step, selection of representative matrices, experimental design, statistical analysis, application of quality control procedures, estimation of uncertainty of measurement, confirmation of residues, performance verification, access to proficiency testing, analysis costs, provision of reference materials, implementation of robustness and ruggedness testing, validation of targeted and untargeted screening methods, scope expansion of a method, and accreditation

body requirements. The presentation was concluded with a generic request for collaboration towards technical workshops, enhanced scientific communication and participation in RALACA technical committees on issues such as method validation.



Ms Maestroni delivering a lecture at the LAPRW.

Several posters were presented by project counterparts and former trainees at Seibersdorf, including “*Risk profile of pesticide residues in fruits and vegetables through the assessment of the national consumption and the main agricultural products exported by Costa Rica during the period 2011–2013*” by the Centro de Investigación en Contaminación Ambiental (CICA) in San José, Costa Rica (an IAEA Collaborating Centre), “*Relevant factors influencing chlorpyrifos environmental migration*” by the counterparts in LIBIQUIMA, University of Neuquén in Argentina; “*Pesticide coefficient distribution in soil and the potential mobility to water bodies, using isotopic techniques*” by the counterparts in CCHEN, Chile.

The information exchange at the workshop was extremely useful. A number of individuals who had previous or current interactions with FEPL through TCPs, CRPs, and RALACA or as participants in training workshops were present. The event provided an opportunity for mutual updating of information and maintenance and the extension of contact networks. The workshop provided an effective forum for creating awareness of the activities of the Joint FAO/IAEA Division in food safety and contaminant analysis, for keeping abreast of technical and regulatory developments, and for the interchange of information and ideas. There was considerable interest in the work of the IAEA in capacity building, including opportunities for potential collaboration with several partners. Participation in this workshop was of direct benefit to participating Member States and the work of FEPL.

First General Meeting of RALACA, Santiago, Chile, 11 May 2015

Technical Officer: Britt Maestroni

The “Red Analítica de Latino América y el Caribe” (RALACA) is a non-profit regional network of laboratories and associated institutions in Latin America and Caribbean countries that aims to enhance regional capabilities to target food safety and environmental sustainability⁵.

RALACA held its first general meeting on 11 May in Santiago, Chile, during the fifth Latin American Pesticide Residue Workshop. The meeting was attended by 80 participants. The TO had the honour of giving a presentation about the RALACA network and its work, on behalf of the RALACA board. This was followed by presentations from: Mr R. Palma, on the modus operandi of the biomonitoring committee, and; Mr H. Heinzen, on the RALACA bank of analytical standards. After these presentations the floor was opened for general discussion.



This meeting was an important milestone in the process of gaining further international recognition for RALACA. The work of RALACA was first presented at the fourth Latin American Pesticide Residue Workshop that took place in Bogotá, Colombia in May 2013. Several posters were then presented at the 2014 IUPAC meeting in San Francisco, California, and at the 2014 FAO/IAEA International Symposium on Food Safety and Quality: Applications of Nuclear and Related Techniques held in Vienna, Austria in November 2014. RALACA is planning to hold its second General Meeting at the sixth Latin American Pesticide Residue Workshop that will take place in 2017 in Costa Rica.

The objectives of RALACA are to strengthen the technical capabilities of the laboratories in the Latin America and Caribbean countries and to promote scientific cooperation among the laboratories and the Institutions.

RALACA is an independent virtual network that functions through the commitment of its members. The incorporation

of laboratories into RALACA is voluntary. Agreement to participate in any activity commits the laboratories and the institutions to comply with the relevant programme and to share relevant information that can enhance regional opportunities. RALACA offers the opportunity to work in a multidisciplinary context, where challenges are shared amongst dedicated committees and addressed collectively using expertise from multiple disciplines and experts. For example, through the RALACA, project participants are applying proven technical solutions and efficient information and communication technologies to allow countries with limited capacity to begin training, drawing upon regional capacity and facilitating the transfer of knowledge, experience and technology from well-established to less well established laboratories.

The RALACA organizational structure is made up of the Board, Committees and an Advisory Group and its work is implemented through a number of committees on the following topics:

- Analytics, Methods, Proficiency testing (APT)
- Bioassays (BS)
- Biomonitoring (BM)
- Calibrations and traceability (CT)
- Contaminants and Residues (CR)
- Emerging contaminants (EC)
- Food Irradiation (FI)
- Method Validation (MV)
- Modelling (MOD)
- Pesticide formulations (PF)
- Quality Assurance and Quality Control (QAQC)
- Research and Academia (RA)
- Risk assessment (RIA)
- Sampling (SA)
- Statistics, uncertainty (SU)
- Use of Nuclear Technology (NT)
- Water, Soil and Environment (WSE)

Each committees role is to provide information to all its members about congresses, training opportunities, links to publications and sources of information, novel developments in analytical work and instrumentation, new challenges in the area of interest of the committee, and to be a source of advice on specific issues.



The RALACA board: Ms A. Nario (CCHEN, Chile) 1st from left, Ms B. Maestroni, centre picture, (FAO-IAEA, Austria), Ms M. Loewy (LIBIQUIMA, Univ. Comahue, Argentina) and Ms E. Carazo (CICA, Univ. Costa Rica, Costa Rica). Mr R. Palma (second from left) is the secretary of the Biomonitoring Committee.

⁵<http://red-ralaca.net>

The committees have developed generic work plans for the biennium 2015–2016 which are now open for comments. For more information, contact the board at ralacaboard@gmail.com.

Currently RALACA invites analytical laboratories and associated institutions in the Latin America and Caribbean countries to join the network and also invites recognized analytical laboratories and associated institutions in other areas of the world to participate in the network's advisory group. The support of the private sector, donor and/or technical cooperation agencies is welcomed in generating viable research proposals for the region and addressing local challenges through an integrated and sustainable strategy.

The RALACA model is being used to create similar networks in other regions of the world, with the goal of forming a global network. The web site for RALACA is <http://red-ralaca.net>

FAO/IAEA Regional Workshop on 'Method Validation for Pesticide Residue Testing', Santiago, Chile, 6–8 May 2015

Technical Officer: Britt Maestroni

The FAO/IAEA Food and Environmental Protection Laboratory (FEPL) in collaboration with the Regional Office of the Food and Agricultural Organization (FAO) in Santiago, Chile, organized this workshop, which was attended by 41 analytical chemists from Argentina, Brazil, Chile, Colombia, Costa Rica, Guatemala, Panama, Paraguay, Peru and Uruguay. Training covered theoretical aspects related to the validation of analytical methods for pesticide residue testing including in house and collaborative trials approaches, statistics, quality assurance and control measures, uncertainty estimation, robustness testing, chromatographic detection by GC-MS/MS and LC-MS/MS, confirmation of residues, planning of experiments and data analysis. As part of the event, participants worked in teams and prepared presentations on calibration aspects, qualitative and quantitative confirmation of residues, and uncertainty and compliance to maximum residue limits.



Speakers at the opening ceremony of the training workshop.

The participants were satisfied with the training: 70% of them indicated that the scientific content of the workshop was excellent and 26% that it was good and had met their

objectives. The workshop resulted in an excellent opportunity to interchange experiences, methodologies and practical applications for method validation in pesticide residue testing. The group discussions helped to identify current issues and challenges and opportunities to improve the technical competence of analytical laboratories. An important result of the workshop was the presentation of open issues and challenges in method validation in the Latin American region. It is hoped that donor agencies can provide some help in the future to address such open issues and challenges. Participants in the workshop can access all of the presentations at the RALACA web site: <http://red-ralaca.net>.



Participants at the training workshop.

2015 Electron Beam Workshop, College Station, USA, 19–24 April 2015

Technical Officer: Carl M. Blackburn

Suresh Pillai and his team at the US National Center for Electron Beam Research (NCEBR)⁶, held the 2015 "Hands-on eBeam Workshop" in April.



Suresh Pillai (far right), Director of the National Center for Electron Beam Research with workshop participants, invited speakers and hosts.

It was reported that countries such as Peru and India, which both have gamma facilities, are poised to also adopt electron beam and X ray technologies to meet growing export demand for irradiated products. The USA market for irradiated fresh produce (especially mangoes and guavas) is expected to expand significantly because these products are now being sold by major USA retailers. The initial breakthrough came with the use of irradiation as a

⁶<http://ebeam.tamu.edu/>

phytosanitary measure against invasive insect pests from Asia. Countries in Latin America are now also irradiating fruits and exporting significant quantities. Regulatory approvals for several irradiation facilities located in the USA (including the NCEBR) mean that countries without the capacity to irradiate at home can access the US market by having their produce irradiated on arrival in the USA. Participants also considered the future of radiation processing and concluded that there is a need for small, modular, and expandable irradiation systems to meet specific market requirements.

