Joint FAO/IAEA Programme
Nuclear Techniques in Food and Agriculture

Food & Environmental Protection Newsletter

Vol. 14, No. 1 January 2011

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

ISSN 1020-6671

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To the Reader

The Food and Environmental Protection Subprogramme continues to strengthen our joint efforts with FAO and IAEA to protect human health and facilitate international agricultural trade by providing technical support and training for the development and application of international standards. These activities are primarily related to the use of ionizing radiation, the implementation of traceability systems and analytical techniques to control food contaminants and improve food safety and the management of nuclear and radiological emergencies affecting food and agriculture.

Specifically, in the area of food irradiation, we are pleased to report that the first research coordination meeting under our new Coordinated Research Project on Irradiated Foods for Immunocompromised Patients and other Potential Target Groups was recently held in Vienna from 23-27 August 2010. The activity was initiated on the basis of a project proposal developed by a consultants meeting held in Vienna in November 2009. This project will research and ultimately promote the application of food irradiation to increase the range and variety of foods available for those with impaired immune systems (e.g. neutropenic patients) or patients who require other special foods, e.g. blended (nasogastric) hospital diets. Please see the Feature Article of this Newsletter for additional details.

IAEA International Atomic Energy Agency

Other activities related to food irradiation include the hosting of several meetings under Asian regional technical cooperation project RAS/5/050 on Enhancing Sanitary and Phytosanitary Treatment of Regional Products for Export by Irradiation. Our most recent meeting, which convened in Daejeon, Republic of Korea, from 13–16 July 2010, was the first international meeting held at the newly built Advanced Radiation Technology Institute (ARTI) of the Korea Atomic Energy Research Institute (KAERI) international conference and training venue, which is part of the IAEA Collaborating Centre for eLearning and Accelerated Capacity Building for Food and Environmental Protection (EACB) led by the Centro de Investigación en Contaminación Ambiental of the University of Costa Rica. The main purpose of the meeting was to allow nuclear authorities and quarantine/plant-health authorities from participating Regional Asian Member States to review, revise and agree on guidelines for the audit and accreditation of food irradiation facilities that seek to irradiate produce as a phytosanitary measure.

In the area of traceability and food contamination control, the Subprogramme contributed to a number of international conferences and regional and national meetings and training events, including the Korean Society of Environmental Agriculture (KSAE) 30th Anniversary International Symposium on Management and Strategy on Sustainable Environment Leading to Food Safety, the 6th International Symposium on Hormone and Veterinary Drug Residue Analysis (Belgium), a decision makers' forum on The Role of the Analytical Laboratory in Food Safety (Panama), the 21st Annual International Conference of the International Environmetrics Society (Venezuela), and The World Mycotoxin Forum, 6th Conference on Mycotoxins, Plant Toxins and Marine Biotoxins (The Netherlands). A manual, prepared and edited in the Subprogramme, on Sampling Procedures to Detect Mycotoxins in Agricultural Commodities was also recently published by Springer.

The Subprogramme has also successfully continued its collaboration with the IAEA Environment Laboratory in Monaco under the Coordinated Research Project on Applications of Radiotracer and Radioassay Technologies to Seafood Safety Risk Analysis. In this regard, we presented an information document to the most recent 33rd Session of the Joint FAO/WHO Codex Alimentarius Commission (Geneva, Switzerland, 5–9 July 2010) that highlighted the consideration of research data arising from the Project at the 73rd Meeting of Joint FAO/WHO Expert Committee on Food Additives (June 2010) in order to establish international standards for maximum levels of cadmium in seafood (oysters, scallops and cephalopods) thorough Codex. This presentation also included a further summary of our activities related to food safety, including the control of food contaminants, particularly pesticide and veterinary drug residues, the use of ionizing radiation and the management of nuclear and radiological emergencies.

Other activities related to food contamination include our recently held Joint FAO/IAEA Regional Training Course on Linking Soil and Pesticide Behaviour at a Landscape Scale (Seibersdorf, 15–19 November 2010) under the Latin American and Caribbean regional technical cooperation project RLA/5/053 on Implementing a Diagnosis System to Assess the Impact of Pesticide Contamination in Food and Environmental Compartments at a Catchment Scale.

Within the context of FAO obligations related to food and agriculture as a full party to the IAEA Early Notification and Assistance Conventions, and in collaboration with our FAO colleagues in Rome, the 21st Regular Meeting of the Inter-Agency Committee on Radiological and Nuclear Emergencies (IACRNE) took place in Geneva, Switzerland from 16-17 June 2010. The World Health Organization hosted the meeting. FAO and the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture were represented by Mrs. Admira Mara, Operations Officer, FAO Food Chain Crisis – Emergency Management Unit, at the IACRNE Meeting. FAO regularly participates in the IAEA sponsored IACRNE meetings, whose purpose is to coordinate the arrangements of the relevant international intergovernmental organizations in preparing for and responding to nuclear and radiological emergencies, including their participation in international nuclear emergency exercises.

In closing, we all extend our warmest welcome to our new staff members, including interns Ms. Patcharin Jankong and Mr. Sorivan Chhem-Kieth, and team assistant Ms.Tamara Winberger, who recently joined the Food and Environmental Laboratory in Seibersdorf.

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

Sincerely,

David H. Byron

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Feature Article

Irradiated Foods for Immuno-Compromised Patients and other Potential Target Groups

Technical Officer: Carl Blackburn

Overview

Radiation processing technology has been employed in the past to completely sterilize foods for patients, but very few foods are currently irradiated specifically for this purpose and the application of this technology to provide safe food for patients and other similar target groups requiring a high margin of food safety is not utilized in most countries.

However, research projects and published papers indicate that low dose irradiation treatments (irradiation without complete sterilization of the food) could be used to provide foods that are suitable for hospital diets. Irradiation to sub-sterilization doses does not severely affect the foods nutritional quality and it retains its organoleptic qualities.

There are certain types of food which are generally excluded from specific groups of ill or recovering patients because these people may be particularly susceptible to infection from food borne organisms. Food irradiation has the potential to increase the range of foods available for hospital patients, particularly the immuno-compromised, and increase the variety of foods available to them. Not only is a varied diet important nutritionally, but also the feel-good-factor associated with an enjoyable meal should not be underestimated. Being allowed to consume food which is like the food you usually eat, or having food treats (enjoying ice cream and fresh fruit salad, for example) can do much to aid recovery and well being.

Immuno-Compromised Patients and Food Safety

Ensuring food safety is especially important for people who have impaired immune systems, such as those who are immuno-compromised by disease (e.g. neutropenic patients) or who have recently undergone medical treatments (e.g. organ transplant patients). Food is a potential source of infection and even organisms normally considered non-pathogenic may cause problems. Three safety levels of diet are generally recognised by healthcare professionals:

- Sterile diet.
- Clean diet (also referred to as a ‘low bacterial count diet’ or ‘neutropenic diet’).
- Normal diet prepared with common sense food hygiene.

Health care trends have moved away from stringent sterile diets towards clean diets where there are advantages in maintaining exposure to normal microbial flora, with the added advantage of having a greater dietary variety. The clean diet approach ensures good hygiene practices are observed and imposes restrictions on foods that are known to be unsafe. In this way, the risk of food borne illness, although not completely eliminated, is minimised to an acceptable degree.

Could there be a role for irradiated food?

Despite the potential for food irradiation to provide food that is sterile or clean, there is little evidence of its wide-scale use to provide food for patients or other potential target groups who require this level of food safety.

However, recent research undertaken within a previous IAEA coordinated research project on the use of irradiation to ensure the safety and quality of prepared meals (2002-2006) demonstrated that ionizing radiation, in combination with good manufacturing practices and refrigeration, greatly reduces the risk of food-borne diseases in a wide variety of foods, and results in both nutritional and psychological benefits for immuno-compromised patients. This was the first research carried out under an IAEA coordinated research project related to the use of food irradiation for immuno-compromised patients. It concluded that more research should be undertaken to widen the meal variety and to explain this method to the medical community, including patients, health institutes and catering services. Collaboration between food irradiation researchers and nutritionists was considered essential to ensure the acceptance of these irradiated foods and to advance regulatory initiatives relating to the use and commercialization of food irradiation for these purposes.

The commercial availability of these shelf-stable irradiated foods would also enable hospitals that do not have specialist catering facilities to provide clean diets. For example, a hospital or catering organization could supply packaged meals that have been prepared normally but have been irradiated in order to ensure the safety of a specific target group of patients.

Food Irradiation

Food irradiation is one of the few technologies which address both food quality and safety by virtue of its ability to control spoilage and food borne pathogenic micro-organisms without significantly affecting sensory or other organoleptic attributes of food products. Foods are irradiated to provide the same benefits as when they are processed by heat, refrigeration, freezing or treatment with chemicals, but irradiation has several advantages:

- It does not significantly raise food temperature and the food does not ‘cook’.
- Unlike chemical treatments, irradiation does not leave potentially harmful residues.

- It can be used to treat packaged food, which will remain safe and protected from microbial contamination after treatment.

After many years of research and the development of national and international standards, more than 60 countries have regulations allowing food irradiation of at least one product. Commercial food irradiation is normally applied in combination with other food processing technologies at radiation doses of less than 10 kilogray (kGy). This degree of irradiation destroys populations of microorganisms, including disease-carrying bacteria and spoilage organisms. The food is not completely sterilized, but the many-fold reduction in microorganisms helps prevent illnesses and also makes it possible to keep food longer. Using irradiation to completely sterilize food is unusual, but high-dose treatments above 10 kGy have been used to sterilize food for non-commercial applications, for example in space programmes where irradiated, shelf-stable food products are provided for astronauts.

Joint FAO/IAEA Activities

The Food and Environmental Protection (FEP) subprogramme of the Joint FAO/IAEA Programme of Nuclear Techniques in Food and Agriculture (NAFA) convened a consultants meeting at IAEA Headquarters in Vienna, Austria from 24–27 November 2009 in order to consider this application of irradiation technology. The purpose of the consultants meeting was to advise the FEP of NAFA on a proposal to initiate a coordinated research project entitled '*The Use of Irradiation for Shelf-Stable Sterile Foods for Immuno-Compromised Patients and other Specific Target Groups*'.

The consults were Jesusa Salvador, Chief Nutritionist and Dietician at the Philippines National Kidney and Transplant Institute, where clean diets are prescribed to immuno-compromised patients and people with impaired-immune function (e.g. organ transplant patients and patients with neutropenia1); Ju-won Lee of the Advanced Radiation Technology Institute (ARTI) of the Korea Atomic Energy Institute (KAERI) where activities include the development of irradiated foods for astronauts; Susy Sabato of the Institute of Energy and Nuclear Research (IPEN) in Brazil, where research has included several studies on physical, chemical and nutritional analysis of irradiated food, and sensory evaluations; Csilla Mohácsi-Farkas of the Corvinus University of Budapest, Central Food Research Institute in who has worked in collaboration with the National Institute of Food Safety and Nutrition of Hungary on radiation processing for safe, shelf-stable and ready-to-eat food and chilled packed meals, and; Suresh Pillai of Texas A&M University, USA National Center for Electron Beam Research (NCEBR), which is involved with both research and commercial activities and applications in food irradiation, including working on foods for the USA space programme.

The meeting considered that research in this area would be beneficial and recommended that the proposal for a coordinated research project should primarily concentrate on the sanitary aspects of foods for patients. It was recommended that the title of the coordinated research project should be revised to reflect this and have less emphasis on shelf-stability. For the project to be successful, it was strongly felt that the participants should investigate and develop irradiated foods in collaboration with other relevant partners, including medical doctors, nutritionists, healthcare/food industry specialists and relevant international organizations. The consultants considered some minimum requirements for those who apply to participate in the research project and recommended that participants should have access to, or be able to undertake radiation processing (using gamma, X-ray or electron beam irradiation), quantitative microbiological, nutritional and sensory testing, and qualitative psychological assessments.

The types of foods to be included for research were also discussed and considered and it was thought that the coordinated research project should take into consideration ethnic, local and regional foods and mainly investigate irradiated foods such as fresh produce, ready-to-eat meals and functional foods.

A report of this consultants meeting is available online[1], as is the coordinated research project proposal that was produced by the meeting and developed and agreed subsequently by the IAEA secretariat[2].

There was considerable interest in this new research project. Participants were recruited from a large number of applications and the first research coordination meeting of the new coordinated research project entitled 'The Development of Irradiated Foods for Immuno-Compromised Patients and other Specific Target Groups' was held at the IAEA Headquarters in Vienna, Austria from 23-27 August 2010 and 14 representatives from some 13 different countries attended[3].

This first research coordination meeting refined the participants work plans and the proposed activities to be undertaken during the course of the project, and helped to provide a better understanding of the project objectives, agree on a common research approach for moving forward, and promoted further research interactions between researchers.

The specific objective of this new coordinated research project is to research a range of simple irradiated foods and complex irradiated foods (ready prepared meals) with the overall objective to utilize irradiation technology to increase the variety, availability and acceptability of foods for immuno-compromised patients and other potential target groups with special dietary needs (for example, irradiated fresh produce such as fruits, vegetables and salads, and ethnic or locally produced ready-to-eat meals

1 http:/www-naweb.iaea.org/nafa/fep/crp/fep-irradiated-foods-for-ICP-CM.pdf

2 http:/www-naweb.iaea.org/nafa/fep/crp/fep-irradiated-foods-for-ICP-proposal.pdf

3 Participants attended from Argentina, Bangladesh, Brazil, China, Hungary, India, Indonesia, Pakistan, Philippines, Republic of the Republic of Korea, Tunisia, United Kingdom and USA.

and functional foods). The research will generate data on the acceptability of irradiated foods in terms of both quantitative factors (microbiological safety, nutritional and organoleptic properties) and qualitative properties (psychological well-being, quality of life).