The NCEBR is the IAEA Collaborating Centre for Electron Beam Technology for Food, Health and Environmental Applications and the IAEA sponsored three participants at the event in Texas A&M University, College Station, USA. It was attended by 16 participants from Bolivia, China, Mexico, Dominican Republic, Ecuador, India, Saudi Arabia, Taiwan, and USA. In addition to giving an overview of the technology, the event provided practical experience of radiation processing and dosimetry systems. Lecture sessions took place each morning with practical work in the afternoon at the electron beam facility.

Codex Committee on Residues of Veterinary Drugs in Foods, San Jose, Costa Rica, 27 April–1 May 2015

Technical Officer: James Sasanya

The Technical Officer (TO) attended the 22nd session of the Codex Committee on Residues of Veterinary Drugs in Foods (CCRVD) co-hosted by the Government of Costa Rica and the United States of America. The event was coordinated by the National Animal Health Services (SENASA) and National Veterinary Services Laboratory (LANASEVE) which underlines the need to continue supporting these institutions in the national and international food safety programmes.



The 22nd Session of the Joint FAO/IAEA Codex Committee on Residues of Veterinary Drugs in Food, co-hosted by the USA and Government of Costa Rica in San Jose, Costa, 27 April–1 May 2015.

The TO reported on the activities of the Joint FAO/IAEA Division and contributed to discussions on standards setting and better functioning of the committee. The TO

further met and held discussions with a number of delegations, either involved or interested in IAEA activities relevant to improving food and environmental safety, enhancing public health and enhancing international trade through the application of nuclear/isotopic techniques.

The CCRVD, through its Chairperson, thanked the Joint Division for the continued collaboration and for the relevant support to Member States. This was echoed by the delegation of Costa Rica, who also thanked the Joint Division and IAEA in general for the support in enhancing LANASEVE's capacity to test veterinary drug residues and related hazards.

Re-Designation; Centro de Investigación en Contaminación Ambiental (CICA) as an IAEA Collaborating Centre for eLearning and Accelerated Capacity Building for Food and Environmental Protection

Technical Officers: Britt Maestroni and James Sasanya

On 24 April 2015, Mr Sasanya visited the University of Costa Rica, to present a plaque denoting the re-designation of Centro de Investigación en Contaminación Ambiental (CICA) as an IAEA collaborating centre that supports e-Learning and accelerated capacity building for food and environmental protection among others⁷. The University Rector, Prof. Dr Henning Jensen Pennington sincerely appreciated the support from and collaboration with the IAEA over the years. He also thanked the Agency for the confidence in the University and promised to build on the good work done. In an interview with a University journalist, the TO highlighted the importance of a collaborating centre to Costa Rica, other Member States and the IAEA, as well as CICA's activities in general.⁸



The re-designation ceremony: Prof. Dr Henning Jensen Pennington, Rector, University of Costa Rica (centre); James Sasanya (2nd from left) Also present were the National Liaison Officer, Costa Rica, Mr Jorge Arturo Aguilar Castillo (far right), the Director CICA, Dr Manuel Jimenez Diaz (2nd from right) and his deputy Dr Elizabeth Carazo Rojas (far left). Photo courtesy of Mr Juan Chin (Costa Rica).

⁷<http://cica.ucr.ac.cr/?p=1340/>

⁸<http://www.rectoria.ucr.ac.cr/site/noticias/organismo-internacional-de-energia-atmica-confirma-al-cica-como-colaborador-regional/>

The CICA was originally designated as an IAEA Collaborating Centre in 2006, for a five period and this was renewed for the period 2011–2013. In December 2014, CICA was re-designated for an additional four year period. The CICA is an exemplary collaborating partner, it has participated in 14 Technical Cooperation Projects, one Coordinated Research Project, provided 18 expert missions to several countries, developed two distance learning courses on mass spectrometry, organized and hosted more than 85 technical workshops on food safety and quality, provided laboratory training to 16 fellows, worked with farmers and communities to address the social component of projects, and promoted the adoption of better practices in agriculture and the environment.

The work plan for 2014–2018 will further enhance the activities of FEPL by providing local expertise and coverage of topics that would otherwise be impossible within the regular FAO/IAEA programme.



The collaborating centre liaison officer, Ms B. Maestroni, FEPL (left) and Ms E. Carazo, CICA.

Codex Committee on Contaminants in Foods (CCCF), New Delhi, India, 16–20 March 2015

Technical Officer: James Sasanya

The technical officer (TO) represented the Joint Division at the ninth session of the CCCF. He reported on subprogramme activities, including capacity building projects and initiatives to establish networks of food control laboratories. He also highlighted the Joint Division's work in assisting Member Countries in their application of Codex standards, and developing standards and guidelines on maximum limits for cadmium and on radionuclides in foods (through the respective CCCF electronic working groups).

The committee was updated on the efforts of the IAEA in collaboration with the FAO and WHO to develop a technical document (TECDOC) entitled “*Guidance on Radionuclide Activity Concentrations for Food and Drinking Water*”. This TECDOC will provide an explanation of the different international standards relating to radionuclides in food and drinking water and the

circumstances in which they are intended to be used, with particular focus on existing exposure situations. It will emphasize that 1 mSv/year is the appropriate dose criteria for food and also for drinking water consumption (as specified in the IAEA Basic Safety Standards). The TECDOC will include a framework to help countries develop activity concentration levels (Bq/kg) for use at the national level which are consistent with the dose criteria. An equivalent approach to that used to calculate the Codex Guideline Levels (CODEX STAN 193-1995) will be used as the framework for calculating radionuclide reference levels (as activity concentrations, Bq/kg) for radioactivity in food in “normal” circumstances or well after an emergency has been declared ended should residual levels of radionuclides be present in food and the environment. The TECDOC will therefore encourage countries to develop national radionuclide reference levels that are applicable to food in general and are consistent with the Codex Guideline Levels that are applicable to radionuclides in food traded internationally.

The CCCF welcomed the Joint Division and IAEA contributions to its work in this area and recommended that the TECDOC be shared with committee members and other interest groups, as soon as it is available. This may inform deliberations at the next CCCF in early in 2016.



The UN works with NGOs in the International Food Standards Setting at Codex Meetings.

Training Course on ‘Innovative Technologies to Enhance the Traceability of the Food Chain’, Zaragoza, Spain, 25–27 March 2015

Technical Officer: Russell Frew

The Technical Officer (TO) was invited to lecture at a training course on ‘*Innovative technologies to enhance the traceability of the food chain*’ which was organized by the Centre International de Hautes Etudes Agronomiques Mediterraneennes (CIHEAM) of the Mediterranean Agronomic Institute of Zaragoza. The course had 34 delegates from 12 Member States (Albania, Algeria, Brazil,

Egypt, Italy, Lebanon, Morocco, Portugal, Senegal, Tunisia, Turkey and Spain).

The TO provided lectures on geochemical and complementary technologies, including the application of nuclear techniques for verifying the authenticity and origin of natural products including food, other geochemical techniques to verify the origin on food, and the role of complimentary techniques including metabolomics and spectroscopy in food traceability and authenticity systems.

He also led a debate in round table discussions on the topic 'Applicability of innovative techniques and future trends in the Mediterranean region'.

The training course was a great success, generating a great deal of interest and interaction with participants and an excellent opportunity to raise awareness of the benefits of nuclear technologies for food safety and traceability and also to promote the work of the IAEA in this field. In addition to the training opportunity, several strong contacts were made for future collaboration with key personnel from Akdeniz University, Antalya, Turkey, The Consumer Protection Directorate, Lebanon, and the Institut Senegaleais de Recherche Agricole, Senegal. Ms Marie Louise El Hayek, the programme implementation and coordination officer of FAO, Lebanon, was a course participant, and the opportunity was taken to apprise Ms El Hayek of the activities of the Joint FAO/IAEA division with respect to food safety and traceability.

Workshop on Phytosanitary Irradiation at Chapman University, Orange, CA, USA, 25–26 March 2015

Technical Officer: Yves Hénon

On 25 and 26 March 2015, the Food and Environmental Protection Section participated in the 5th Annual Opportunities in Phytosanitary Irradiation Workshop organized in Orange, California by the Chapman University and the US Department of Agriculture.



Workshop participants.

The workshop was attended by 80 people representing growers, retailers, shippers, importers and exporters, irradiation providers, regulators and academia from eight countries. The primary goal of this workshop was to increase awareness and understanding of irradiation as a phytosanitary treatment in order to facilitate the use of the technology in US fruit and vegetable export programmes. The information presented and the discussion among the audience and presenters allowed for an improved understanding of the global opportunities presented by phytosanitary irradiation. Details of the workshop including the agenda and links to the presentations can be found at <https://www.chapman.edu/food-irradiation-workshop>. There are plans to turn this annual event into an international meeting with the cooperation of IAEA.

In 2014, approximately 14,000 tons of fruit and vegetables, irradiated for phytosanitary purposes were imported into the US from five countries, the largest part coming from Mexico. In March 2015, the first shipment of irradiated Australian Calypso mangoes went from Brisbane to Los Angeles by air and was sold to Central Market, an upmarket supermarket chain in Texas. The fruit sold out in just five days from the nine Central Market stores with customers mostly buying two mangoes, attracted by the appealing yellow and red fruit as well as the distinctive Australian flavour.

The USDA is now encouraging US producers of fresh produce to use irradiation in order to conquer new foreign markets.

Second Annual Conference of the EU 7th Framework Project 'FoodIntegrity', Bilbao, Spain, 24–27 March 2015

Technical Officer: Andrew Cannavan

The Technical Officer (TO) is Head of the Food and Environmental Protection Laboratory (FEPL) participated in the second annual meeting and conference of the project '*FoodIntegrity – Assuring the integrity of the food chain*', which was hosted by AZTI Technalia in Bilbao, Spain.

The event comprised two days of work package meetings for the project consortium, a one-day conference open to pre-registered participants, and a series of parallel workshops on the final day. The FEPL is a research partner in the project and will receive funding over its four-year duration.

The TO participated in the meetings for work packages 1, 2 and 10 which relate to '*Food Integrity Network*'; '*Knowledge Base*', and; '*Industrial Integration*' respectively, and are the key areas in which FEPL is actively involved. The progress of each work package was discussed and evaluated and plans were revised and confirmed for future work. Project evaluators from the European Commission participated in each meeting. Break-

out discussion groups were also held to address specific issues within the overall work plan.

The TO also participated in all five sessions of the one-day conference, '*Food Integrity – Assuring the Integrity of the Food Chain*' and co-chaired Session 4, a discussion session on food integrity research priorities, and Session 5, a plenary session entitled '*Food Integrity – Next Steps*'.

The conference had 150 registered participants, and there were many additional potential registrants who could not be admitted. Discussion was lively and interesting.

On the final day the TO gave a presentation on information and technology transfer in the workshop, '*Formation of a Network of Excellence for Food Authenticity Analysis – Key Challenges*'.

Participation in the 'FoodIntegrity' project will lead to outcomes that are of direct benefit to IAEA Member States and in line with the Food and Environmental Protection subprogramme's objectives. Participation in the work package meetings, the conference and the workshops was extremely beneficial in consolidating and expanding collaboration and cooperation with other institutes, and the information and knowledge exchange was at the very apex of the science in this field of work.

FERA Science Conference, Sand Hutton, UK, 27 January 2015

Technical Officer: Andrew Cannavan

The Technical Officer (TO) is Head of the Food and Environmental Protection Laboratory (FEPL) and was invited to give a plenary talk at the UK's Food and Environmental Research Agency (FERA) Science Conference on the work of FEPL, focusing on current and future research and capacity building needs in food traceability and food authenticity.

FERA is an applied research agency with the vision to be the leading provider of science-based solutions, evidence and advice across the agri-food supply chain. The institute is a very important collaborator with IAEA and provides expertise in both research and capacity building for Agency projects, hosts TC fellowships, and coordinates extra-budgetary projects through which the Joint FAO/IAEA Division can receive funding. The aim of this one-day event, which included participants from FERA, campus partners, industry and UK Government, was to promote cross-disciplinary interaction by bringing together colleagues to share their knowledge and discuss the latest scientific trends. The programme comprised a plenary session, 24 short talks in parallel sessions, 12 posters, four Special Interest Group events, and some interactive table-top displays.

Mr Cannavan presented one of two plenary lectures. Entitled '*The Application of Chemical Measurement Techniques to Support Food Traceability and*

Authenticity'. The lecture introduced the general work of the Joint FAO/IAEA Division, then focused on stable isotope techniques, metabolomics and other techniques developed and applied in the Food and Environmental Protection Laboratory (FEPL) at Seibersdorf, and with CRP and EU project counterparts. The lecture prompted lively discussion, with several questions from the floor.

Following the plenary session, discussions were held with Dr Phil Newton, Science Director of FERA, and with several participants from FERA who wish to collaborate in future research work with FEPL in the fields of food authenticity using nuclear magnetic resonance, international development on food safety/plant health capacity building issues, control of invasive insects and food contaminant control. Discussions were also held with Mr Paul Brereton, the coordinator of an EU 7th Framework project, 'Food Integrity', under which FEPL receives funding as a research partner, and Dr Elena Fesenko, leader of one of the project's work packages to which FEPL contributes.

The invitation to present a plenary talk at the FERA Science Conference confirmed recognition of the importance of the FEPL's work in international research and capacity building, especially in the development and application of nuclear and related techniques to underpin food control systems, including food traceability, food authenticity and food contaminant control. The event provided an opportunity to consolidate current collaboration with this important partner, and to expand the areas of collaboration, with consequent potential benefits for IAEA Member States.

American Society for Mass Spectrometry (ASMS) Sanibel Conference, Florida, USA, 22–25 January 2015

Technical Officer: Russell Frew

The Technical Officer (TO) participated in the ASMS conference held in Sanibel, Florida, to present an invited paper on the role of nuclear techniques in food authentication and traceability, and on the activities of FEPL in particular.

The TO also engaged in discussion with international experts on the progress of CRP52038, 'Accessible Technologies for the Verification of Origin of Dairy Products as an Example Control System to Enhance Global Trade and Food Safety'. Discussions were held with Prof. Gabe Bowen (Utah) on the development of geospatial modelling approaches to the datasets being generated under D52038. Prof. Bowen has committed to assisting the CRP project holders with the implementation of such modelling. Discussions were also held with Prof. Jose Almirall and Ms Tricia Hoffman concerning progress on their work contributing to CRP D52038. In particular detailed analytical and sampling strategies were developed for

implementation in the coming year. Further discussions were held with Prof. Almirall on the concept for the planned CRP involving novel instrumentation. Prof. Almirall is enthusiastic to be involved and has offered his expertise as consultant and/or technical contract holder. Discussions were also held with Dr Libby Stern (FBI) on the need for databasing and opportunities for further interaction and collaboration between IAEA and FBI.

Attendance at international conferences is an essential component for a scientific organization. As well as the numerous intangible benefits that come from interaction with other experts, participation in the conference raised awareness of the role of nuclear techniques and work of IAEA in food and agriculture and garnered support for FEPL research activities.

Subsequent to the conference, the contacts made were used to support applications to the International Dairy Federation (Belgium) and the Dairy Research Institute (USA). Both these organizations have enthusiastically agreed to support the CRP by facilitating access to samples from diverse geographical locations.

First Scientific Committee Meeting for the EuroResidue VIII International Conference, Utrecht, The Netherlands, 16 January 2015

Technical Officer: Andrew Cannavan

The first meeting of the Scientific Committee for the EuroResidue VIII International Conference on Residues of Veterinary Drugs in Food. The EuroResidue conferences, held every four years, are amongst the most important meetings in the world on residues of veterinary drugs in food and the environment. The conference covers aspects such as analytical techniques, pharmacological and toxicological studies, and the registration and regulation of veterinary drugs.

The eighth in the series of EuroResidue conferences will be held in Egmond aan Zee, the Netherlands, in May 2016. Mr Cannavan, Head of the Food and Environmental Protection Laboratory, was invited to chair the Scientific Committee for EuroResidue VIII. A Scientific Committee comprising 20 individuals was preselected and invited to join the committee. The first meeting was attended by 12 of the committee members representing research institutes, regulatory laboratories, academia and industry. At the meeting, the central theme of the conference was elaborated, session titles drafted and potential keynote speakers identified.

The central theme of the control of residues of veterinary drugs in food is of great interest to many IAEA and FAO member nations – there are currently more than 20 IAEA TCPs and one CRP focusing on such contaminant control. Issues identified for discussion included the development

of antibiotic resistance, which may be connected to the use of antibiotics in food-animal production, and the increasing contribution of aquaculture products to the global food supply. These are areas in which FAO, and the Joint FAO/IAEA Division, play a leading role, and the Joint Division has recently commenced a CRP on the control of veterinary drug residues in aquaculture products.

The conference will be further developed through electronic working groups and meetings, with one more physical meeting before the event itself.

The invitation to chair the Scientific Committee for this prestigious event indicates the recognition in the scientific community of the important role played by the Joint FAO/IAEA Division, and by the Food and Environmental Protection subprogramme in particular, in the development of food control strategies and techniques globally. Participation as chair of the committee will facilitate focus on some of the issues important to IAEA and FAO member nations. As for past conferences in the series, it is expected that many TCP and CRP counterpart personnel will participate. Negotiations are under way with the financial board of the conference to agree on concessionary reduced or waived conference fees for developing country participants who are connected with IAEA projects.

Third Annual Meeting of the Global Food Safety Partnership, Cape Town, South Africa, 8–12 December 2014

Technical Officer: Andrew Cannavan

Mr Cannavan, Head of the Food and Environmental protection laboratory, participated in the meeting, representing the Joint FAO/IAEA Division in the GFSP's Technical Working Group on Food Safety.