The acceptance of irradiated foods by the healthcare and regulatory communities will increase the rate of development, marketing and commercialization of irradiated foods for hospital patients. It is envisaged that this project will also lead to the use of irradiated foods by other target groups (e.g. as rations during civil defence/emergency response activities, or outdoor activities, or in space programmes). A number of participants have made proposals to research the development of foods for emergency situations and recent applications to participate in the project are considering calamity victims as a specific target group.

Expected Project Outputs and Outcomes

Expected outputs for this research activity include data on microbiological, nutritional and organoleptic properties of irradiated foods for patients, the acceptability of irradiated foods for patients, hospitals, medical professionals and other potential target groups, and the use of ionizing radiation in combination with other food technologies such as Modified Atmosphere Packaging (MAP) or natural additives which act in synergy with irradiation to lessen the radiation dose required to achieve a defined level of food safety.

Written material will also be an output and publications are expected to provide research data on the applicability of food irradiation for medical diets; educational and informational material for healthcare specialists, consumers and other relevant stakeholders, and; an FAO/IAEA technical publication (IAEA-TECDOC) will be produced that will inform and can be used by the medical community and other relevant parties, including in the development of future IAEA Technical Cooperation projects.

It is expected that the information generated by this CRP will enable the socio-economic potential of irradiated foods for these target groups to be realized (i.e. the potential to market irradiated foods and for patients to benefit from availability of this food). The microbiological, nutritional and organoleptic information generated will be available to others and the developed technology transferred and employed to enable the production of specific food products for patients and others. These data and informational outputs will support the acceptance of irradiated food where it is found to be of benefit to hospitals, medical professionals, patients and other groups. This research will also help improve peoples general understanding of irradiation technology and could further the acceptance of irradiated foods by the general public.

Past Events

7th Meeting of the Working Group on Agriculture of Greater Mekong Sub-region (GMS) on Improved Food Safety and Traceability Systems in the Context of Regional Trade; Hanoi, Vietnam; 15-16 November 2010

Technical Officer: Josef Brodesser

The seventh Meeting of the Asian Development Bank (ADB), Working Group on Agriculture (WGA-7), Greater Mekong Sub-region (GMS), took place in Hanoi, Vietnam on 15 and 16 November 2010. The focus of the meeting was on Improved Food Safety and Traceability Systems in the Context of Regional Trade.

The Meeting of the WGA-7 was attended by approximately 50 participants from the countries of the Greater Mekong sub-region, i.e., Cambodia, southern China, Laos, Myanmar, Thailand, Vietnam, as well as by representatives of various national and international development partners, organizations, embassies, delegations, resource speakers and the private sector.

The meeting was organized and hosted by the Asian Development Bank (ADB). Building on the ADB Core Agriculture Support Program (CASP) (2006–2010), CASP Phase II (2011–2015) proposes new strategic directions to address emerging challenges to agricultural development, specifically those linked to expanding cross-border trade in agri-food products and climate change adaptation. Inputs from development partners mostly focused on extending and facilitating cross-border trade. For example, the representative of Microsoft Inc. presented a software platform for facilitating electronic pre-shipment notification as required by many developed countries from 2011. Further contributions focused on economic and environmental aspects and respective on-going activities in the GMS region. Progress reports since the last meeting were presented by the countries of the WGA and future perspectives for the further development of agriculture and food safety in the sub-region were discussed.

On behalf of IAEA a presentation was given outlining IAEA activities in the area of food safety and traceability. Current IAEA activities, embracing areas of all NAFA sections including the Food and Environmental Protection Subprogramme (FEP), were presented as well as future technical inputs that IAEA could provide in the context of ADB programmes. For IAEA as a technically oriented organization with its own laboratory capacities collaboration with ADB and its counterparts would fit in well when technical problems that need to be addressed and solutions involving the application of nuclear techniques would become a technically feasible and competitive option. Details were discussed and explanations giv-

en about respective IAEA activities and potential fields of cooperation. Future cooperation opportunities involving the FAO/IAEA Division and TC, ADB/WGA and the parties involved in these programmes were outlined.

The information provided through the presentation of IAEA activities raised awareness about the role and portfolio of the IAEA and the Joint FAO/IAEA Division in particular. Respective information provided about the Agency's involvement regarding food safety and traceability, pest management, plant breeding, soil/water management, animal health as well as utilizing TC projects and CRP approaches may, therefore, widen the scope for the IAEA to become involved more in depth in matters and areas covered by the Joint Division. In conjunction with the ADB and other development partners, the scope of activities may become extended in the future for intensifying inter-organizational cooperation and, above all, for the benefit and the development of the countries concerned.

Final Advisory Board - Top Management Group meeting of the EU 6th Framework Project 'BioCop'; Rome, Italy; 28-29 September 2010

Technical Officer: Andrew Cannavan

The final meeting of the Advisory Board and the Top Management Group of the EU 6th Framework Integrated Project 'New technologies to screen multiple chemical contaminants in foods' (BioCop) was held in Rome, Italy, 28-29 September 2010. The Food and Environmental Protection Laboratory (FEPL) Head participated in the meeting as a member of the Advisory Board.

The Biocop project focused on the development and implementation of new methods to monitor and control the occurrence of multiple chemical contaminants in foods through the use of advanced sample preparation techniques and emerging biotechnological and physico-chemical screening approaches, including novel applications of existing technologies. The objectives included method development and preliminary validation, training of scientists in the developed technologies, and the widespread dissemination of project results and associated information.

A wide range of techniques were developed or adapted in the project for application to the detection of food contaminants, utilizing technologies such as transcriptomics, proteomics, molecular immunology, microarrays, biosensor technology, bioinformatics, isotope dilution and mass spectrometry, resulting in a number of rapid tests that can detect many types of toxins in foods. The results include methods that are suitable for routine regulatory monitoring and also techniques that are more suited to upstream research applications to underpin food safety policy development.

Overviews of the achievements and problems encountered in each of the contaminants groups (veterinary drugs, pesticides, mycotoxins, marine toxins and heavy metals) were presented and discussed at the meeting. Presentations were also given on dissemination and training activities, which included awareness building modules for developing country scientists within train-the-trainers workshops held at the FAO/IAEA Training and Reference Centre for Food and Pesticide Control at Seibersdorf. In response to Advisory Board recommendations, training for 20 developing country scientists from 9 countries in South East Asia was also provided under BioCop in a training course held in Bangkok, Thailand.

The project was considered by the Advisory Board and the Top Management Group to be highly successful overall, with a number of advantageous methods likely to be adopted for regulatory laboratories, in both EU and non-EU countries, including IAEA and FAO member states.

The final session focused on the preparation of major conclusions and recommendations to be made to the EU DG Research, DG Sanco and other stakeholders, including Codex Alimentarius.

As a follow-up to the interactions within BioCop, discussions were held with Prof. Bruno Le Bizec, Director of LABERCA and the School for Advanced Residues Analysis in Food (SARAF), Nantes, France, on future collaboration between IAEA and SARAF in organizing one or more training courses in Latin America. It is expected that such training will be held under current regional ARCAL TC projects with additional extra-budgetary funding from SARAF and the Pasteur Institute.

The inclusion of an IAEA representative in an advisory capacity in this type of project helps to facilitate the effective transfer of the technologies developed to a wider customer base, including IAEA and FAO developing country member states that have no chance to undertake the primary research and development themselves. This adds value to the project outcomes through the enhancement of food safety both within and outside the EU, and through increased potential to meet the requirements for trade between developing countries and the major trading blocks of the developed world.

Participation in projects such as BioCop also creates opportunities for further interactions and collaboration with partner institutes to benefit IAEA member states, for example, the planned collaboration with SARAF in designing and implementing regional training courses in Latin America, with associated extra-budgetary funding.

Further information on the BioCop project is available at http:/www.biocop.org/.

19th Session of the Codex Committee on Residues of Veterinary Drugs in Foods (CCRVDF); Burlington, Vermont, USA; 30 August- 3 September 2010

Technical Officer: Rajendra Patel

The 19th Session of the Codex Committee on Residues of Veterinary Drugs in Foods (CCRVDF) was held from August 30–September 3 2010, in Burlington, Vermont, USA[4]. The session was attended by delegates from 56 Member countries and International Organisations including FAO, IAEA and WHO. It was chaired by Dr Steven Vaughn, Director of the Office of New Animal Drug Evaluation, United States Food and Drug Administration, Centre for Veterinary Medicine. The Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture was represented by Mr Alfredo Montes Nino. In his presentation to the committee, he highlighted activities of the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture of interest to the CCRVDF, including progress under the Coordinated Research Project (CRP) on Analytical Methods to strengthen National Residue Control Programs focusing on areas of priority and concern to developing countries. He made the committee aware of the findings of an IAEA supported study demonstrating the natural occurrence of chloramphenicol in plant material[5], the continuing work to investigate sources of natural antimicrobial compounds likely to impact the regulatory framework for veterinary drug residues and the initiation of a new CRP in recognition of the need for robust traceability systems to prove food authenticity and to control adulteration and other fraudulent practices. This will help laboratories in member states to establish robust analytical techniques to determine origin of food through the assessment of isotopic and elemental composition of foodstuffs.

CCRVDF was also made aware of the Joint FAO/IAEA support to developing countries through technical cooperation projects to provide support in establishing national and regional residues control laboratories and the continuing work is in association with FAO, the International Federation for Animal Health (IFAH) and UNIDO to address problems associated with the use of counterfeit and low quality veterinary pharmaceutical products by developing quality control/quality assurance protocols for trypanocidal and other veterinary drugs.

With reference to discussions concerning methods of analysis for residues of veterinary drugs in foods and to increase the capabilities of developing countries to identify and implement suitable methods in support of residue monitoring plans, the CCRVDF was informed that the Joint Division will include on its web pages protocols of methods developed and validated through its activities.

The CCRVDF also considered a project document for approval of new work to develop guidance on performance characteristics for multi-residues methods. On completion of this guidance it would be appended to the Guidelines for the Design and Implementation of National Regulatory Food Safety Assurance Programmes Associated with the Use of Veterinary Drugs in Food Producing Animals (CAC/GL 71-2009[6]). An electronic Working Group, led by the United Kingdom, has been established to prepare a draft of the appendix.

The Committee also considered a discussion paper prepared by the Electronic Group on Sampling of Aquatic Animal Products and agreed to circulate for comments a revised table (REP11/RVDF Appendix VII) on sampling plans for residue control for aquatic animal products and derived edible products of aquatic origin. An electronic Working Group, led by the United States, has been established to consider the comments received and make appropriate revisions to the table.

KSAE 30th Anniversary International Symposium 'Management and Strategy on Sustainable Environment Leading to Food Safety'; Busan, Republic of Korea; 8-9 July 2010

Technical Officer: Andrew Cannavan

The FEPL Head was invited to the Republic of Korea to present a lecture at the Korean Society of Environmental Agriculture's (KSAE) 30th Anniversary International Symposium 'Management and Strategy on Sustainable Environment Leading to Food Safety', 8-9 July, Busan, Republic of Korea. The trip also included a seminar presentation at the National Veterinary Research and Quarantine Service (NVRQS) Headquarters, Seoul, on the Food & Environmental Protection Subprogramme's approach to food safety and traceability, and a visit to the NVRQS facilities in Seoul and Busan to discuss current and possible future collaborative activities.

This visit to the Republic of Korea was at the invitation and expense of the NVRQS.

The first part of the visit (4-6 July) was spent in Ahn-Yang/Seoul. The FEPL Head visited the NVRQS headquarters with Dr. Jin-Wook Kwon, Head of the regional Laboratory Inspection Division office of NVRQS in Busan, and Dr. Linda Stolker, Head of the Veterinary Drug Residues Section of the RIKILT Institute for Food Safety in The Netherlands.

A meeting was held with Dr. Joo-Ho Lee, the Director General of the NVRQS and Dr. Seong-Wan Son, Director of the Residue Chemistry and Toxicology Division.

4 www.codexalimentarius.net/download/report/761/REP11_RVe.pdf

5 Berendsen, Bjorn, Stolker, Linda, de Jong, Jacob, Nielen, Michel, Tserendorj, Enkhtuya, Sodnomdarjaa, Ruuragchas, Cannavan, Andrew and Elliott, Christopher. Evidence of natural occurrence of the banned antibiotic chloramphenicol in herbs and grass. Analytical and Bioanalytical Chemistry, April 2010, http:/dx.doi.org/10.1007/s00216-010-3724-6.

6 http:/www.codexalimentarius.net/download/standards/11252/CXG_071e.pdf

Previous, ongoing and possible future interactions with IAEA were discussed, including the results of a previous CRP (D3.20.22), the current CRP mentioned above, and various interactions through IAEA train-the trainers and policy-makers workshops. Dr. Son was a participant in an IAEA policy-makers workshop on strengthening capacities for implementing Codex Standards in Vienna in 2003, and affirmed that the workshop had several direct outcomes, including collaboration between NVRQS and the State Central Veterinary Laboratory in Mongolia (being assisted under TCP MON/5/012), enhanced interaction with the Codex Alimentarius Committees, and enhanced networking with institutes in other countries. It was also reported that participation in CRP D3.20.22 helped the NVRQS achieve laboratory accreditation under the ISO 17025 standard for a number of analytical methods. Dr. Kwon also participated in a train-the-trainers workshop in Seibersdorf in 2008, and reported that the information gained was used in designing and upgrading/developing the regional NVRQS laboratory and associated services in Busan.