The GFSP is a public private partnership dedicated to food safety capacity building. The main GFSP objective is to support improved food safety systems as demonstrated by enhanced agri-food value chains for economic growth and improved public health outcomes in developing and middle income countries. The GFSP approach is intended to fill a gap whereby food safety initiatives would be better coordinated and accessible to improve impact. Until recently, a variety of food safety capacity building programmes have been functioning independently, and at times duplicating each other. Knowledge developed through government, private sector, academic and donor programmes had not been shared widely, even though the need for this knowledge had been growing. While some initiatives had been developing similar capacity building materials, there were others that needed these materials and had limited or no access to them.

The third annual GFSP conference brought together approximately 150 participants from UN organizations, NGOs, the private sector and academia. The meeting

consisted of three days of working group and bilateral meetings and two days of open conference, with roundtable meetings and a food safety regional leadership dialogue event.

As a member of the Food Safety Technical Working Group (FSTWG), Mr Cannavan participated in all FSTWG sessions and bilateral sessions, as well as the final two days of round table discussions. He contributed to the meetings through various interventions and presentations, coordinated with FAO and WHO. The inputs of the Joint FAO/IAEA Division were presented, including important applications of nuclear and related techniques, web-based resources relevant to food safety (the Food and Environmental Protection subprogramme's FCRIS database - method databases to support the Codex Committees on Residues of Veterinary Drugs in Food and on Pesticide Residues, e-learning courses on laboratory procedures for food safety, and food irradiation databases), TCPs and CRPs in food safety, traceability and authenticity. Mr Cannavan also acted as rapporteur for a break out session aiming to identify the strengths and weaknesses of the GFSP, to enable the strengthening of the work plan for 2015 and beyond.



Mr Cannavan leading a discussion session at the GFSP meeting.

Individual and small group discussions were held with many meeting participants, resulting in potential collaborations and alliances of direct relevance to Joint Division projects, as well as synergies between GFSP and Joint Division activities.



GFSP Third Annual Meeting participants.

As a public-private partnership dedicated to collaboration for global food safety capacity building, GFSP has made significant progress during the last year. Despite difficulties in attracting private sector financial commitments to the Partnership's multi-donor trust fund, the Partnership has begun to deliver on its key goal: to serve as a platform where otherwise scattered food safety capacity building initiatives can be linked together for greater impact.

Throughout the year, the key question of interest to GFSP partners was whether the Partnership would focus mainly on its convening and facilitation role, or whether it would balance between this role and the implementation of selected key activities to advance the agenda of food safety as a global public good. There is now strong consensus and interest in the latter.

The outputs from the Joint FAO/IAEA Division are directly relevant to the GFSP. The experience gained from implementing IAEA TCPs and CRPs can be used to help make the GFSP projects more effective, and synergy between the Joint Divisions projects and those of the GFSP will be to the benefit of recipient countries and institutes, including IAEA TCP counterparts.

Coordinated Research Projects

CRP Reference Number	Ongoing CRPs	Scientific Secretary
D52037	Implementation of Nuclear Techniques to Improve Food Traceability	Frew, R. Cannavan, A.
D52038	Accessible Technologies for the Verification of Origin of Dairy Products as an Example Control System to Enhance Global Trade and Food Safety	Frew, R. Cannavan, A.
D61024	Development of New Applications of Machine Generated Food Irradiation Technologies	Blackburn, C.M. Hénon, Y.
D52039	Development and Strengthening of Radio-Analytical and Complimentary Techniques to Control Residues of Veterinary Drugs and Related Chemicals in Aquaculture Products	Sasanya, J.J.
CRP Reference Number	Closing CRPs	Scientific Secretary
D52036	Development of Radiometric and Allied Analytical Methods to Strengthen National Residue Control Programmes for Antibiotic and Anthelmintic Veterinary Drug Residues	Sasanya, J.J. Cannavan, A.
D62008	Development of Generic Irradiation Doses for Quarantine Treatments	Hénon, Y. Parker, A.G.
D62009	Development of Irradiated Foods for Immuno-compromised Patients and Other Potential Target Groups	Blackburn, C.M. Hénon, Y.
CRP at the Planning Stage	Working Title	Scientific Secretary
2156	The Use of Irradiation to Control Foodborne Parasites in Non-Animal Origin Foods such as Fruits And Vegetables	Blackburn, C.M. Hénon, Y.
2144	Nuclear Techniques and Novel Instrumentation for Low-Z isotope analysis in Food Products	Cannavan, A.

Research Coordination Meetings (RCMs)

As this newsletter was being produced, two RCMs were taking place at the IAEA Headquarters, Vienna, Austria and reports of these meetings will be provided in the next newsletter. The two meetings relate to CRPs D52039 and D62009 and were respectively the First RCM of the CRP on the *Development and Strengthening of Radio-Analytical and Complimentary Techniques to Control Residues of Veterinary Drugs and Related Chemicals in Aquaculture Products* and the final RCM of the CRP on the *Development of Irradiated Foods for Immuno-compromised Patients and Other Potential Target Groups*.

Technical Cooperation Field Projects

Country/Region	Project No.	Title	Technical Officer
Azerbaijan	AZB5001	Establishing a Spectrometry Laboratory at the State Metrology Service under the State Committee for Standardization, Metrology and Patents	Kis-Benedek, G. (NAEL) Blackburn, C.M.
Belize	BZE5007	Supporting Sustainable Capacity Building through Distance Learning for Laboratory Personnel of the National Agricultural Health Authority	Corley, J. S. Viljoen, G. J. Maestroni, B.M.
Benin	BEN5008	Establishing Enhanced Analytical Capability to Comply with International Standards for the Evaluation and Control of Veterinary Drug Residues in Food of Animal Origin	Sasanya, J.J.
Benin	BEN5009	Monitoring Safe Food Supply through Total Diet Studies and the Application of Nuclear and Complementary Analytical Techniques	Hénon, Y. Blackburn, C.M. Sasanya, J.J. Pitois, A.R.R. (NAEL)
Botswana	BOT5010	Enhancing Veterinary Drug Residue Monitoring Capabilities	Cannavan, A. Sasanya, J.J.
Central African Republic	CAF5007	Enhancing Laboratory Capacity to Control Chemical and Bacteriological Hazards in Foodstuffs of Animal Origin	Sasanya, J.J.
China	CPR5021	Facilitating the Application of Electron Beam for Food Irradiation	Hénon, Y. Blackburn, C.M.
Costa Rica	COS1007	Establishing Gamma Irradiation Capabilities at the Costa Rican Institute of Technology (ITCR) for the Use of Radiation Processing Technology	Hénon, Y. Blackburn, C.M.
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	Sasanya, J.J.
Ecuador	ECU5027	Improving Food Security and Environmental Sustainability by Monitoring Wetlands as Indicators of Good Agricultural Practice in Palm Oil Production	Maestroni, B.M. Corley, J. S.

Country/Region	Project No.	Title	Technical Officer
Ecuador	ECU5028	Consolidating Food Security and Environmental Sustainability in Palm Oil Production Using Nuclear Applications	Cannavan, A. Maestroni, B.M. Heng, L.K.
El Salvador	ELS7006	Building Capacities to Minimize Environmental Contamination and to Protect the Health of the Rural Population by Strengthening Research Capabilities and Laboratory Infrastructure	Maestroni, B.M.
Guatemala	GUA7004	Developing Capabilities to Evaluate the Transfer and Fate of Water Pollutants to Improve the Management of Major Basins and the Safety of Agricultural Products	Maestroni, B.M.
Malaysia	MAL5029	Applying Mutation Breeding and Optimized Soil, Nutrient and Water Management for Enhanced and Sustainable Rice Production	Nielen, S. Blackburn, C.M.
Mongolia	MON5019	Assessing and Enabling the Implementation of Food Irradiation Technologies	Sasanya, J.J. Cannavan, A.
Morocco	MOR1008	Developing Application and Implementation of Quality Management Protocols for Multipurpose Gamma Irradiation Facility	Hénon, Y. Sabharwal, S. (NAPC) Blackburn, C.M.
Morocco	MOR5033	Using Nuclear Techniques to Support the National Programme for the Generic Improvement of Annual and Perennial Plants and to Develop Agricultural Production	Hénon, Y. Sabharwal, S. (NAPC) Blackburn, C.M. Sarsu, F.
Morocco	MOR5034	Improving Veterinary Drug Residue Detection and Animal Disease Diagnosis with Nuclear and Molecular Techniques	Naletoski, I. Sasanya, J.J.
Namibia	NAM5013	Assessing the Spatial Distribution of Lead, Cadmium and Selected Pesticide Residues in Livestock Farming	Corley, J.S. Cannavan, A. Sasanya, J.J.
Niger	NER5017	Improving Onion Quality and Storage Life by means of Gamma Irradiation	Hénon, Y. Blackburn, C.M.
Oman	OMA5003	Strengthening National Capabilities in Food Safety and Food Traceability	Corley, J.S. Maestroni, B.M.
Pakistan	PAK5048	Strengthening Capabilities to Monitor and Control Veterinary Drug Residues in Foodstuffs	Sasanya, J.J.

Country/Region	Project No.	Title	Technical Officer
Panama	PAN5022	Determining Pesticides and Inorganic Pollutants in Vegetables and Studying the Adsorption and Migration Through Nuclear Technologies in Zones of High Pollution Incidents to Guarantee Safe Food for Consumers	Maestroni, B.M.
Paraguay	PAR5010	Strengthening the National Network of Laboratories Involved in Chemical Risk Analysis to Ensure Food Safety Through the Use of Nuclear and Complementary Non-Nuclear Techniques	Corley, J.S. Maestroni, B.M. Sasanya, J.J.
Qatar	QAT5004	Upgrading the Central Food Laboratory	Blackburn, C.M. Ceccatelli, A. (NAEL)
Sri Lanka	SRL1008	Providing Technical Support for Smooth, Safe and Sustained Operation of the Multipurpose Gamma Irradiation Facility	Hénon, Y. Sabharwal, S. (NAPC) Blackburn, C.M.
Sri Lanka	SRL5043	Supporting the Operation of a Gamma Irradiation Facility for Preservation of Food, Sterilization of Medical Products and Quarantine of Fruits	Hénon, Y. Blackburn, C.M. Sabharwal, S. (NAPC)
Sudan	SUD5035	Establishing a Laboratory for Monitoring Veterinary Drug Residues and Prohibited Substances in Livestock and Livestock Products through Application of Nuclear and Related Techniques to Protect Public Health	Sasanya, J.J. Cannavan, A.
Syria	SYR5023	Enhancing Analytical Capacities of Major Pesticide Residues	Maestroni, B.M. Corley, J.S.
Uganda	UGA5034	Strengthening National Capacity for Testing and Monitoring of Drug Residues in Animal Feeds and Animal Products	Sasanya, J.J.
Uruguay	URU5029	Implementing a System for Traceability and Authenticity to Ensure Food Safety of Cheeses and Wines	Frew, R.
Africa	RAF5067	Establishing a Food Safety Network through the Application of Nuclear and Related Technologies	Sasanya, J.J. Cannavan, A.
Asia	RAS5061	Supporting Food Irradiation Technology to Ensure the Safety and Quality of Meals for Immunocompromised Patients and Other Target Groups	Blackburn, C.M. Hénon, Y.

Country/Region	Project No.	Title	Technical Officer
Asia	RAS5062	Building Technological Capacity for Food Traceability and Food Safety Control Systems through the Use of Nuclear Analytical Techniques	Frew, R. Cannavan, A. Maestroni, B.M. Jandrić, Z.
Asia	RAS5071	Strengthening Adaptive Climate Change Strategies for Food Security through the Use of Food Irradiation (RCA)	Hénon, Y. Blackburn, C.M.
Asia	RAS7026	Supporting the Use of Receptor Binding Assay (RBA) to Reduce the Adverse Impacts of Harmful Algal Toxins on Seafood Safety	Cannavan, A. Dechraoui Bottein, M.Y.(NAEL)
Latin America	RLA5065	Improving Agricultural Production Systems Through Resource Use Efficiency (ARCAL CXXXVI)	Maestroni, B.M. Sakadevan, K.
Latin America	RLA5066	Increasing the Commercial Application of Electron Beam and X Ray Irradiation Processing of Food	Hénon, Y. Blackburn, C.M.
Latin America	RLA7019	Developing Indicators to Determine the Effect of Pesticides, Heavy Metals and Emerging Contaminants on Continental Aquatic Ecosystems Important to Agriculture and Agroindustry (ARCAL CXXXIX)	Maestroni, B.M. Vasileva-Veleva, E.T. (NAEL)

Highlights of Technical Cooperation Projects

Bahrain and the IAEA, Working Together in Food Safety and Security, Manama, Bahrain, 16–19 February 2015

Technical Officer: Johannes Corley

The Government of Bahrain has made food safety and security one of their high priorities in order to protect the health of its citizens. They have an active food safety programme in place overseen by the Directorate of Public Health. The Public Health Laboratories (PHL) which includes food safety monitoring is made up of a section overseeing pesticide residue monitoring, mycotoxin and heavy metal contamination testing, and analysis for microbial contamination. The Food and Environmental Protection Section is providing technical assistance and working with Bahrain via the TC project BAH2014004 which aims to enhance laboratory capacity and improve capabilities in residue and contaminant testing of food products using nuclear, isotopic and related techniques. In order to protect consumer health in Bahrain, the

cooperative efforts to assist the Bahrain PHL with their routine monitoring of foods for a wide range of pesticide residues, heavy metal contaminants both unbound and organically bound as well as monitoring sea foods for radionuclide contamination. The PHL would also like to pursue ISO 17025 accreditation and method certification in order to gain a broader acceptance of their analyses results globally.

The Technical Officer (TO) visited the PHL in Bahrain in order to evaluate current laboratory capabilities, develop the outputs, activities and inputs for the TC project on food safety and security and discuss areas of cooperation between the FEP and Bahrain. Bahrain's food safety testing laboratory is staffed with qualified and knowledgeable scientists and is in the process of modernizing its analytical instruments. The PHL currently conducts screening tests using immunoassays and LC-fluorescence detection. It is currently procuring a LC-MS/MS for pesticide residue and mycotoxin contamination analysis and the FEP's assistance in the development of analytical methods using nuclear and isotopic techniques was at the top of their priorities. Additionally, in heavy metal analysis of fish and seafood products, the PHL uses a single graphite furnace Atomic Absorption Spectrometer. A second AAS (Atomic

Absorption Spectrometer) is in procurement and an ICP-MS is being considered. Bahrain expressed a desire for upgrading its capabilities to be able to analyze and differentiate between organically bound and unbound heavy metal residues and training in that area was also planned for the project. Finally, Bahrain expressed interest in developing capacity for analysing fish and sea food commodities for radionuclide contamination.

The standards and metrology directorate of the Ministry of Industry and Commerce in Bahrain is responsible for developing / adopting food safety standards and maximum residue limits (MRLs). Bahrain currently follows standards set by the GCC countries and these standards needed to be updated on a regular basis. This was another potential area for cooperation between Bahrain and the FEP and also possibly involving the FAO. Both the counterpart and the standards and metrology directorate expressed keen interest in this area of the project and its importance to ensuring food safety in Bahrain.



Meeting in Bahrain with stakeholders in food safety.

Given the current level of commitment from the government of Bahrain and the Directorate of Public Health in ensuring the safety and security of Bahrain's food supply and the protection of the health of its citizens, the TC project BAH2014004 would have good potential for success and achieving the overall objective of protecting consumer health by ensuring the safety and quality of the food supply in Bahrain.

National Veterinary Services Laboratory of the National Animal Health Services, San José, Costa Rica, 22–24 April 2015

Technical Officer: James Sasanya

The technical officer (TO) undertook a mission to the National Veterinary Services Laboratory (LANASEVE) to provide technical guidance in support of national efforts to modernize the laboratory, meet international standards, protect consumers and enhance international trade in food stuff. Following a series of technical meetings, the cost-shared procurement of a much needed LC-MSMS has been initiated. Assistance to the Member States is through the Technical Cooperation Project COS5032 (2015–2016).

Enhancing Food Safety Programmes through Collaboration and Training with IAEA Support, Kampala, Uganda, 13–17 April 2015

Technical Officer: James Sasanya

This regional food safety training workshop was part of TC Project (RAF/5/067) and included 29 participants from 10 African countries (Algeria, Egypt, Botswana, Namibia, Tunisia, Ethiopia, Nigeria, Cameroon, Sudan and South Africa) and seven local institutions including the host, the Uganda Bureau of Standards (UNBS). In addition, stakeholders from the National Drug Authority, Dairy Development Authority, Makerere University, Uganda Industrial Research Institute and the Ministry of Agriculture Animal Industry and Fisheries as well as the Directorate of Government Analytical laboratory were also involved.



RAF/5/067 regional food safety training workshop at the Uganda National Bureau of Standards, Kampala; 13–17 April 2015.

The workshop was a successful event and encouraged the use of radio-analytical and complementary techniques in Africa and helped increase awareness among key stakeholders including the Heads of Ministries.



National media coverage of IAEA TC and Joint FAO/IAEA Workshop.

New Experimental Gamma Irradiator in Cartago, Costa Rica

Technical Officer: Yves Hénon

As part of the Technical Cooperation Project COS 1007, a self-shielded gamma irradiation unit was installed at the Technological Institute of Costa Rica in Cartago in early May 2015. The equipment, supplied by the Institute of Isotopes (Izotop) in Budapest, Hungary was installed in a dedicated building of the Institute. The irradiator, initially loaded with 12 kCi of cobalt-60, will be used for research in biomedical, biomaterials and agricultural applications.



The self-shielded gamma irradiator at the Technological Institute of Costa Rica.