Various departments and laboratories of the NVRQS were visited, including the Department of Sanitation and Quarantine, Residue Chemistry and Toxicology Division, Department of Livestock Products Safety and Inspection and the Avian Disease Division. Dr. Byung-Hoon Cho, who is now Head of the NVRQS veterinary drug residues laboratory, participated in an IAEA regional (East Asia & the Pacific) training course on veterinary drug residues methodology held in Australia in 2004, and reported that the course was critical in developing the NVRQS drug residues laboratory to its current high standard. Several standard operating procedures and methods based on those used in the training are in use in the laboratory.

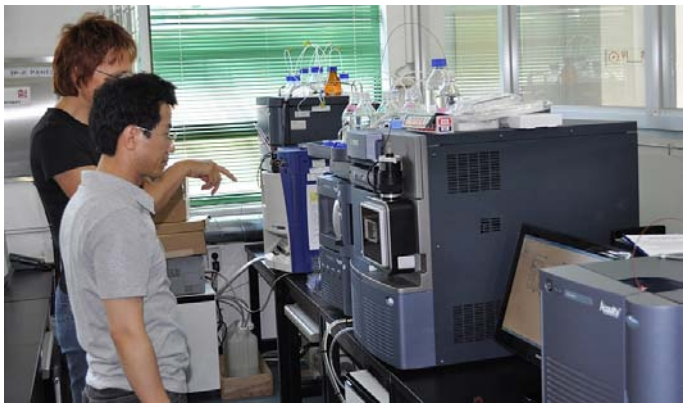
On the afternoon of Tuesday 6 July, Dr. Stolker and the FEPL Head presented a seminar on the activities and approaches to food safety of the RIKILT Institute and the Food and Environmental Protection Subprogramme of the FAO/IAEA Joint Division. The seminar was attended by approximately 35 members of staff of the NVRQS and neighbouring institutes, including the plant quarantine service. Although NVRQS staff members were generally aware of the activities of IAEA in food and agriculture, participants from some other institutes were less aware of this aspect of the IAEA's work and were interested in the programmes and how to become involved.

On Wednesday, we travelled to Busan and visited the regional NVRQS laboratory and the quarantine facilities for livestock and livestock products entering the Republic of Korea. Technical issues were discussed with the staff of the veterinary drug residues, pesticide residues, microbiology and toxicology laboratories. Dr. Kwon demonstrated the extraction system for his instrumental laboratories, which was designed based on his experience in the IAEA train-the-trainers workshop in the Food and Environmental Protection Laboratory at Seibersdorf.

The KSAE 30th Anniversary International Symposium 'Management and Strategy on Sustainable Environment Leading to Food Safety' took place on 8-9 July. The symposium had approximately 200 participants, mainly from East Asia, and included parallel sessions on food safety and the environment. In the food safety session, the FEPL Head gave the first invited lecture entitled 'Food safety, integrity and traceability', which focused on the Food & Environmental Protection Subprogramme's strategy and activities in promoting holistic food safety systems which are integrated with environmental sustainability. The essential and overarching aspect of traceability for the development and maintenance of effective food safety systems was stressed, and the comparative advantages of nuclear techniques employing stable isotope measurements and the use of radiotracers were highlighted. The main points of the presentation tied in closely with those of the plenary lecture, 'Preservation of agricultural environment and food safety', presented by Prof. Kyu-Seung Lee, of Chungnam National University, the Republic of Korea. The IAEA's focus on traceability was perceived as highly pertinent, since the Republic of Korea has invested heavily in paper-trail traceability over the past 4 years, but has as yet no technical or analytical capacity in place to verify and support the traceability systems.

Discussions on both policy and technical issues took place between symposium sessions with delegates from the Republic of Korea, Japan, New Zealand, Egypt, Canada and the USA

The visit to NVRQS was very useful for several reasons. Tangible outcomes resulting from the participation of several staff members of the institute in IAEA training courses, workshops and CRPs were evident, including the design of some of the laboratories, methodology used, and maintenance of ISO 17025 accreditation for various methods. The Director General of the institute and the Director of the Residue Chemistry and Toxicology Division were appreciative of the IAEA's inputs, and were interested in collaborating in the design and implementation of further training activities for laboratory personnel from countries in East Asia, as well as future CRPs.



Drs. Jin-Wook Kwon and Linda Stolker in the NVRQS Laboratory, Busan

Participation in the KSAE symposium was also useful, providing an excellent opportunity for outreach and promotion of the IAEA's activities and the use of nuclear techniques in food safety and environmental sustainability. Again, the focus on traceability as an overarching aspect of the production of safe food, and the need for verification of traceability systems, were appreciated and there was considerable interest in the IAEA's future research and capacity building programmes in this field.

33rd Session of the Joint FAO/WHO Codex Alimentarius Commission; Geneva, Switzerland; 5 - 9 July 2010

Technical Officer: David H. Byron

The technical officer represented IAEA and the Joint Division at the 33rd Session of the Joint FAO/WHO Codex Alimentarius Commission (Geneva, Switzerland, 5–9 July 2010) to report on matters arising from the Food and Environmental Subprogramme of interest to Codex. The Session was attended by 471 delegates from 120 member countries and 1 member organization, and 37 international governmental and non-governmental organizations, including UN agencies.

In addition to the activities of the Joint FAO/IAEA Programme presented under document CAC/33 INF/7 (Report on Activities of the International Atomic Energy Agency Relevant to Codex Work, see ftp:/ftp.fao.org/codex/CAC/CAC33/if33_07e.pdf), the Reporting Officer also presented a statement on activities of the Food and Environmental Protection subprogramme related to food safety, including the control of food contaminants, particularly pesticide and veterinary drug residues, the use of ionizing radiation and the management of nuclear and radiological emergencies.

In this regard, it was reported that the IAEA had recently commenced coordinated research activities through the execution of two new Coordinated Research Projects on the Implementation of Nuclear Techniques to Improve Food Traceability and on the Development of Irradiated Foods for Immunocompromised Patients and Other Potential Target Groups. It was reported that these projects were in addition to the ongoing IAEA Coordinated Research Projects on the Development of Radiometric and Allied Analytical Methods to Strengthen National Residue Control Programs for Antibiotic and Anthelmintic Veterinary Drug Residues and on Applications of Radiotracer and Radioassay Technologies to Seafood Safety Risk Analysis.

In the latter Project, it was noted that the IAEA submitted an information document to the most recent 4th Session of the Codex Committee on Contaminants in Foods (April 2010) that highlighted the consideration of research data arising from the Project at the 73rd Meeting of Joint FAO/WHO Expert Committee on Food Additives (June 2010) in order to establish international standards for maximum levels of cadmium in seafood (oysters, scallops and cephalopods) thorough Codex.

The reporting officer also offered its continued cooperation with the Codex Committees on Pesticide Residues and on Veterinary Drug Residues in Foods on issues related to methods of analysis and sampling for contaminants, including the inclusion of analytical methods developed by the IAEA in the Food and Environmental Protection subprogramme webpages.

In relation to the control of veterinary drug residues in foods, it was noted that an ongoing joint project with the FAO Animal Health Service and the International Federation for Animal Health was examining the development of standards and protocols for the quality control of trypanocidal drugs used in animal production.

The Commission expressed its thanks to the Representative of the IAEA for the useful information provided at the present session and their continued cooperation with the Codex Alimentarius Commission in the future.

In view of ongoing work of the IAEA directly related to activities of the Codex Alimentarius Commission, an IAEA representative will attend the next 34th Session (Geneva, Switzerland, 4-9 July 2011) of the Joint FAO/WHO Codex Alimentarius Commission to present a progress report on these and other IAEA initiatives. The IAEA information document will also further explain the contribution and relationship between our relevant activities, including coordinated research projects, laboratory research and development and training, in order to provide a better understanding of how IAEA and Codex interact and compliment each others work in the development of international food standards.

28th Meeting of the Radiation Safety Standards Committee (RASSC); IAEA Headquarters; Vienna, Austria; 21-24 June 2010

Technical Officer: David H. Byron

The Radiation Safety Standards Committee (RASSC) is a standing body of senior experts in radiation safety, established by the IAEA Deputy Director General of the Department of Nuclear Safety and Security. RASSC advises the Deputy Director General on the overall programme for the development, review and revision of standards relating to radiation safety. Its objective is to achieve consensus, quality, coherence and consistency in the development of international standards for radiation safety.

The functions of RASSC are:

- To advise on the approach to the development of the radiation safety standards issued in the IAEA Safety Standards Series, covering Safety Fundamentals, Safety Requirements and Safety Guides, both thematic and practice specific, and to advise on priorities.

- To review proposals for the development of new standards relating to radiation safety and to approve the relevant document preparation profiles (DPPs) prior to their submission to the Commission on IAEA Safety Standards.
- To review draft radiation safety standards, considering, throughout the preparation and review process, the value of each draft standard and the needs of users of the standards.
- To approve the text of draft radiation safety standards prior to their submission to Member States for comment and again prior to their submission to the Commission, in accordance with the established procedure.
- To ensure a broad international input in the preparation and review of radiation safety standards.
- To advise on radiation safety standards, relevant regulatory issues and activities for supporting the use and application of IAEA Safety Standards.
- To advise on the timely review of and the need for revision of published safety standards.

Specialized international organizations and relevant non-governmental bodies may be invited by the IAEA Deputy Director General to attend the RASSC meetings and in this regard, the reporting officer represented FAO at the most recent 28th Meeting of the RASSC. The reporting officer noted that the Food and Agriculture Organization of the United Nations (FAO) has statutory functions, within its constitutional mandate to monitor and evaluate the world food security situation, that are relevant in preparing for, responding to, and providing assistance in the event of a nuclear or radiological emergency. These statutory functions are implemented in the context of FAO obligations as a full party to the international Conventions on *Early Notification of a Nuclear Accident* and on *Assistance in the Case of a Nuclear Accident or Radiological Emergency*. Specifically, the FAO is mandated to provide prompt notification and technical assistance in the event of nuclear or radiological emergency affecting food and agriculture, which includes the application of agricultural countermeasures to alleviate adverse affects arising from these events.

In this regard, the reporting officer indicated that subsequent to the 27th Meeting of the Radiation Safety Standards Committee in November 2009, the FAO successfully finalized its contributions to the publication of the revised 2010 version of the Joint Radiation Emergency Management Plan of the International Organizations (EPR JPLAN 2010), which became effective on 1 January 2010. The FAO is a full party and co-sponsor of the JPLAN, which provides the management tools for coordinating international organization arrangements in preparing for, and responding to, nuclear or radiological emergencies. This activity was undertaken in the context of FAO membership in the Interagency Committee on Radiological and Nuclear Emergencies (IACRNE), whose purpose is to coordinate international organization arrangements in preparing for and responding to nuclear or radiological emergencies, including in the application of the newly revised 2010 edition of the Joint Plan.

In view of FAO responsibilities under the JPLAN which stipulate that detailed inter-agency procedures should be maintained by the participating organizations, we also reported that we expect to publish the most recent revision of the *Cooperative Arrangements between FAO and IAEA in Response to Nuclear or Radiological Emergencies* in early 2011. The objective of the Cooperative Arrangements is to define coordinated actions between FAO and IAEA in response to nuclear or radiological emergencies affecting food and agriculture and to ensure that interagency procedures and communication channels are established and maintained. The Cooperative Arrangements describe the basic response actions to be taken by FAO and IAEA in the case of a nuclear or radiological emergency affecting food and agriculture as related to communication and information exchange, the provision of technical advice and/or assistance, and the dissemination of public information.

The FAO representative also participated in RASSC discussions concerning the review and revision of the International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources (BSS) as a cosponsoring organization, particularly in regard to the development of emergency preparedness and response procedures for nuclear and radiological emergencies affecting food and agriculture. The FAO has been intimately involved since 2006 with the Inter-Agency Secretariat to Coordinate the Revision of the Basic Safety Standards (BSS Secretariat), which is the body responsible for coordinating the revision of the Basic Safety Standards. It is anticipated that the FAO will further contribute to discussions and revisions to the BSS during the next 29th Meeting of RASSC in Vienna from 7–10 December 2010.

The subprogramme looks forward to its continued collaboration with the RASSC and the BSS Secretariat in the ongoing revision of the International Basic Safety Standards and in assisting governments to effectively respond to nuclear and radiological emergencies through the provision of training and support and the development, coordination and implementation of standards, management procedures and emergency preparedness and response mechanisms related to food and agriculture.

21st Meeting of the Inter-Agency Committee on Radiological and Nuclear Emergencies (WHO Headquarters; Geneva, Switzerland; 16–17 June 2010)

Technical Officer: David H. Byron

The 21st Regular Meeting of the Inter-Agency Committee on Radiological and Nuclear Emergencies (IACRNE)

took place in Geneva, Switzerland from 16–17 June 2010 at the invitation of the International Atomic Energy Agency. The World Health Organization hosted the meeting.

FAO and the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture were represented by Mrs. Admira Mara, Operations Officer, FAO Food Chain Crisis – Emergency Management Unit, at the IACRNE Meeting.

FAO regularly participates in the IAEA sponsored IACRNE meetings, whose purpose is to coordinate the arrangements of the relevant international intergovernmental organizations in preparing for and responding to nuclear and radiological emergencies, including their participation in international nuclear emergency exercises.

Representatives of seven IACRNE members participated at the meeting (EC, FAO, IAEA, Interpol, OECD/NEA, WHO, WMO). In addition, six representatives from the WHO and five from IAEA, CTITF, NATO-EADRCC, NCACG and UNDSS attended the meeting as observers.

The Reporting Officer made a presentation on FAO activities related to preparedness and response to nuclear and radiological emergencies affecting food and agriculture, including the mandate of the newly established Food Chain Crisis - Emergencies Management Unit (FCC-EMU) of the FAO Emergency Operations and Rehabilitation Division (TCE) and the mandates of FAO and the Joint FAO/IAEA Division on Nuclear Techniques in Food and Agriculture. These FAO responsibilities are mandated under the Conventions on *Early Notification of a Nuclear Accident* and on *Assistance in the Case of a Nuclear Accident or Radiological Emergency*.

The meeting was informed that given the increasing number of food chain emergencies originating from trans-boundary plant pests, animal diseases and food safety, and in view of their potential or real impact on human health, food security and livelihoods and national and global economies, FAO has established the Food Chain Crisis Management Framework (FCC). The FCC is the primary instrument of FAO for action in support of Member States and for institutional collaboration in the global governance of threats to the human food chain at all stages from production to consumption.

The FCC is a system-wide, inter-departmental, collaborative and integrated approach that carries out prevention, early warning and response to food chain crisis while utilizing all available skills and expertise within FAO at headquarters and decentralized offices and strengthening internal and external partnerships in risk management and risk communication. The FCC also reflects FAO responsibilities in the area of response to nuclear and radiological emergencies. The FCC designs and implements capacity-building programmes on risk assessment, risk management and risk communication in support to Member states.

The Food Chain Crisis Management Framework comprises three inter-related components:

Intelligence and Coordination Unit - responsible for overall coordination, information and communication, advocacy, and facilitation of long-term food chain risk analysis. It also coordinates and provides risks assessment in the event of nuclear or radiological emergencies threatening the food chain.

Emergency Prevention and Early Warning - carried out by the EMPRES (Emergency Prevention System) and its technical units at headquarters and in the decentralized offices on animal diseases including aquatic diseases, plant pests including forest pests, and food safety threats. Risks assessment in the event of nuclear and radiological emergencies involves all units with a focus on the food safety dimension.

Emergency Response - operationally managed by the Food Chain Crisis - Emergency Management Unit within the Emergency Operations and Rehabilitation Division under the overall technical leadership of relevant units. The Emergency Response includes rapid, medium, and longer-term programme development and implementation in addition to resource mobilization. The Food Chain Crisis - Emergency Management Unit is the operational arm in response to animal diseases, plant pests, food safety and nuclear or radiological emergencies.

Moreover, the meeting was informed that FAO Headquarters in Rome collaborates closely with the Joint FAO/IAEA Division in Vienna in improving interagency emergency preparedness and response management procedures, the elaboration of agricultural countermeasures to mitigate immediate and longer-term effects arising from radionuclide contamination, and the continued elaboration and revision of standards related to radiation protection of the public, including hazards arising from existing exposure situations.

It was also noted that FAO participates in various international emergency response activities, including ConvEx-3 exercises, the IAEA Incident and Emergency Centre (IEC) Work Group on Long Term Sustainability of Emergency Preparedness and Response Programmes (WG-EPR) and the Interagency Committee in Radiation Safety (IACRS). FAO has in addition contributed to the revision and co-sponsorship of the Joint Radiation Emergency Management Plan of the International Organizations (EPR-JPLAN 2010) and the revision of the IAEA International Basic Safety Standards (BSS) for Protection against Ionizing Radiation and for the Safety of Radiation Sources. FAO has also co-sponsored the IAEA Safety Guide on Criteria for use in Planning Response to Nuclear and Radiological Emergencies and the recent revision of the Cooperative Arrangements between FAO and IAEA in Response to Nuclear or Radiological Emergencies.

The reporting officer also highlighted a Feature Article on Preparedness and Response to Nuclear and Radiological Emergencies Affecting Food and Agriculture that was published in the Food and Environmental Protection Newsletter in July 2010.

The meeting was informed that future FAO activities related to the IACRNE include the ongoing elaboration of FAO Emergency Response Expert Qualifications and a Roster of Consultants for field missions, participation in Radiation Safety Standards Committee (RASSC) meetings, participation at the Inter-agency Committee on Radiation Safety (IACRS), finalization of the International Basic Safety Standards (BSS) for protection against ionizing radiation and for safety radiation sources, and participation in the next international ConvEx-3 exercise (2012).

The Meeting recapitulated conclusions and outcomes from the 20th Regular Meeting of IACRNE held in November 2008. It further noted international organization progress reports, discussed the concept of ConvEx-3 (2012) Exercise, and considered proposals for the revision of the IACRNE Terms of Reference, reapplication of the NATO-EADRCC for cosponsoring the JPLAN and a proposed IACRNE Work Plan for 2010-2013.

The Meeting endorsed the concept of the ConvEx-3 (2012) exercise, decided to distribute proposed revised Terms of Reference and the NATO application to all IACRNE members for their consideration and feedback and endorsed the IACRNE Work Plan 2010-2013. Based on the discussions held during the table-top exercise it was agreed that procedure(s) on public information coordination during emergencies will be prepared by the IACRNE secretary for discussion at 22nd Regular Meeting. It was also strongly suggested that UNDSS considers cosponsoring the JPLAN and that IAEA prepares cooperative agreements with Interpol and EUROPOL.

In view of ongoing collaborative work between FAO and IAEA in preparedness and response to nuclear and radiological emergencies affecting food and agriculture, it is anticipated that FAO/Rome and/or Joint FAO/IAEA Division representatives will continue to participate in IACRNE and related activities and meetings to address:

- Finalization of the revised Cooperative Arrangements between FAO and IAEA in Response to Nuclear or Radiological Emergencies (2011);
- Ongoing revisions to the IAEA International Basic Safety Standards (BSS) for Protection against Ionizing Radiation and for the Safety of Radiation Sources, including hazards arising from existing exposure situations;
- The elaboration of a FAO emergency response expert qualifications and a roster of consultants for field missions so as to provide advice on the application of agricultural countermeasures to mitigate intermediate and longer term effects.

The reporting officer also suggested the holding of an internal communication testing exercise (table-top) between FAO Headquarters and the Joint FAO/IAEA Division (Vienna) staff to test logistical management arrangements related to preparedness and response to nuclear and radiological emergencies affecting food and agriculture, especially in view of the latest revision of the Cooperative Arrangements.

The 22nd Regular IACRNE Meeting will be hosted by the OECD Nuclear Energy Agency (NEA) and will take place in Paris on 5 December 2011, organized adjacent to the NEA INEX-4 workshop.

Additional information on the Inter-Agency Committee for Response to Nuclear Accidents can be found at the IACRNA website.

Forthcoming Events

Food Integrity and Traceability Conference: ASSET 2011; Belfast, United Kingdom; 21-24 March 2011

Technical Officer: Andrew Cannavan

A draft conference programme is now available for the Food Integrity and Traceability Conference organized by the Institute of Agri-Food and Land Use, Queen's University Belfast in conjunction with ***safe*food**, 21-24 March 2011. A call for papers has been issued and abstract submissions are welcomed.

Further information on abstract submission and registration for the conference are available at www.qub.ac.uk/asset2011. If you know of colleagues who would be interested in this Conference, please let them know that they can join the mailing list and receive updates by visiting http:/www.qub.ac.uk/asset20the website and clicking on **Register your Interest.**

The Saskatoon International Workshop on Validation and Regulatory Analysis; Saskatoon, Canada, 19-22 June 2011

Technical Officer: Andrew Cannavan

To update readers on the announcement for this workshop in our previous newsletter, the second announcement has now been issued for the 2nd SASKVAL Interna-

tional Workshop, with a call for abstracts for oral presentations and posters. Abstracts should relate to one of the five themes of the meeting:

- Programme design/Quality Management
- Multi-Residue Methods of Analysis & Validation
- Current International (Global) Initiatives
- Novel Applications of Mass Spectrometry in Residue Control

The deadline for receipt of abstracts is 25 January 2011.

Details on abstract submission and registration for the workshop can be found at www.SaskVal.ca.

The Proceedings of the meeting will be published in a special issue of Food Additives and Contaminants. Authors are requested to provide the scientific committee 'first refusal' on any work presented at SaskVal for inclusion in the Proceedings. Please see the website for instructions for authors:

http:/www.informaworld.com/smpp/title~db=all~content=t713599661~tab=submit~mode=paper_submission_instructions

If you are interested in submitting an abstract for publication in the Proceedings, please be aware that the deadline for submission will be the last day of the meeting, June 22, 2011.

SASKVAL 2011

SASKATOON INTERNATIONAL WORKSHOP
VALIDATION AND REGULATORY ANALYSIS

Atelier International de Saskatoon
Validation et analyse de réglementation

Technical Cooperation Projects

Project Number	Title and Project Objectives	Technical Officer
ALG5025	**Strengthening Capabilities to Control Veterinary Drug Residues in Foodstuffs** To improve consumer protection and facilitate trade through increased capacity in the determination of veterinary drug residues in foods.	**Patel, Rajendra Kumar P. (NAFA)** **Cannavan, Andrew (NAFA)**
ARG5011	**The Use of Ionizing Radiation for the Phytosanitary Treatment of Fresh Fruit** To strengthen the national technological capacity for the establishment of irradiation services for phytosanitary treatment.	**Blackburn, Carl Michael (NAFA)** **Byron, David Henry (NAFA)**
BEN5004	**Regulatory Control and Monitoring of Mycotoxins to Facilitate Trade** To establish laboratory capacities and analytical procedures for mycotoxin control.	**Brodesser, Peter Josef (NAFA)** **Byron, David Henry (NAFA)**
BGD5024 (completed)	**Phytosanitary Treatment for Insect Pests Infesting Fresh Fruits and Vegetables** To strengthen the national capacity in applying irradiation as a quarantine treatment for insect pest infestations in fresh fruits and vegetables.	**Blackburn, Carl Michael (NAFA)** **Byron, David Henry (NAFA)**

Project Number	Title and Project Objectives	Technical Officer
BGD5027	**Establishing a Veterinary Drug Residue Laboratory** To establish a laboratory complying with international standards for surveillance of veterinary drug residues and prohibited substances in food of animal origin.	**Cannavan, Andrew (NAFA)** **Patel, Rajendra Kumar P. (NAFA)**
BOL5017	**Capacity for Monitoring Pesticide Residues for Compliance with Minimum Risk Levels and Good Agricultural Practice According to ISO 17025** To improve food safety and environmental quality in Bolivia and the competitiveness of Bolivian farmers.	**Ferris, Ian Glen (NAFA)** **Maestroni, Britt Marianna (NAFA)**
BRA5058 (completed)	**Applying Ionizing Radiation for Food Security and Healthcare** To train specialized personnel capable of processing food and blood with radiation, taking into consideration the variety of foodstuffs, storage facilities and climatic conditions in the country.	**Blackburn, Carl Michael (NAFA)** **Byron, David Henry (NAFA)**
BZE5003	**Providing Technical Assistance and Training for the Control of Chemical Residues in Food.** To help ensure that the food placed on the market for consumers from national or imported sources is free from harmful chemical contaminants by supporting and strengthening the development of a national chemical contaminant residue monitoring programme, and to further increase the technical capacity (in the area of residue testing) of the competent authority in Belize responsible for agricultural health and food safety.	**Maestroni, Britt Marianna (NAFA)** **Ferris, Ian Glen (NAFA)**
CHI5046 (completed)	**Certification of Exported Animal Products Using Nuclear and Other Analytical Techniques** To strengthen the analytical capabilities of laboratories authorized to certify exported animal products to support the national programme on control of chemical residues, in order to comply with international standards, harmonize measurement results and promote mutual recognition agreements on product certification.	**Cannavan, Andrew (NAFA)** **Patel, Rajendra Kumar P. (NAFA)**

Project Number	Title and Project Objectives	Technical Officer
CHI5048 (completed)	**Integrated Watershed Management for the Sustainability of Agricultural Lands** To develop a management model for sustainable agricultural systems through nuclear and chemical diagnosis of the impacts of anthropogenic practices.	**Ferris, Ian Glen (NAFA)** **Mabit, Lionel (NAFA)**
COL5021	**Cost Benefit Assessment for the Modernization of an Irradiator in Colombia** To develop a proposal for the sustainable operation of a pilot irradiator (100 000 Ci, cobalt-60), through the realization of a cost benefit analysis with account taken of the situation in Colombia.	**Blackburn, Carl Michael (NAFA)** **Sampa, Maria Helena de O. (NAPC)** **Pacheco Jimenez, Ronald Enrique (NSRW)**
COL5022	**Assessment of the Impact of Pesticide Use in Lake Tota, Boyacá,Colombia** To identify sources of agrochemical pollution; to determine the pesticide transport mechanism, the risk of pollution from agrochemicals applied to the area of the project and the environmental impact and risk to human health; to upgrade the pesticide residue analysis laboratory for monitoring and analysis of pollution in water resources.	**Ferris, Ian Glen (NAFA)** **Maestroni, Britt Marianna (NAFA)**
COS5026	**Management and Appropriate Use of Insecticide-nematicides** To reduce the adverse impact of insecticide-nematicides through the application of water management and nuclear techniques.	**Ferris, Ian Glen (NAFA)**
CPR5018	**Building Technological Capacity for Food Traceability and Testing of Pesticide Residues in Food** To provide the technical and regulatory basis for food origin traceability and for monitoring residues of pesticides, in order to ensure food safety and consumer confidence.	**Brodesser, Peter Josef (NAFA)**
ERI5005 (completed)	**Zoonotic (diseases that can be transmitted from animals to humans) Disease Control and Analysis of Veterinary Residues in Foods** The objective of the project is to determine the epidemiological prevalence of brucellosis and tuberculosis in the major dairy producing areas and to develop baseline data on veterinary drug residues in milk and meat products.	**Cannavan, Andrew (NAFA)** **Unger, Hermann (NAFA)** **Patel, Rajendra Kumar P. (NAFA)**