IAEA Technical Cooperation: Food Safety Monitoring Programme, Port-au-Prince, Haiti, 5–8 May 2015

Technical Officer: Johannes Corley

Agriculture plays a dominant role in the Haitian economy, contributing over 25% of GDP, accounting for around 50% of overall employment, 66% of employment in rural areas and 75% of employment in low income households. Mangoes, coffee, cocoa and essential oils are important Haitian agricultural exports and bananas, rice, vegetables (tomatoes), beans, etc. have potential for export as well. The former are important exports to large markets in the USA, Canada, Mexico and EU. The latter commodities were discussed during meetings between the visiting IAEA team and the Haitian Ministries of Agriculture and of Commerce and Industry, and other agricultural experts who stressed that Haiti was looking to expand its potential markets to include the Bahamas and Jamaica as well as Venezuela. As per the Inter-American Development Bank (IADB), Haiti Agricultural Rural Development Report dated August 2011, Haitian agriculture has a high potential for growth and income generation, with an increasing

demand for agricultural products in the local market and clear opportunities for export. However, agricultural competitiveness in Haiti has been hampered by its inability to meet increasingly important food safety standards required by international markets (IADB report of August 2011).

The Government of Haiti has requested the IAEA's assistance in building a food safety monitoring programme using nuclear and isotopic techniques at the Laboratoire Vétérinaire et de Contrôle de Qualité des Aliments (LVCQAT) in Haiti and using nuclear and isotopic techniques to improve nutrient and water uptake efficiency in agriculture. A team from the IAEA, including Ms Geraldine Arias (TC), Mr Karuppan Sakadevan (Soil & Water Management and Crop Nutrition, SWMCN) and Mr Johannes Corley (FEP), visited Haiti to explore current capabilities and coordinate efforts between Haitian scientists, the IAEA and other international organizations assisting Haiti with food safety and agriculture projects.

Pesticides are widely used in Haitian agriculture to meet increased food demand. Although beneficial when used correctly, improper use can result in residues exceeding internationally accepted food safety standards, potentially posing health risks to humans and having harmful impacts on wildlife and the environment.

Although, the export of Haitian agricultural produce could significantly increase farmer income and hence contribute to an increase in GDP, the exportability of Haitian agricultural products is severely restricted by a lack of pesticide regulations, non-adherence to Good Agricultural Practices (GAP) in the areas of sanitation and pesticide use and, a non-existent food safety monitoring programme. Rigorous monitoring of food crops (both local and imported) for pesticide residues is necessary to ensure the safety of Haitian food products and their marketability internationally.



Rice Ready for Transplanting in the Artibonite Valley of Haiti.

The Government of Haiti has recognized the export potential for Haitian agricultural produce as well as the necessity for reducing Haiti's dependence on imported food. In meetings with the IAEA team, the Ministère de

l'Agriculture, des Ressources Naturelles et du Développement Rural (MARNDR) reinforced that it was the government's priority to:

- Create appropriate legislation to regulate and control pesticides and their uses in Haiti;
- Evaluate pesticide formulations currently;
- Build capacity within Haiti to monitor Haiti's agricultural produce using nuclear, isotopic and related techniques for compliance with international food safety standards.

MARNDR expressed strong support for establishing a food safety monitoring programme at the LVCQAT in Tamarinier. Separately, the Ministry of Trade and Industry indicated that they have a Haitian Standard for Quality and they were in the process of developing the parameters and standards. They expressed interest in using the LVCQAT as the monitoring laboratory for ensure compliance. In meetings with the Ministry of the Environment, they too expressed an urgent need for laboratory capabilities to enable them to monitor the environment (and samples such as water and soil).



Meeting between IAEA representatives, Haitian partners and other international organizations involved in food safety in Haiti.

As part of the IAEA mission to Haiti, we visited the LVCQAT in Tamarinier. The laboratory was currently equipped to perform a few microscopic pest identification tests and had ELISA equipment for mycotoxin screen tests. However, due to a complete destruction of infrastructure caused by the earthquake in 2010, major upgrades would be needed for the laboratory to perform routine pesticide monitoring analyses.

Several international organizations including the FAO, IADB, USDA-FAS and USDA-APHIS are involved in various aspects of food safety in Haiti. Among several food and agriculture priorities, the FAO is involved in developing relationships between Haiti and the Dominican Republic (DR). The two neighbours share similar pest problems and would do well to coordinate and collaborate. The DR has food testing laboratories (possibly ISO 17025 accredited) and it would be good for Haitian scientists to collaborate with DR labs as they develop their own food safety monitoring programme. This avenue would need to be pursued from the very early stages of the development of Haiti's food safety monitoring programme. The IADB

has an ongoing project to fund the Laboratory renovations at Tamarinier. The IAEA has discussed with the Haitians a potential expert mission in 2015 to evaluate the laboratories in Tamarinier in preparation for building capacity for a food safety monitoring programme. As the IAEA and the IADB have similar goals in laboratory renovation and upgrades, both organizations plan to collaborate, coordinate and share information related to capacity building at the LVCQAT. The USDA-FAS and APHIS are also assisting Haiti in various aspects of food safety. The USDA-FAS along with the FAO are assisting Haiti draft pesticide control legislation and APHIS expressed interest in working with Haiti and the LVCQAT to build capacity for authenticating pesticide formulations. Coordinating efforts between the IADB, FAO, USDA and the IAEA is paramount to success in assisting Haiti to improve the safety of their food supply and increase the global marketability of their agricultural produce. Establishing a successful food safety monitoring programme including the use of nuclear, isotopic and related techniques and building capacity to monitor Haitian agricultural produce for compliance with international food safety standards would be a major step towards increasing farmer income resulting in an increase in Haiti's GDP.

New TC Project: Irradiated Food for Special Target Groups, Bali, Indonesia, 24–28 November 2014

Technical Officer: Yves Hénon

The First Regional Coordination Meeting of TC Project RAS/5/061 'Food Irradiation Technology to Ensure the Safety and Quality of Meals for Immunocompromised Patients and Other Target Groups' was held in Bali, Indonesia with 14 participants from 12 countries.



Example of ethnic irradiated food distributed to people housed in emergency shelters due to a landslide in Indonesia.

Prof Dr Djarot Sulistio Wisnubroto, Chairman of BATAN, opened the meeting and presided over the one-day seminar for representatives of the Indonesian food industry.

This new project will make use of the knowledge and technical know-how acquired during the Coordinated Research Project D62009 "Development of Irradiated Food

for Immune-Compromised Patients and Other Target Groups” which has now been completed.

The planned activities include a regional seminar on irradiated food for security forces and national disaster management authorities (Chengdu, China, from 16 to 18 June 2015) and another one on irradiated food for immunocompromised patients (Bangkok, 2016). Information material including a dedicated website will be produced in order to increase awareness on the solutions that irradiation offers to solve some of the problems that exist to provide these special groups with safe, nutritious and convenient food.

Regional Training Course on Best Practices for Phytosanitary Irradiation, Manila, Philippines, 1–5 December 2014

Technical Officer: Yves Hénon

This regional training course was provided under the IAEA/RCA Project RAS/5/057 and hosted by the Philippine Nuclear Research Institute (PNRI). The course was attended by 23 participants from 16 RCA Member States and by representatives from the Department of Agriculture of the Philippines and USDA-APHIS.



Participants to the Regional Training Course in Manila.

Phytosanitary applications require a high level of confidence in the irradiation process. Consequently it is important to disseminate best practices among operators of irradiation facilities and to inform the regulators on the process and its critical points. The course was based on material then under development and to which all participants contributed: a Good Practice Manual and an e-Learning course.

Developments at the Food and Environmental Protection Laboratory

Hydrogen Isotope Ratio Analysis in Tea

Technical Officers: Russell Frew, Aiman Abraham, Yasmin Leithner

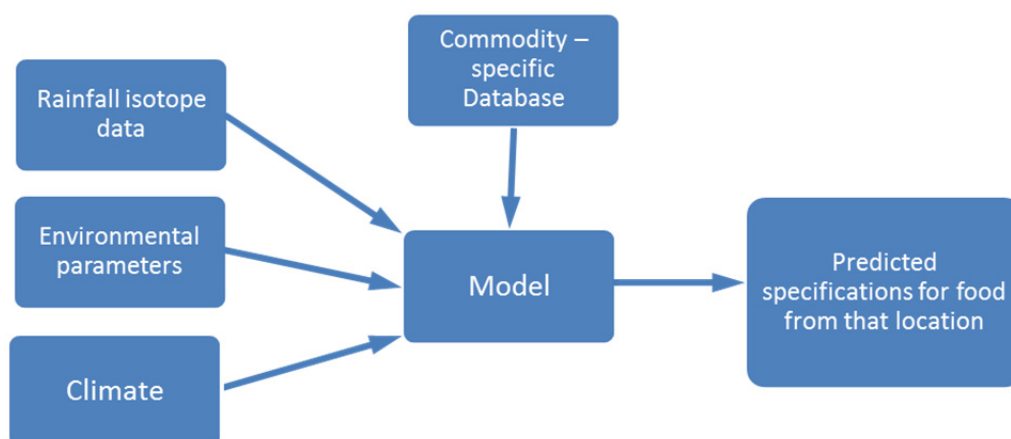
Verification of origin is an essential component of a food control system. Traceability refers to the ability to follow the movement of a food through specified stage(s) of production, processing and distribution. Origin refers to the point where the produce was harvested. The ability to independently verify food origin provides a necessary audit of the traceability.