Project Number	Title and Project Objectives	Technical Officer
GUA5015 (completed)	**Establishing a Food Irradiation Plant** To establish the technical conditions for setting up a food irradiation plant in Guatemala in order to support agriculture exports.	**Blackburn, Carl Michael (NAFA) Byron, David Henry (NAFA)**
HAI5003	**Enhancing Crop Productivity through the Application of Isotope Nuclear Techniques** To enhance national capabilities to apply suitable agricultural practices and nuclear techniques to increase crop productivity to meet the national requirements for food security.	**Sakadevan, Karuppan (NAFA) Ferris, Ian Glen (NAFA)**
INS5033 (completed)	**Enhancement of Quality Assurance for the Analysis of Veterinary Drug Residues** To enhance the national capacity to ensure the safety of food products of animal origin.	**Patel, Rajendra Kumar P. (NAFA) Cannavan, Andrew (NAFA)**
ISR5016	**Supporting a Feasibility Study for Using Irradiation as a Quarantine Treatment** To investigate the technical feasibility of using irradiation as a quarantine treatment on key export commodities.	**Byron, David Henry (NAFA) Blackburn, Carl Michael (NAFA)**
IVC5027	**Monitoring of Pesticide Residues in Food Products** To establish a sustainable capacity for control and monitoring of pesticide residues in food products.	**Brodesser, Peter Josef (NAFA) Maestroni, Britt Marianna (NAFA)**
JAM5011 (cancelled)	**Supporting Food Irradiation of Selected Economically Important Crops** To increase the efficiency and productivity of farmers and/or agro-processors in Jamaica in the marketability of selected highly perishable and economically important foods/food products.	**Blackburn, Carl Michael (NAFA) Byron, David Henry (NAFA)**
LEB5014	**Upgrading the Environmental and Food Analysis Laboratory at the National Council for Scientific Research** To upgrade the laboratory of environment and food analysis in order to extend analytical capabilities for the analysis of thermo fragile organic compounds.	**Brodesser, Peter Josef (NAFA)**
MAK5005 (completed)	**Upgrading of Food Safety System** To improve the food safety system in the country.	**Brodesser, Peter Josef (NAFA) Maestroni, Britt Marianna (NAFA)**

Project Number	Title and Project Objectives	Technical Officer
MNE5002	**Upgrading Capabilities to Establish Effective Monitoring Systems for Residues in Food and Air Quality** To establish an effective monitoring system for residues in food and air quality in Montenegro by enhancing analytical capabilities and establishing a network of air quality monitoring stations.	**Brodesser, Peter Josef (NAFA)**
MNE8002 (completed)	**Upgrading a Persistent Organic Pollutant Laboratory towards Accreditation for Environmental Monitoring** To upgrade capacities in Montenegro and renovate the existing laboratory equipment at CETI through the provision of a new GCMS system required for POP control, especially for the presence of polychlorinated dibenzo-dioxins (PCDD) and polychlorinated dibenzo-furans (PCDF) and other POPs in the air, water and human food so as to protect the health of Montenegrin population.	**Safrany, Agnes (NAPC)** **Brodesser, Peter Josef (NAFA)**
MOR5024 (completed)	**Industrial Application of Irradiation** To reduce staple food losses, increase the microbiological safety of foods, and facilitate food trade through the use of irradiation technology.	**Blackburn, Carl Michael (NAFA)** **Byron, David Henry (NAFA)**
MOR5029	**Conserving and Improving the Quality of Aromatic and Medicinal Plants through Irradiation, and Transfer of this Procedure on an Industrial Scale** To help promote aromatic and medicinal plants in Morocco and to improve the income of those who grow, produce and sell them by valorizing them.	**Blackburn, Carl Michael (NAFA)** **Sampa, Maria Helena de O. (NAPC)**
NIC5007	**Determining Drug Residues in Bovine Meat Exports** To determine veterinary medicine residues and growth promoters through nuclear and complementary techniques to improve production, product quality and diagnostic techniques.	**Cannavan, Andrew (NAFA)** **Brodesser, Peter Josef (NAFA)** **Patel, Rajendra Kumar P. (NAFA)**

Project Number	Title and Project Objectives	Technical Officer
NIR5033	**Improvement of Quality Management and Food Safety Monitoring Using Isotope Techniques** To improve the safety and quality of food, and to provide up-to-date information on methods of regulatory control in order to strengthen the technical capability to perform pesticide residue analysis in foodstuffs. To improve capacities and procedures for mycotoxin control for compliance with international standards. To serve as a reference center in the region.	**Brodesser, Peter Josef (NAFA)** **Byron, David Henry (NAFA)**
NIR5034	**Feasibility Study on the Optimal Use of an Industrial Gamma Irradiation Facility** To conduct a feasibility study on the optimal use of the new Gamma Irradiation Facility for industrial application in Nigeria.	**Sampa, Maria Helena de O. (NAPC)** **Blackburn, Carl Michael (NAFA)**
PAN5017 (completed)	**Monitoring Pesticide Residues in the Production of Tropical Fruit (Pineapples and Melons) and Controlling Analytical Quality with the Aid of Nuclear Techniques** To improve food safety in the production of tropical fruits in Panama.	**Ferris, Ian Glen (NAFA)** **Maestroni, Britt Marianna (NAFA)**
PAN5019	**Supporting the Accreditation of a Pesticides Residue Laboratory** To establish an accredited laboratory according to ISO 17025.	**Maestroni, Britt Marianna (NAFA)** **Ferris, Ian Glen (NAFA)**
PHI5030	**Upgrading the Gamma Irradiation Facility** To upgrade and increase the throughput of the pilot-scale gamma irradiation facility at the Philippine Nuclear Research Institute (PNRI) to a semi-commercial one.	**Sampa, Maria Helena de O. (NAPC)** **Haji-Saeid, Seyed Mohammad (NAPC)** **Blackburn, Carl Michael (NAFA)**
RAS5046	**Novel Applications of Food Irradiation Technology for Improving Socioeconomic Development (RCA)** To focus on the application of technologies related to new uses of irradiation for sanitary and phytosanitary purposes, including technology transfer to participating RCA Member States.	**Blackburn, Carl Michael (NAFA)** **Byron, David Henry (NAFA)**

Project Number	Title and Project Objectives	Technical Officer
RAS5050	**Enhancing Sanitary and Phytosanitary Treatment of Regional Products for Export by Irradiation (RCA)** To enhance treatment of and trade in irradiated products of economic importance in the Asia Pacific region.	**Blackburn, Carl Michael (NAFA)** **Byron, David Henry (NAFA)**
RLA5050	**Strengthening Laboratory Capacity to Assess the Implementation of Good Agricultural Practices in the Production of Fruit and Vegetables in Latin America** To improve the assessment of good agricultural practices, with the support of analytical laboratories.	**Ferris, Ian Glen (NAFA)** **Dercon, Gerd (NAFA)** **Maestroni, Britt Marianna (NAFA)**
RLA5053	**Implementing a Diagnosis System to Assess the Impact of Pesticide Contamination in Food and Environmental Compartments at a Catchment Scale in the Latin American and Caribbean (LAC) Region (ARCAL CII)** To apply a diagnosis and assesment system for evaluating the impact of pesticide contamination in food and environmental compartments.	**Ferris, Ian Glen (NAFA)** **Dercon, Gerd (NAFA)** **Maestroni, Britt Marianna (NAFA)**
RLA5055	**Establishing a South American Regional Network of National and Reference Laboratories for Pharmacologically Active Substances and Contaminants in Food of Animal Origin Through Implementation of Approved Nuclear & Conventional Analytical Techniques (ARCAL CIV)** To establish a network of Latin American National Laboratories and Centres of Excellence by introducing harmonized procedures for the analysis of pharmacologically active substances and contaminants in food of animal origin.	**Patel, Rajendra Kumar P. (NAFA)** **Cannavan, Andrew (NAFA)**
SLO5002 (completed)	**Protecting Groundwater and Soil against Pollutants Using Nuclear Techniques** To improve the capability of counterpart institutes in addressing nitrate and pesticide in drinking water by calibrating and applying relevant risk management approaches at benchmark sites in Slovenian catchments.	**Adu-Gyamfi, Joseph Jackson (NAAL)** **Ferris, Ian Glen (NAFA)**

Project Number	Title and Project Objectives	Technical Officer
SRL8019	**Technical Support for the Establishment and Operation of a Multi-Purpose Gamma Irradiation Facility** To provide technical assistance for the establishment of a multi-purpose gamma irradiation facility (MGIF) in Sri Lanka to sterilize medical products, to develop health care products, and to improve the quality and safety of food and other agricultural products.	**Sampa, Maria Helena de O. (NAPC)** **Blackburn, Carl Michael (NAFA)**
SYR5020 (completed)	**Implementation of Quality Assurance and Quality Control Procedures in Pesticide Residue Analysis Laboratories** To improve the national pesticide residue monitoring programme and introduce analytical quality assurance and validated risk management technologies, which will lead to more sustainable cropping systems.	**Brodesser, Peter Josef (NAFA)** **Byron, David Henry (NAFA)**
TAD5004	**Improving Laboratory Capacity for Food Safety** To provide assistance in the establishment of a central laboratory for the analysis of contaminants and residues in food and agricultural products and satellite laboratories at the border with neighbouring countries.	**Fesenko, Sergey (NAFA)** **Ferris, Ian Glen (NAFA)** **Maestroni, Britt Marianna (NAFA)**
URT5024	**Nuclear Techniques for the Monitoring of the Food Quality in the United Republic Of Tanzania** To improve consumer protection and facilitate trade.	**Brodesser, Peter Josef (NAFA)** **Byron, David Henry (NAFA)**
URU5025	**Determining Pesticide and Antibiotic Residues in Food for Local and Export Consumption** To improve the capability to determine pesticide residues in fresh fruit and vegetables, to introduce the Quecher procedure to analyse pesticide residues and to introduce the use of 14C-labelled pesticides.	**Maestroni, Britt Marianna (NAFA)** **Ferris, Ian Glen (NAFA)**
URU5027	**Preparing for the Introduction of Irradiation Techniques** To introduce irradiation technology in Uruguay as a health and plant protection measure that will contribute to stimulating production and improving its quality for both local and external markets.	**Blackburn, Carl Michael (NAFA)**

A laboratory success story: Pesticide Residues Analysis Laboratory (LARP) of Colombia

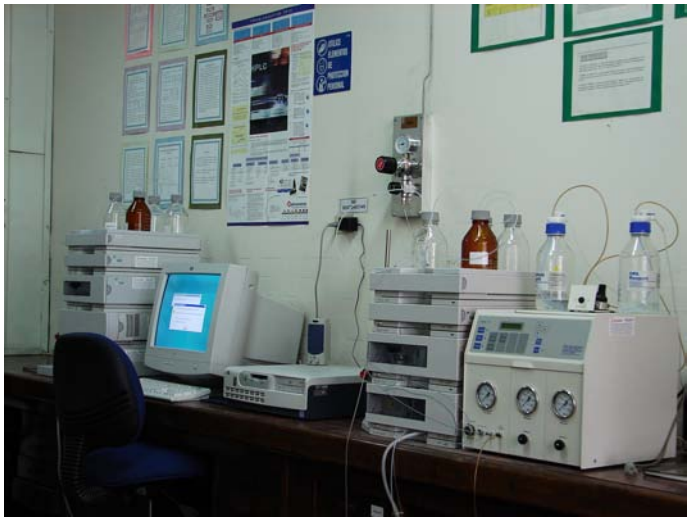
Technical Officer: Andrew Cannavan

The Pesticide Residues Analysis Laboratory (LARP) of the Chemistry Department at Universidad Nacional de Colombia was created with the specific objective to solve problems related to agrochemical use and misuse in Colombia.

The laboratory was inaugurated in 2000 under the auspices of the IAEA technical cooperation project COL/5/018 on the 'Assessment of Pesticide Residues in Vegetables, Fruits and Flowers and their Impact on the Environment'. The IAEA project provided access to regional experts and the necessary infrastructure, including instruments and supplies to help establish quality system management.

In 2005 the technical cooperation project COL/5/022 on the 'Assessment of the Impact of Pesticides Use in Tota Lake, Boyaca, Colombia' funded a liquid scintillation analyzer. This project involved close cooperation with the Food and Environmental Protection Laboratory (FEPL) in Seibersdorf and enabled LARP to become a service laboratory with an efficient quality control and quality assurance system for the analysis of agrochemical residues. A key output was the production of a video that showcased LARP on national television.

The laboratory was accredited under ISO 17025 on 6 March 2007. This formally recognized LARP's commitment to provide accurate and reliable results. Having achieved accreditation, results produced by LARP started to be recognized nationally and internationally.



The HPLC equipment

LARP offers analytical services which include the analysis of volatile pesticides by gas chromatography with specific detectors such as ^{63}Ni electron capture detector for the determination of organochlorine compounds, nitrogen phosphorous detector for compounds that contain nitrogen or phosphorus, and the flame photometric detector for compounds that contain phosphorus or sulfur. Mass spectrometry is mainly used for the confirmation of positive results.

Injecting extract for GPC clean-up

For the analysis of more polar and less volatile pesticides LARP offers high performance liquid chromatographic techniques with post-colum derivatization, fluorescence and diode array (DAD) detectors. Generally, LARP employs multi-residues methodologies for the determination of pesticides residues in fruits, vegetables, cereals, coffee, vegetable oils, water and soils.