There are numerous examples of the use of chemical analysis of food to determine its origin. These techniques rely on defining specifications for authentic food from measurements from a test sample set. Data from an unknown sample can be compared with these authentic data for consistency with expectations. This method can be very robust but tends to be slow and expensive to implement. Research at FEPL aims to make such verification technology more accessible to Member States through the development or adaptation of nuclear techniques for faster and cheaper response.



One approach is to reduce the reliance on data from authentic samples by making use of our understanding of how the environmental factors control the stable isotope ratios of the food product. There are many ‘drivers’ of isotopic composition, the best understood being the ratio of hydrogen isotopes in rainfall. The IAEA, through its Global Network of Isotopes in Precipitation (GNIP), has collected

a very large database of rainfall data that reveal consistent patterns in global distribution of isotope ratios of hydrogen (and oxygen). It has been found that these patterns are passed up through the food chain, and therefore measurements of isotope ratios furnish a direct link from the food product to its origin.



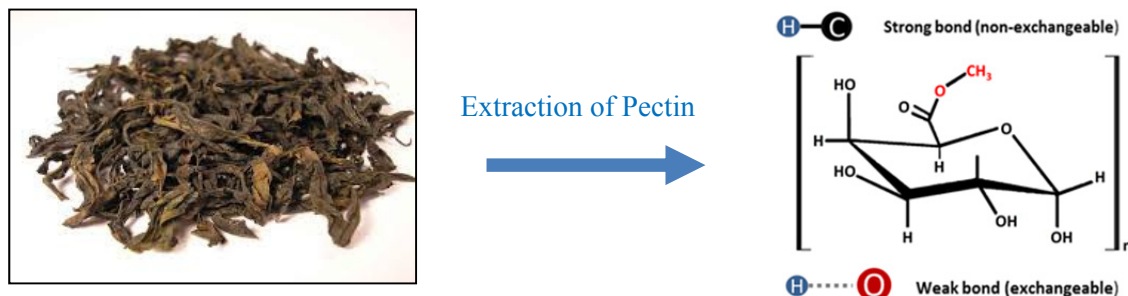
A complication that arises is that not all the hydrogen in food is equal. Hydrogen that is bound to carbon atoms is strongly held and incorporates the isotope signal from its origin. However, hydrogen bound to O or N atoms e.g. in carboxylic or amino acids, is weakly bound and can exchange with ambient water vapour over short timescales.

Therefore at least some of the hydrogen isotope signal measured will come from the water vapour encountered post-harvest, including in the laboratory.

Methods have been developed to account for this exchangeable portion but they require considerable skill

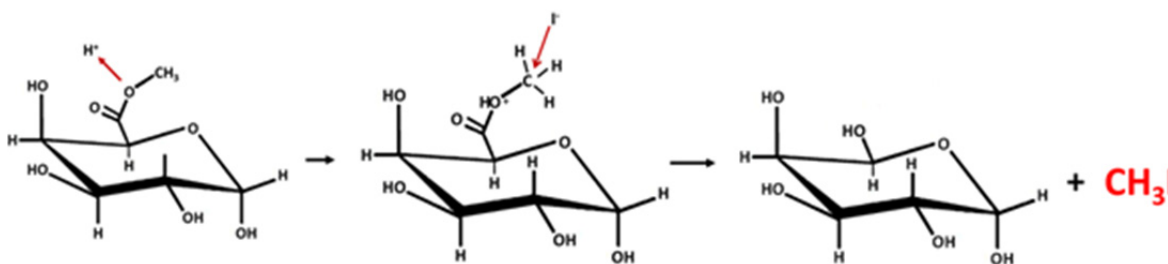
and specialized equipment to implement. FEPL has adapted a method that targets only non-exchangeable hydrogen by producing methyl iodide (CH_3I) from a nucleophilic substitution reaction with the methoxyl groups on pectin

extracted from the food. This is demonstrated in the schematic below where pectin is extracted from tea and reacted with hydro-iodic acid (HI) to form CH_3I .



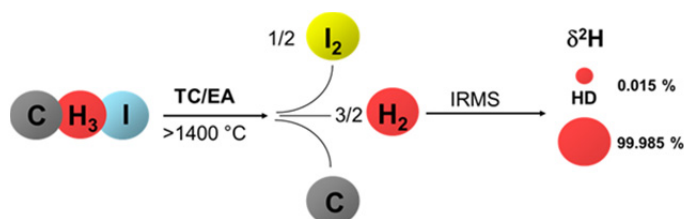
The pectin is dried overnight and then an aliquot (~50 mg) is weighed onto a 10 mL headspace vial and 2 mL of HI added.

The capped vial is heated for 30 min at 110°C to promote the $\text{S}_\text{N}2$ reaction and produce CH_3I .



The CH_3I is a gas and is injected into the carrier stream of an elemental analyser where it is pyrolysed to produce H_2

gas for isotopic analysis.



Initially the pyrolysis was conducted using a high-temperature system (TC/EA at 1400°C) and glassy carbon as the reductant. It was found that 5 g of tea provided 150 mg of pectin, enough for triplicate preparations of CH_3I . The reproducibility was comparable to conventional techniques with precision of 2‰ achieved from repeat injections from the same vial. Reproducibility between preparations of the same pectin was 3‰. The time taken for analysis was two hours for extraction, overnight drying in a freeze-dryer, 45 minutes for preparation of CH_3I and 10 minutes per sample for mass spectrometry. This compares well with the room temperature equilibration (10 days plus analysis time) and is similar to the steam equilibration process.

While these results are very encouraging the method still relies on a specialized high-temperature conversion system. Further experiments were conducted where we replaced the glassy carbon reactor with a quartz reactor filled with chromium powder. The use of Cr has several advantages: the cost per reactor is <10% of a glassy carbon reactor, the reduction to H_2 occurs at 935°C so is amenable to a standard elemental analyser, the I_2 by-product is trapped on the Cr so there is no need for further traps to purify the gas stream prior to admission to the mass spectrometer. The testing of the Cr system is still underway but initial results indicate better reproducibility than was achieved with the glassy carbon.

Laboratory Staff News

Ms Agneta Krukke joined the FEPL as an intern on 13 April 2015. Ms Krukke holds a MSc degree in Food Safety from the University of Natural Resources and Life Sciences, Vienna. After graduation, Ms Krukke started an internship at the Soil and Water Management and Crop Nutrition Laboratory of the Joint FAO/IAEA Division and worked for four months on soil and plant sample preparation for GC-IRMS analysis. Currently Ms Krukke works at the FEPL under the supervision of Ms B. Maestroni. Ms Krukke is being trained on a multiresidue method for analysis of pesticides in potato samples using gas chromatography coupled to tandem mass spectrometry (GC-MS/MS).



Agneta Krukke.

Ms Victoria Ochoa's internship ended on 31 March, 2015, after one year at FEPL under the supervision of Ms B. Maestroni and Mr Andrew Cannavan. Her work contributed to the development, adaptation and validation of nuclear and related techniques to improve food safety and environmental sustainability. Her responsibilities included performing laboratory tasks such as sample preparation and extraction for the analysis of pesticides in food and soil by gas chromatography coupled to mass spectrometry (GC-MSD), the use of radiotracers to estimate soil sorption parameters, analysis and interpretation of laboratory data and assisting in the preparation of scientific publications. She was involved in the preparation of training materials and laboratory practical sessions for a workshop on quality assurance and quality control procedures to ensure food quality and safety (Seibersdorf, November 2014). We wish Ms Ochoa every success in her future career.

Ms Yasmin Leithner's internship in FEPL also ended in March 2015. Yasmin joined the laboratory in July 2014. Her work included support in the development and application of analytical methods for food authenticity and traceability by stable isotope analysis, covering a range of food types. She contributed to the development of a number of methods, including methods for carbon and hydrogen isotopic analysis for the authenticity testing of food samples in connection with research partners in Sri Lanka and Pakistan, facilitating parallel research in those countries. She gained experience in various bench and instrumental techniques, including mass spectrometric techniques for stable isotope measurements and for food contaminant detection. After her internship, Yasmin returned to study, and we wish her all the best for her future career.



Yasmin Leithner (left) and Victoria Ochoa.

ReNuAL Update

January–June 2015

ReNuAL (Renovation of the Nuclear Applications Laboratories) is an initiative to modernize the eight laboratories of the IAEA's department of Nuclear Applications, five of which are joint FAO/IAEA laboratories including the Food and Environmental Protection Laboratory.