Over the years, LARP gradually increased its laboratory area and improved the infrastructure of the instrument laboratory where the chromatographic instruments are located. Similarly, the sample preparation laboratory where extraction and clean up of samples are carried out was recently brought into full compliance with ISO 17025 requirements. This laboratory now has the necessary equipment for preparation, processing, extraction and clean-up procedures of samples. The laboratory adheres to stringent safety requirements to protect the laboratory personnel.

Recently the laboratory was commissioned to investigate the environmental fate of agrochemicals utilizing radioisotopes. In addition to the analytical services offered, the laboratory staff is actively involved in scientific research programmes where pre-graduate and post-graduate students can obtain university degrees. With IAEA's support, eight pre-graduate students and eight master students have completed their theses. Currently, there are

four Masters students and two Ph.D. students carrying out their research investigations at LARP.

The extraction room

The laboratory participated in the IAEA coordinated research project 'Testing the Efficiency and Uncertainty of Sample Processing for Analysis of Food Contaminants' and in the IAEA technical regional projects including: Strengthening Laboratory Capacity to Assess the Implementation (GAPs) in the Production of Fruits and Vegetables in Latin America (RLA/5/050) and Implementing a Diagnosis System to Assess the Impact of Pesticide Contamination in Food in Environmental Compartments at a Catchment Scale in the Latin American and Caribbean region (ARCAL RLA/5/053).

GC-MS data

LARP researchers have published more than 20 articles in national and international journals and presented over 20 posters in different congresses and conferences. At the 12th IUPAC International Congress of Pesticide Chemistry held in Melbourne, Australia in July 2010, a 2nd place was awarded for the poster presented by LARP and IAEA staff, and others, on 'Reliability of Available Environmental Fate Data (K_d and K_{oc}) for Pesticide Risk Assessment in Latin America'.

LARP aims to maintain accreditation and to offer a range of analytical products on a fee-for-service basis, thus ensuring the sustainability of the laboratory and providing national capacity to determine the environmental impact and fate of agrochemicals. LARP is a member of the Latin American and Caribbean laboratory network and is fostering research programs to solve pressing regional food and environmental security problems. The laboratory's high quality pre- and post-graduate professionals undertake expert missions and provide training aimed at minimizing misuse of pesticides in the region. The work includes advising national and international institutions and sharing experience with other laboratories in the region to solve food and environmental issues and advance laboratory capabilities to monitor good agriculture practice.

Using the chopper

Technical Cooperation Project URT 5/024 Conduct of a national training course on pesticide residue analysis; Dar Es Salaam, United Republic of Tanzania; 13-24 September 2010

Technical Officer: Josef Brodesser

The main task of the mission concerned lecturing at the National Training Course on Analysis of Pesticides in Foodstuffs whose overall duration was two weeks, i.e., 13 to 24 September 2010. The training was held at the laboratory of the United Republic of Tanzania Food and Drugs Authority (TFDA). The course was attended by twelve national participants from different laboratories in United Republic of Tanzania. Expert consultant Dr. Peri-

han Aysal led the training technically. The overall organization resided with the TO.

The theoretical part of the workshop consisted of lectures, among others, on: impacts of food contaminants in international trade; estimation of measurement uncertainty; systematic method validation, and; ISO Standard 17025.

In general, conducting a practical training workshop on site in a laboratory that is not readily adjusted to modern analytical techniques is difficult and challenging. Local conditions need to be accommodated and minor deviations regarding available tools and instruments can make a difference when introducing and executing new analytical procedures. Nevertheless, performing such training on site has distinct advantages. Firstly, the number of participants sharing the training and experience is greater than if done abroad and secondly, demonstrating that respective analytical techniques can be applied successfully in a developing country laboratory can also have a great impact locally with participants witnessing that it can be done in a less sophisticated laboratory in their own country.

The practical part of the hands-on training course consisted of the analysis of pesticides amenable to detection by GC-ECD. Blank and spike samples of different food matrices, i.e. fish, tomato and milk, were investigated. Despite certain infrastructure weaknesses it could be demonstrated that contemporary analytical procedures using the QuEChERS analytical procedure can be applied successfully. For the course participants, most of which had limited or no experience in the field of residue analytical techniques, it was illustrative and could provide knowledge on how systematic introduction of new analytical methods can be done at home.

The application of residue analysis methods in Africa is mostly in its infancy. Despite of the short time and difficulties related to a weak infrastructure the importance of performing such training inside the country is obvious and helps to disseminate these essential techniques in the interest of national food safety and consumer protection.

Technical Cooperation Project RAS 5/050 Executive Management Meeting to Review and Adopt Guidelines for the Audit and Accreditation of Food Irradiation Facilities; ARTI, Daejeon, Republic of Korea; 13-16 July 2010

Technical Officer: Carl Blackburn

This was the first international meeting held at the newly built ARTI international conference and training venue which is part of the IAEA Collaborating Centre for eLearning and Accelerated Capacity Building for Food and Environmental Protection. The main purpose of this meeting was to allow nuclear authorities and quarantine/plant-health authorities from participating RCA Member States to review, revise and agree guidelines for the audit and accreditation of food irradiation facilities that seek to irradiate produce as a phytosanitary measure. These were based on draft guidelines first produced by consultant experts in March 2010 at the IAEA in Vienna. These initial draft guidelines were reviewed and developed further by participating Asia Pacific region Member States at a meeting in Indonesia in May 2010.

The guidelines will facilitate trade in irradiated products by providing a common approach to official approvals of food irradiation facilities. The guidelines will also be used for the training element of this TC project in the Asia Pacific region. It is intended that these guidelines will be put forward to be considered as a regional standard under the Asia Pacific Plant Protection Commission (APPPC). In the longer term, any resulting APPPC regional standard could be put forward for consideration as an international standard under the International Plant Protection Convention (IPPC).

A meeting for National Project Coordinators (NPCs) was held on 13 July. The main meeting commenced at ARTI on Wednesday 14 July and was opened by Dr Sung-Kee Jo Director General of the Advanced Radiation Technology Institute (ARTI) and Vice President of the Korean Atomic Energy Research Institute (KAERI). He welcomed participants to ARTI and provided a summary of radiation technology and current research taking place at ARTI. Dr Sung-Kee Jo expressed his wishes for a successful meeting and his intention to host further international meetings of this type at the new ARTI facilities. Mr Saeng-ki Kim (Mayor of Jeongeup City) made a welcoming speech and introduced the city and region. Dr Geum-Hwan Lee (Commissioner for Strategic Industry Development in Jeongeup) also made a welcoming address to the meeting and highlighted the economic importance of international collaboration and technological developments at research at centres such as ARTI.

Opening of the IAEA/RCA Executive Management Meeting in the new ARTI building

Carl Blackburn welcomed participants on behalf of the Directors General of IAEA and FAO, he thanked the Government of the Republic of Korea for agreeing to host this meeting. On behalf of the meeting participants he also thanked Dr Ju-Woon Lee and his team for making the arrangements and the ARTI of the KAERI for providing the facilities for the meeting.

Participants of the IAEA/RCA Executive Management Meeting

Technical Cooperation Project RLA 5/053 Joint FAO/IAEA Inter-Regional Workshop on Integrated Analytical Approaches to Monitor Good Agricultural Practice (GAP); Melbourne, Australia; 9-11 July 2010

Technical Officer: Britt Maestroni

Under the IAEA's Regional Latin Amercian Technical Cooperation project RLA/5/050, a 'black box' monitoring strategy was deployed by Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Ecuador, and Uruguay to monitor indicators of good agricultural practice (GAP) and compliance with maximum residue limits (MRLs). The approach involved integrated biological and chemical monitoring of water quality at a landscape scale using harmonized protocols and georeferenced sampling. The follow-on ARCAL CII project takes the approach a step further by obtaining information about relevant pesticide processes in the subcatchment and pesticide load to the environment. An additional nine countries are participating: the Dominican Republic; El Salvador; Haiti; Jamaica; Nicaragua; Paraguay; Peru; Spain (net contributor); and Venezuela. An FAO/IAEA inter-regional workshop took place in Melbourne, Australia 9 to 11 July 2010 to discuss new developments and to revise work plans. A total of 24 participants represented laboratories from Argentina, Australia, Belize, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, El Salvador, Ecuador, Haiti, Jamaica, Peru, Paraguay, and Uruguay.

The workshop immediately followed IUPAC 2010 where the Latin American and Caribbean (LAC) laboratory network distinguished itself with a 2nd place award for the joint poster on 'Reliability of Available Environmental Fate Data (K_d and K_{oc}) for Pesticide Risk Assessment in Latin America' and an acknowledgement from the IUPAC Congress organizers.

Participants at the 12th IUPAC International Congress of Pesticide Chemistry

The aim of the workshop was strengthening the capabilities of laboratories to assess the implementation of GAP at a sub-catchment level and scaling-up the strategy to obtain results at the national and regional levels.

Experts updated participants on topics ranging from estimation of pesticide loads to spatial assessments of pesticide sorption input parameters as well as new tools for networking and the participants' presentations on recent pesticide developments.

Participants at International House, the University of Melbourne, and venue for the IAEA/FAO inter-regional workshop

The Meeting concluded that monitoring of GAP should continue while at the same time intensifying efforts to ensure laboratory sustainability and to bridge the divide between national laboratories at the current international standard and those without any capacity to monitor GAP. This will require enhance communication and networking amongst existing LAC laboratories and broadening donor participation to address cross-cutting issues. To minimize the impact of rising consumable costs, especially solvents, methodologies should be harmonized as far as possible and a business plan developed for participating laboratories. Analytical quality management systems were seen as the key to sustainable monitoring of GAP and a mechanism to reverse the 'brain drain' suffered by many

developing countries. Participation in inter-laboratory comparisons and the application of LIMS would help meet current ISO 17025 requirements. Advances in risk assessment programs and mass spectrometry/liquid chromatography should be deployed as a priority to screen, quantify and confirm the identity of high impact ranking contaminants and feed back information to stakeholders.

The participants agreed on a revised ARCAL CII work plan for implementing a diagnosis system to assess the impact of pesticide contamination in food and environmental compartments at a catchment scale in the LAC.

Technical Cooperation Project PAN 5/019 Decision Makers Forum: The Role of the Analytical Laboratory in Food Safety; Panama City, Panama; 9-11 August 2010

Technical Officer: Britt Maestroni

Ms. Britt Maestroni (FEPL) represented the Joint FAO/IAEA Division at the decision makers' forum on 'The role of the analytical laboratory in food safety' on 9 August 2010 and gave an introductory presentation at the national training course on 'Method validation, statistics and measurement uncertainty' from 10-11 August in Panama City, Panama. The opportunity was also taken to evaluate progress under TCP PAN/5/019, 'Supporting the Accreditation of a Pesticides Residue Laboratory'.

The Directorate of Sanidad Vegetal (DNSV), a service under the Ministry of Agricultural Development (MIDA) of Panama, together with IAEA and FAO, organized the decision-makers' forum. The objective of the forum was to raise awareness amongst Panama's high-level government officials on the importance and the role of the MIDA analytical laboratory in the assessment of good agricultural practices, the assurance of food safety, and the compliance of food produce to domestic and international trade requirements. The forum was attended by 26 participants from 15 different institutions in Panama and the Latin American region. The introductory remarks were given by the newly posted vice Minister of Agriculture, Mr. Luis Villareal, who thanked the organizers of the event and stated that the meeting was very much in line with the new government direction, as contained in the publicly available Government plan (plan de Gobierno) dated December 2009. It was stated that full support would be given to the MIDA laboratory. Dr. Hruska (FAO Plant Protection Regional Officer) strongly supported the need for analytical laboratories to generate data and information for the management of food quality and safety systems in Panama and the Latin American region.

Ms. Maestroni's presentation on the role of the analytical laboratory covered the whole farm-to-fork chain and introduced the concept of integrated and multidisciplinary teams that can provide data to both regulators and producers to catalyze national and regional development. The presentation was well received.

Representatives from the Inter-American Institute for Cooperation on Agriculture (IICA) and the Organismo Internacional Regional de Sanidad Agropecuaria (OIRSA) also discussed the importance of improving analytical laboratory capacities to establish well controlled food safety systems. A meeting was held after the forum with the representatives of IICA and OIRSA. It was agreed that a joint technical meeting in 2011 would be very useful to discuss regional integrated initiatives to enhance food safety systems.

Informal discussions with Mr. Hruska lead to potential future collaboration with FAO in the region in terms of organization of training workshops and meetings to accelerate capacity building.

The last session of the forum was chaired by Mr. Requena, vice Director of MIDA. A round table discussion was convened to consolidate a strategy plan and to strengthen the public role of the analytical laboratory. Issues such as awareness raising campaigns, recipes for economic sustainability, the need for consumer representation, education of farmers and extension services through the laboratory were discussed at length by all the participants. The follow up to this meeting will be the preparation of an action plan to involve all stakeholders and enhance the role of the analytical laboratory.

On the 10th of August the national training course on 'Method validation, statistics and measurement uncertainty' organised under TCP PAN/5/019 started at the MIDA laboratory. Ms. Maestroni's introductory remarks explained the role of the analytical laboratory in assuring food safety and consumer protection and the need to reach accreditation. The important responsibility of analysts in communicating well with all stakeholders was also noted. Ms. Miriam Loewy and Mr. Jairo Guerrero, experts under TCP PAN/5/019, took training responsibility for the whole duration of the course. This practical course was designed to cover many of the essential aspects to complete the accreditation process, such as uncertainty statements, method performance criteria, and consolidation of quality systems.

There was a change of government in Panama in July 2010, and the new director of Sanidad Vegetal, Mr. E. Quintero, took up his duties beginning of August 2010. Mr. Quintero is very supportive with respect to getting MIDA accredited against ISO17025 and has asked his staff to prepare an action plan with realistic dates to reach accreditation. It is hoped that MIDA will be accredited by the first trimester of 2012.