The ReNuAL project continues to make progress in 2015. The conceptual designs completed in November last year for the two new laboratory buildings to be constructed — the Flexible Modular Laboratory (FML), which will house the Joint FAO/IAEA Division's ***Food and Environmental Protection Laboratory*** and the ***Soil and Water Management & Crop Nutrition Laboratory*** in addition to the Terrestrial Environment Laboratory, and the new Insect Pest Control Laboratory — were reviewed by a panel of external experts in February this year. The experts concluded that the designs would successfully meet the future needs of the laboratories. The detailed design plans were accordingly initiated in March, with an expected completion date in August, so that the procurement of building construction can begin, pending the availability of funds.



Approximately €7.4 million in extrabudgetary resources have been raised to date. By September, when the IAEA's Programme and Budget for 2016–17 is expected to be approved by the General Conference with an additional €5 million in regular budget resources for ReNuAL, a total of €10.4 million in regular budget funds will have been allocated to the project. This will bring the total funds raised and allocated to nearly €18 million of the €31 million that is targeted to fund ReNuAL, with the remaining approximately €13 million to come from extrabudgetary sources. Additional extrabudgetary contributions are expected during the General Conference in September.

The funds available by September should be sufficient to construct the first of the two buildings and the new site infrastructure necessary to support these buildings. Procurement to begin construction of the infrastructure began in June, with work on site to begin in September. Once the final cost estimates are available in late August, a decision will be made to construct either the FML or IPCL, with the construction contract to start by the end of 2015. In the meantime, fundraising will continue and construction of the second building will begin as soon as the required funds are available.

Publications

2015

Sasanya, J.J. (2015). [Activities of the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture \(CX/RVDF 15/22/4-Add.1\)](#). Twenty-second Session of the Codex Committee on Residues of Veterinary Drugs in Foods, San José, Costa Rica, 27 April–1 May 2015.

Corley, J.S. (2015). [Activities of the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture \(CX/PR 15/47/4-Add.1\)](#). 47th Session of the Codex Committee on Pesticide Residues, Beijing, P.R. China, 13–18 April 2015.

Sasanya, J.J., Cannavan, A. and Blackburn C. M. (2015). [Activities of the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture \(CX/CF 15/9/4\)](#). 9th Session of the Codex Committee on Contaminants in Foods, New Delhi, India, 16–20 March 2015.

Jandrić, Z., Haughey, S.A., Frew, R.D., McComb, K., Galvin-King, P., Elliott, C.T. and Cannavan, A. (2015). Discrimination of honey of different floral origins by a combination of various chemical parameters. Food Chemistry, <http://dx.doi.org/10.1016/j.foodchem.2014.11.165>.

Holder, P.W., Frew, R. and Van Hale, R. (2015). The geographic origin of an intercepted biosecurity pest beetle assigned using hydrogen stable isotopes. Journal of Economic Entomology (DOI: 10.1093/jee/tou097)

Cannavan, A., Frew, R. and Jandrić, Z. (2015). The application of chemical measurement techniques to support food traceability and authenticity. Book of abstracts of the FERA Science Conference, Sand Hutton, UK, 27 January 2015, 2–3.

2014

Cannavan, A., Frew, R., Abraham, A. and Jandrić, Z. (2014). The application of chemical measurement techniques to support systems for food traceability and authenticity. Book of abstracts of the International Symposium on Food Safety and Quality: Applications of Nuclear and Related Techniques, Vienna, Austria, 10–13 November 2014, 117.

Jandrić, Z., Cannavan, A., Islam, M., and Singh, D. (2014). Authentication of Indian citrus fruit/fruit juices by untargeted and targeted metabolomics. Book of abstracts of the International Symposium on Food Safety and Quality: Applications of Nuclear and Related Techniques, Vienna, Austria, 10–13 November 2014, 121.

Jandrić, Z., Cannavan, A. and Frew, R. (2014). Metabolomics; an approach to control food authenticity.

Book of abstracts of the International Symposium on Food Safety and Quality: Applications of Nuclear and Related Techniques, Vienna, Austria, 10–13 November 2014, 122.

Maestroni, B., Ochoa, V. and Cannavan, A. (2014). The use of analyte protectants and matrix matched calibration in gas chromatographic analysis for pesticide residues in potatoes. Book of abstracts of the International Symposium on Food Safety and Quality: Applications of Nuclear and Related Techniques, Vienna, Austria, 10–13 November 2014, 156.

Maestroni, B., Ochoa, V., Rathor, N. and Cannavan, A. (2014). Validation of a gas chromatographic method for several pesticides in potatoes. Book of abstracts of the International Symposium on Food Safety and Quality: Applications of Nuclear and Related Techniques, Vienna, Austria, 10–13 November 2014, 157.

Maestroni, B., Ochoa, V., Rathor, N., Caceras, T. and Cannavan, A. (2014). Nuclear techniques applied to the generation of input data for first tier risk assessment. Book of abstracts of the International Symposium on Food Safety and Quality: Applications of Nuclear and Related Techniques, Vienna, Austria, 10–13 November 2014, 158.

Islam, M., Jandrić, Z., and Cannavan, A. (2014). A multiresidue method for the determination of antimicrobials in meat. Book of abstracts of the International Symposium on Food Safety and Quality: Applications of Nuclear and Related Techniques, Vienna, Austria, 10–13 November 2014, 171.

Frew, R. and Abraham, A. (2014). Stable isotope deltas – nature's own traceability system for verifying food authenticity. Book of abstracts of the International Symposium on Food Safety and Quality: Applications of Nuclear and Related Techniques, Vienna, Austria, 10–13 November 2014, 69.

Sutcliffe, O.B., Skellern, G.G., Araya, F., Cannavan, A., Sasanya, J.J., Dungu, B., van Gool, F., Munstermann S. and Mattioli, R.C. (2014). Animal trypanosomosis: making quality control of trypanocidal drugs possible. OIE Scientific and Technical Review, 33, 12092014-00040-EN, <http://www.oie.int/en/publications-and-documentation/scientific-and-technical-review-free-access/peer-reviewed-papers-for-the-plurithematic-review-2014/>.

Cannavan, A., Frew, R. and Jandrić, Z. (2014). Application of stable isotope measurements and metabolomics for traceability and authenticity of milk, fruit juices, and honey. Book of abstracts of the 248th American Chemical Society National Meeting and Exposition, San Francisco, USA, 10–13 August 2014, abstract no. 75.

Maestroni, B.M., Carazo, E., Nario, A., Loewy, M.R. and Cannavan, A. (2014). Integrated analytical approaches to assess indicators of the effectiveness of pesticide management practices at a catchment scale. Book of abstracts of the 248th American Chemical Society National Meeting and Exposition / 13th IUPAC International Congress of Pesticide Chemistry, San Francisco, USA, 10–13 August 2014, abstract no. 779.

Chin, J.S., Carazo, E.R., Aguilar, P.M., Nario, A., Parada, A.M., Videla, X., Vieira, E., Ferreira, R.C.B., Luchini, L.C., Loewy, M., Savini, M.C., Parolo, E., Maestroni, B.M., Cáceres, T. and Payes, J.E. (2014). Comparison of estimated Kd and Koc for pesticides using pure active ingredient and formulated product in soils from Latin America and Europe using radiometric techniques. Book of abstracts of the 248th American Chemical Society National Meeting and Exposition / 13th IUPAC International Congress of Pesticide Chemistry, San Francisco, USA, 10–13 August 2014, abstract no. 656.

Pillai S., Bogran, C. (Texas A&M University, USA) and Blackburn, C. (IAEA, Austria), Ionizing irradiation for phytosanitary applications and fresh produce safety; Pages 221-232 in Global Safety of Fresh Produce. A Handbook of Best Practice, Innovative Commercial Solutions and Case Studies, Jeffrey Hoorfar (Ed) , ISBN: 978-1-78242-018-7, Woodhead Publishing 2014.

Corley, J., Sasanya, J.J. and Cannavan, A. (2014). [Activities of the Joint FAO/IAEA Division of Nuclear Techniques In Food And Agriculture \(CX/PR 14/45/4\)](#). Forty Sixth Session of the Codex Committee on Pesticide Residues, Nanjing, China, 5–9 May 2014.

Sasanya, J.J., Blackburn, C. M. and Cannavan, A. 2015. [Final Report of the Fourth Research Coordination Meeting for the Coordinated Research Project on the Development of Radiometric and Allied Analytical Methods to Strengthen National Residue Control Programs for Antibiotic and Anthelmintic Veterinary Drug Residues](#), Natal, Brazil, 14–18 April 2014.

Jandrić, Z., Frew, R., McComb, K., Haughey, S., Elliott, C. and Cannavan A. (2014). Discrimination of honey of different floral origins by a combination of various chemical parameters. Book of abstracts of the 2nd Food Integrity & Traceability Conference, Belfast, UK, 8–10 April 2014, 57.

Sasanya, J.J., Cannavan, A. and Blackburn, C. M., (2014). [Activities of the Joint FAO/IAEA Division of Nuclear Techniques In Food And Agriculture \(CX/CF 14/8/4\)](#). Eighth Session of the Codex Committee on Contaminants in Foods, The Hague, Netherlands, 31 March–4 April 2014.

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