Ms. Maestroni's intervention at the decision-makers' forum generated interest from IICA and OIRSA, two cooperation organizations that are very active locally. As such they would make excellent partners for IAEA in building local capacity. Integrated approaches to target food safety, domestic and international trade, and environmental

sustainability are required. All donor organizations involved, including financial institutions, should work together to ensure that technical cooperation projects achieve optimal impact at the national and regional level. It is hoped that IICA and OIRSA, as well as FAO, will participate in the proposed meeting in 2011 and contribute with practical project proposals for the Latin American region.

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Food and Environmental Protection Laboratory, Seibersdorf

The World Mycotoxin Forum, 6th Conference on Mycotoxins, Plant toxins and Marine Biotoxins; Noordwijkerhout, Netherlands; 8-10 November 2010

Technical Officer: Zora Jandric

The World Mycotoxin Forum (WMF) 6th Conference on Mycotoxins, Plant toxins and Marine biotoxins was held in Noordwijkerhout, Netherlands from to 8 to 10 November 2010.

The WMF is the leading international meeting series on mycotoxins. The 6th Conference differed from previous years in that it also dealt with plant toxins and marine biotoxins. The WMF 2010 comprised presentations and discussions in plenary meetings and parallel sessions, poster presentations, spotlight presentations covering a range of topics, including case studies and industry updates, and a concurrent instrument/manufacturers exhibition providing information on products, equipment and services. The conference had approximately 200 participants.

Ms. Zora Jandric presented a poster entitled 'A liquid chromatography-tandem mass spectrometric method for the simultaneous determination of tropane alkaloids and glycoalkaloids in crops' on the development of a method in FEPL for the determination of plant toxins in seeds and grains using radiotracer technique, and the optimisation and validation of the liquid chromatography-tandem mass spectrometry determinative method. The Scientific Panel on Contaminants in the Food Chain of the European Food Safety Authority (EFSA) has concluded that the tropane alkaloids and glycoalklaoids are undesirable substances in food and feed. The tropane alkaloids and glycoalkaloids are toxins naturally produced by the family Solanaceae or Nightshade, comprising over 100 genera and 3000 plant species found worldwide. These produce variable amounts of alkaloids and all parts of the plant, particularly the seeds, are potentially poisonous. To facilitate the analysis of food and feeds for these compounds, a new, rapid and sensitive multiresidue method was reported for the simultaneous determination of tropane alkaloids (tropine, atropine, scopolamine, homatropine, anisodamine) and glycoalkaloids (α-solanine, α-chaconine) in seeds and grains (wheat, rye, corn, soyabean, linseed).

The poster was well received and resulted in discussions with individuals during poster presentations, including representatives of the Food and Agriculture Organization (FAO), the World Health Organization (WHO) and different organizations and universites. They were especially interested about the way of method development using radio- and stable isotopes. This was the only poster in the conference that was dealing with problems of plant toxin contamination in food and feed. A full paper is in preparation and will shortly be submitted to a peer-reviewed journal for consideration for publication.

The 6th conference had a special session of FAO, WHO and the International Life Science Institute (ILSI Europe). The representatives of these organizations opened the conference with lectures about food safety and public health implications of climate change and changing contamination patterns in food. Climate change may have both direct and indirect impact on the occurence of food safety hazards at various stages of the food chain. Increased average global temperature, trends towards stronger storm systems, increased frequency of heavy precipitation events, extended dry periods, and evental rise of sea-levels all have implications for food production, food security and food safety. The factors governing the exposure of man to dietary mycotoxins and plant toxins form a complex, interconnected system that interacts with crop plants.

Mr Gerrit M. Alink and Ms. Kirsten Pilegaard (ILSI Europe) gave a presentation on important plant toxins (produced by plants that are used as food) that are recognized as genotoxic carcinogens. For example, cyanogenic glycosides are natural toxins present in cassava, an important crop in asia and in africa, where roots provide 30% of the staple food. The toxicity is related to the capacity of all parts of the plant to relase hydrogen cyanide. Another group of toxins presented was the alkenyl benzenes (such as safrol, estragole and methyleugenol) that occur in food predominantly from the use of spices including basil, tarragon, nutmeg and allspice. Various phenylhydrazines, e.g. agaritine, are found in the cultivated mushroom (*Agaricus bisporus*). Some of the phenylhydrazines and the fruiting bodies have shown carcinogenic effect in mice studies. Also, the two major glycoalkaloids, α-solanine and α-chaconine, produced in tubers from potato (*Solanum tuberosum*) may exert acute toxic effects in humans. The concentrations of these compounds in plants show significant variation dependent of geographical origin,

exposure to daylight, harvesting time, storage conditions and procesing.

The need to perform rapid screening for a wide range of biotoxins has never being greater due to the complexities of international trade regulations, the need to ensure safe food and the probabilities that the presence of biotoxins in harvests will increase due to changes in climatic conditions. Several different rapid testing techniques were presented for mycotoxins, based on imunochemistry (ELISA test, multiplex lateral flow imunoassays, Fungi-Plex Microbead Assay (MA)), nanotechology (using nanomaterials and micro-nanosensors) and insect sniffing. Such techniques have not yet been developed for the anlaysis of plant toxins. In all types of analysis mass spectrometry is becoming of greater interest due to the ability to detect a wide range of compounds simultaneously.

Participation in the conference was very useful and successful. The method developed in FEPL and presented at the conference enables fast, reliable, selective and sensitive quantification of the major tropane alkaloids and glycoalkaloids defined by EFSA, and would facilitate the implementation of EFSA recommendations and allow simultaneous analysis of these plant toxins for research and risk assessment purposes.

The WMF offered an excellent way to network and to share ideas with experts from all over the world, providing a reference source. Climate change and food/feed security were especially emphasized. Feed and food safety are assumed to be mainly negatively affected by climatic change, as the predicted extreme weather is expected to lead to expanding ranges of crop contamination. Continuous research is needed to check the uptake of toxins by crops and develop fast, cheap, multi-contaminant screening methods for the determination mycotoxins and plant toxins. Some of the conference participants were interested in collaborating with IAEA in this field, using the unique advantages and opportunities afforded by the use of radio–tracer techniques to control food and feed, especially in developing countries.

Training course on Sampling for decision making; Margarita, Venezuela; 25 June 2010

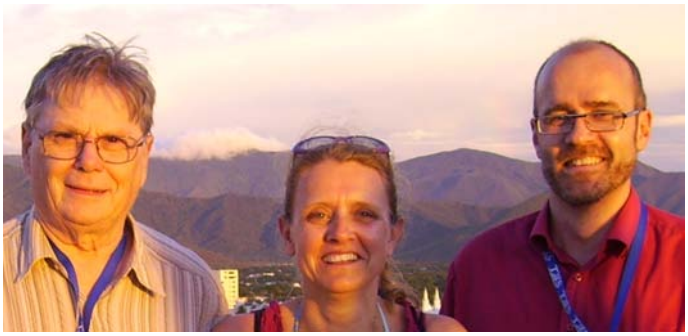
Technical Officer: Britt Maestroni

The Food and Environmental Protection Laboratory (FEPL) provided technical support in a training course on ‘sampling for decision making’. This took place in Margarita, Venezuela on the 25th June, 2010.

Ms. Maestroni gave the introductory notes to the course, including the issue of sampling for compliance to maximum limits for pesticides and mycotoxins, and Dr. Ray Correll (Rho Envirometrics, Australia) and Dr. Anders Nordgaard (Forensic Laboratory, Sweden) presented the statistical parts of the course.

Fifteen people attended the training, either enrolled through the TIES 2010 Conference (see below), or from universities in Venezuela.

The training aimed at providing ground rules for obtaining data that can be used to aid and promote decision making. The course included fundamental methods used in sampling and monitoring, but the emphasis was focussed on practical applications.



Ms. Maestroni with Dr. Correll and Dr. Nordgaard

The course started with an examination of the type of data that are required by decision makers, with emphasis on food safety and environmental issues. This led to a discussion of decision rules, consequences of incorrect decisions and what parameters should be estimated, and the definition of the population to be sampled. Examples were given to illustrate the relationship between precision, accuracy and bias. An overview of sampling schemes was given. This covered simple random sampling, stratified random sampling, systematic sampling, cluster sampling, and other more complex schemes that are model orientated. Problems and benefits of composite sampling were also included. Designs of monitoring schemes were discussed with emphasis on the frequencies of measurements that are required to detect trends and changes in environmental time series. Dr Nordgaard emphasised the importance of being able to detect non natural change points in a time series database. Attendees brought real problems to the course, and sampling strategies were identified with the aid of the instructors. The training course was evaluated favourably by all participants. Suggestions for improvement were collected through a questionnaire, and will be addressed in the preparation of an FAO/IAEA eLearning course on ‘statistics for decision making’. The instructors are available for future training courses as the need arises.

21st Annual Conference of The International Environmetrics Society (TIES) on Sustaining our environment under changing conditions: quantitative methodological challenges; Margarita, Venezuela; 20-25 June 2010

Technical Officer: Britt Maestroni

The International Environmetrics Society held the 21st Annual International Conference, ‘TIES 2010’, at Marga-

rita, Venezuela, from 20-25 June 2010. The conference was attended by approximately one hundred people from 30 different countries. The theme of the conference was 'sustaining our environment under changing conditions: quantitative methodological challenges'. Topics covered by the oral and poster presentations ranged from air quality monitoring and assessment to indicators of environmental change, environmental data quality assessments, monitoring and modelling of environmental systems, environmental sustainability assessments, space-time modelling of environmental data, outreach of environmental statistics, and water quality monitoring and assessment.

Ms. Britt Maestroni (FEPL) participated in the conference and presented a poster on 'sampling surface waters to monitor the effectiveness of good agricultural practices at a catchment scale'. The poster, which was well received, described the activities presently carried out by contract holders under the IAEA coordinated research project (CRP) D5.20.35, and generated discussions on the usefulness of establishing models in space-time using all data generated through the water monitoring activities carried out by the project participants. One of the agreement holders of CRP D5.20.35, Dr. Anders Norgaard, restated that he will take the lead in statistically analysing the data and prepare specific space-time models, and this will represent the basis for future calibrations of the model in other geographical areas.

Dr. Anders Grimvall from Sweden opened the conference with a lecture on 'environmetrics for a data-rich world'. Dr Grimvall highlighted that massive datasets and detailed models of complex environmental systems must be summarized into simple statements in order to be accessible to all stakeholders. This calls for greater emphasis on visualization techniques, including the use of the free software, 'R', strategies for assessing data quality, and the creation or improvement of information platforms to collect data from many difference sources.

Of particular interest was the presentation by Dr Marisa Sagua from Argentina on 'social vulnerability in the risk assessment of ground-water contamination in peri-urban areas'. Dr Sagua used an established statistical model to assess the risk of contamination of aquifers and incorporated a weighting to account for the social vulnerability of potentially exposed populations. The modelling and quantification of social effects deriving from environmental contamination is a rather new concept, and the possibility to quantify a component such as a social issue would be a useful component for inclusion in IAEA projects, including technical cooperation activities. To this end, help from a statistician would need to be sought.

Dr. Bruce Lauckner from Trinidad and Tobago discussed challenges faced by the world renowned centre for research in tropical agriculture, the Imperial College of Tropical Agriculture (ICTA), located in Trinidad. No biometrician was employed until 1955 and according to Lauckner, this challenged areas such as the prediction of agricultural yields, weather forecasting, and agricultural practices, all subjects where statistics are employed to predict missing input data and make predictions.

Dr. Melissa Dobbie from Australia gave an excellent example of a spatial design intended for monitoring a complex river system. In the presentation entitled 'where to put the dots on the map?' Dr Dobbie demonstrated how she developed a sampling design for a water catchment in Australia, taking into account practical issues and statistical constraints. Such a practically oriented approach will be considered in the preparation of FAO/IAEA sampling guidelines for Member States.

The materials presented in the conference underlined the necessity of using statistical tools in the type of research and capacity building work carried out by the IAEA, both at the design stage and for the evaluation of outputs and outcomes.

Future work in the FEPL also calls for high quality statistical tools in the frame of the traceability work under the CRP on 'Traceability as an approach to control food contaminants and improve food safety'.

2nd Annual Advisory Board – Project Management Board of the EU 7th Framework project, 'CONffIDENCE'; Ghent, Belgium; 3 June 2010

Technical Officer: Andrew Cannavan

The second annual meeting of the Advisory Board (AB) and the Project Management Board for the EU 7th Framework Integrated Project 'Contaminants in Food and Feed: Inexpensive Detection for Control of Exposure' (CONffIDENCE) was held in Ghent, Belgium on 3 June, in parallel with the 6th International Symposium on Hormone and Veterinary Drug Residue Analysis (also reported in this issue). CONffIDENCE is a 4-year project with 17 partners from 10 countries and a budget of € 7.5 million, € 5.8 million from the EC. The main objective of the project is the development of novel, multiplex screening methods for a wide range of contaminants in high-risk products such as fish and cereal-based food and feed, and vegetables. The validated methods will be applied to provide data for risk assessment and for regulatory systems for food safety.

The FEPL Head participated in the meeting as Chair of the AB, and also co-chaired the PMB-AB meeting. The AB included two new members, following previous recommendations to the PMB, both with close IAEA connections. Dr. Gregory Doucette, from the Marine Biotoxins Programme of the US National Oceanic and Atmospheric Administration, worked on the development of a receptor-binding radioassay for paralytic shellfish poisoning toxins used in IAEA CRP K4.10.10, 'Applications of radiotracer and radioassay technologies to seafood safety risk analysis'. Dr. Alfredo Montes Niño, from Xenobioticos Laboratories, Brazil, is a research contract holder in

CRP D5.20.36, 'Development of radiometric and allied analytical methods to strengthen national residue control programs for antibiotic and anthelmintic veterinary drug residues', and has worked as a consultant for IAEA. The involvement of both new members and continued IAEA participation are expected to help direct the outputs of the EU project to benefit FAO and IAEA developing country member states.

The CONffIDENCE project is progressing well and should result in the development of several simple, cheap, robust and portable test methods to enhance food safety both within and outside Europe. Some of these technologies are potentially transferrable through the IAEA TC mechanism.

Individual ad hoc meetings and discussions resulted in the identification of experts for inclusion in the TC roster and a host institute for specialist TC Fellowship training for Latin American scientists in Chile.

6th International Symposium on Hormone and Veterinary Drug Residue Analysis; Ghent, Belgium; 1-4 June 2010

Technical Officer: Andrew Cannavan

The 6th International Symposium on Hormone and Veterinary Drug Residue Analysis was held in Ghent from 1 -4 June 2010.

This symposium series, founded in 1988, has become one of the leading European meetings for the presentation and discussion of the latest scientific and instrumental advances in the control of residues in food. The 2010 symposium comprised plenary lectures, presented by invited speakers outstanding in the domain, contributed papers as oral presentations or posters, and a technical exhibition of scientific instruments and related products. The symposium had approximately 350 participants.

Research initiated by the FAO/IAEA Food & Environmental Protection Laboratory (FEPL) with the State Central Veterinary Laboratory in Mongolia and followed up in collaboration and the RIKILT Institute of Food Safety in the Netherlands resulted in an oral presentation by Dr. Linda Stolker (RIKILT) entitled 'Evidence of natural occurrence of the banned antibiotic chloramphenicol in herbs and grass'. In recent years, there have been major trade disruptions and penalties to producers world-wide due to the supposed illegal use of the antibiotic, chloramphenicol, in animal production as a growth promoter and the subsequent detection of its residues in food (aquaculture, poultry, meat). Exposure to trace levels of chloramphenicol in food is potentially harmful to human health, being linked with conditions such as aplastic anaemia. The data produced by research activities initiated by IAEA show that chloramphenicol can be present naturally in various plants and plant products, and can cause residues in animals feeding on these plants even when there is no illegal use as a growth promoter. This is likely to have a significant impact on international trade regulations as well as food safety implications.

The paper was well received and resulted in discussions both in the plenary session and with individuals afterwards, including representatives of the European Commission's Food and Veterinary Office. The paper has also been published in the peer-reviewed journal, Analytical and Bioanalytical Chemistry. This research is being continued under the CRP D5.20.36, 'Development of radiometric and allied analytical methods to strengthen national residue control programs for antibiotic and anthelmintic veterinary drug residues'.

A discussion was held with Dr. Stefan Weigel of the RIKILT Institute for Food Safety regarding an EU call for proposals for a research project on food safety aspects of nanotechnology. Dr. Weigel was interested in including the Food & Environmental Protection Laboratory as research partner in a project proposal, with the focus on the use of radio- and stable isotope labelling to investigate food safety issues related to the use of nanoparticles in food and to potentially provide robust test methods. This topic was already identified by the Subprogramme as one in which nuclear techniques may provide an important comparative advantage, and will be further discussed with the research group in RIKILT in coming months.

An invitation was tendered by Prof. Jana Hajslova, Institute of Chemical Technology, Prague, Czech Republic, and organizer of the biennial International Symposium on Recent Advances in Food Analysis (RAFA), to hold an IAEA 1-day workshop on food safety and control technologies for developing countries as a satellite session at the 5th RAFA symposium in 2011. The proposed workshop would focus on methods and systems to control food residues and contaminants in developing countries, including nuclear techniques for food traceability and authenticity. The offer was tentatively accepted, pending discussion within the Joint Division.

The FEPL Head was invited to become a member of the International Scientific Committee for the EuroResidue VII Conference on Residues of Veterinary Drugs in Food, to be held in May 2012 in the Netherlands. The EuroResidue series is the world's largest and most important conference on the control of veterinary drug residues. It is held every 4 years and attracts international participation.

The second annual Advisory Board - Project Management Board meeting of the EU 7th Framework Project 'CONffIDENCE' was held as a satellite event and is reported on separately in this issue of the newsletter.

Participation in the symposium was very useful and successful. The paper presented on the occurrence of chloramphenicol in grass and herbs will have beneficial results for producers in IAEA member states, notably in south-east Asia. This important research was initiated and driven by IAEA, in collaboration with international partners.

The invitations to join the International Scientific Committee for EuroResidue VII, to hold a workshop for developing countries at the 5th International Symposium on Recent Advances in Food Analysis, to participate in a proposal for an EU funded project on nanotechnology and food safety, and continued participation on the advisory board of the CONffIDENCE project, all acknowledge the importance and impact of the IAEA's contribution s in the field of food safety and provide excellent opportunities to provide further assistance to member states in synergy with important partners in Europe and throughout the world.

Combating the Use of Counterfeit Trypanocides in Developing FAO/IAEA Member States: A QA/QC Analytical Method Approach

Technical Officer: James Sasanya

Counterfeit drugs such as those against trypanosomosis, an economically devastating disease, are common in developing country member states. Such substandard drugs – with quality and safety repercussions - present two major problems, namely, under-dosing of animals ultimately leading to the development of drug resistance in the disease causing agents. This subsequently results in increased morbidity and mortality rates in affected animals, thus increasing the economic burden and escalating poverty. Secondly, and paradoxically, there may be increased administration of the drugs when animals fail to respond to treatment as expected, resulting in poisoning of the animals. This in turn causes food insecurity. The use of counterfeit drugs with containing unknown compounds may also cause a food safety hazard in, for example, milk produced by treated animals.

Against this background, a study was initiated to develop an analytical method that is simple, quick and cheap to ensure quality assurance/quality control (QA/QC) of common trypanocidal drugs. A high performance liquid chromatography (HPLC) method with photodiode array detection (DAD) was chosen since it may be readily affordable to member states. The drugs studied include diminazene aceturate, isometamidium chloride hydrochloride and ethidium bromide, as well as the antipyretic/analgesic/anti-inflammatory drug antipyrine. For the first time, the method has been optimized for analysis of all these drugs together (Fig 1)

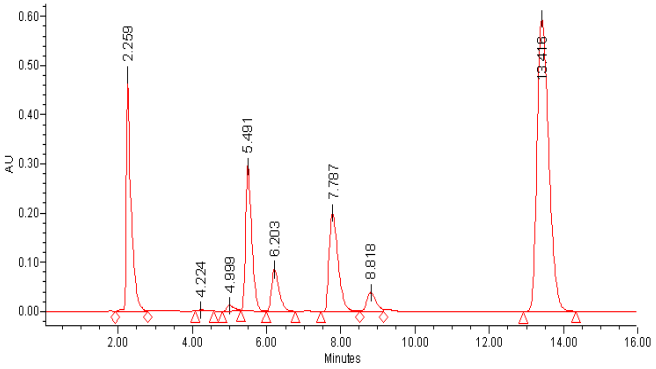


Figure 1. A standard (at 100 µg/mL) containing a mixture of isometamidium chloride hydrochloride (with isomers: MB 4180A at 7.79 min; MB 38897 at 6.20 min; MB 4250 at 8.82 min; MB 4596 at 4.99 min), ethidium bromide (at 13.42 min), antipyrene (at 5.49 min) and diminazene (at 2.259 min).

The method has been demonstrated to be suitable for the intended use. For example, it has been used to analyze drug sachets containing isometamidium (with or without the excipient, antipyrine) provided by a number of international pharmaceutical companies (sample in Fig 2). Another set of sachets containing diminazene and antipyrine, also obtained from a number of international pharmaceutical companies, has also been analyzed (sample in Fig 3)

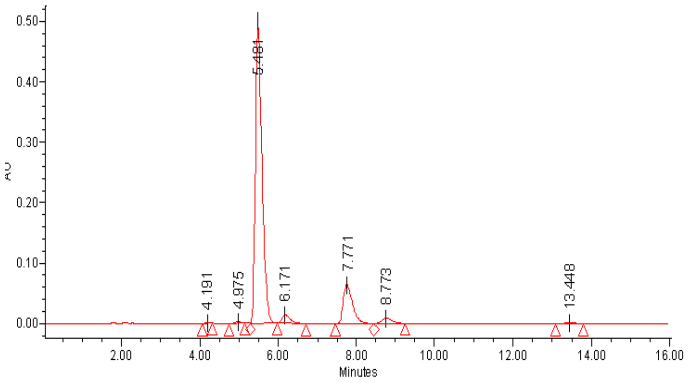


Figure 2. Sample chromatogram of a commercial drug sachet containing isometamidium (peaks at 8.773, 7.771, 6.171 and 4.975 min) and antipyrine (at 5.481 min) with ethidium bromide (at 13.448 min) as an impurity. The sample (concentration 200 µg/mL) was obtained from an international pharmaceutical company.

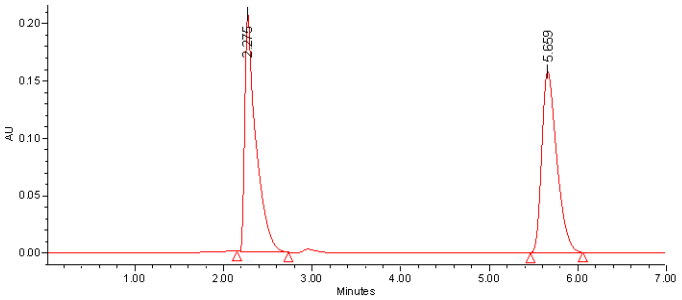


Figure 3. A representative chromatogram of a drug sachet (100 µg/mL) containing diminazene (at 2.275 min) and Antipyrin (at 5.659 min). The sample was obtained from an international pharmaceutical company

These studies are being carried out under an FAO led project in collaboration with The International Federation of Animal Health (IFAH), The Institute of Pharmacy and

Biomedical Sciences of Strathclyde University, and the United Nations Industrial Development Organization (UNIDO). Monographs for these drugs have also been prepared for submission to a recognized pharmacopeia and final approval of monographs for these drugs will be completed in the next stakeholder meeting in November 2010. Work is also ongoing to develop a multi-analyte liquid chromatography – tandem mass spectrometry (LC-MS/MS) confirmatory method. The possibility of using stable isotopes with the LC-MS/MS method is being evaluated. Additional work will include use of radio-labeled trypanocides. In this regard, a thin layer chromatographic method is being optimized to assess separation of these drugs.

To summarize, in collaboration with international stakeholders, FEPL is contributing towards ensuring that the supply of trypanocidal drugs for use in food animals in member states is safe and of good quality. The analytical method will be distributed to member states for routine QA/QC application. Monographs describing the authentic drugs have been developed for submission to reputable pharmacopeia for use as references against which counterfeit and poor quality drugs can be tested.

Assessing the biotransformation of the antiviral drugs valacyclovir and acyclovir in tsetse flies in support of the sterile insect technique (SIT) to eradicate animal and human trypanosomosis.

Technical Officer: James Sasanya

Tse-tse flies and the trypanosomal infections they transmit significantly contribute to poverty and perpetual underdevelopment in some FAO/IAEA member states such as in Africa. Besides human suffering, sleeping sickness causes an estimated economic loss of US$4.5 billion per annum. Tools such as SIT, an important component of an integrated pest management strategy, are used to combat the disease through vector control. However, SIT initiatives are threatened by a viral infection, *Glossina pallidipes* Salivary Gland Hypertrophy, that is associated with increased mortality and infertility in tse-tse fly colonies. As part of efforts to identify a suitable remedy to this infection, a new liquid chromatography-mass spectrometry (LC-MS/MS) method was recently developed and validated and applied (Sasanya et al, 2010, see 'publications' in this issue) for analysis of the antivirals valacyclovir and acyclovir in tsetse flies at the Agriculture and Biotechnology Laboratories (ABL) in collaboration between the Food and Environmental Protection Laboratory (FEPL) and the Insect and Pest Control Laboratory (IPCL).

This study, the first of its kind, indicates that valacyclovir is converted to acyclovir in invertebrates, as was previously known for vertebrates. This is a useful finding, given that valacyclovir is cheaper than acyclovir (20% of the cost). Moreover, acyclovir, if used directly as the primary drug, appears to be more toxic to tse-tse fly colonies than valacyclovir, causing high mortality and reduced fecundity rates. The flies seem to tolerate valacyclovir at a concentration 3 times higher than that of acyclovir. Thus, valacyclovir is perhaps the drug of choice in this regard. Therefore, the results of the study represent both safety and economic advantages, besides the overall goal of supporting poverty eradication and public health initiates in member states.

The collaborators found it necessary to determine the pattern of biotransformation of these drugs with time. How do the concentrations/levels of these drugs change with time in tse-tse flies? When does metabolism begin? Answering such questions should generate information needed to determine the appropriate dosages and regimen. Through personal communications to the collaborators, interested colleagues from some member states have requested information regarding the exact dosages and regimens. Therefore, a preliminary study was initiated to assess the levels of these drugs in the flies in order to elucidate the biotransformation pattern. Two sets of flies each were fed with blood meals containing valacyclovir or acyclovir. The flies were then frozen after 3, 5 and 8 days, prepared and then analyzed according to Sasanya et al. (2010). Figure 1 shows sample chromatograms of reference standards for the two drugs in tsetse fly matrix. As shown in figures 2 and 3, the findings confirm conversion of valacyclovir to acyclovir as we had previously observed. Also, the levels of acyclovir decreased from day 3 to day 8 (Figure4).

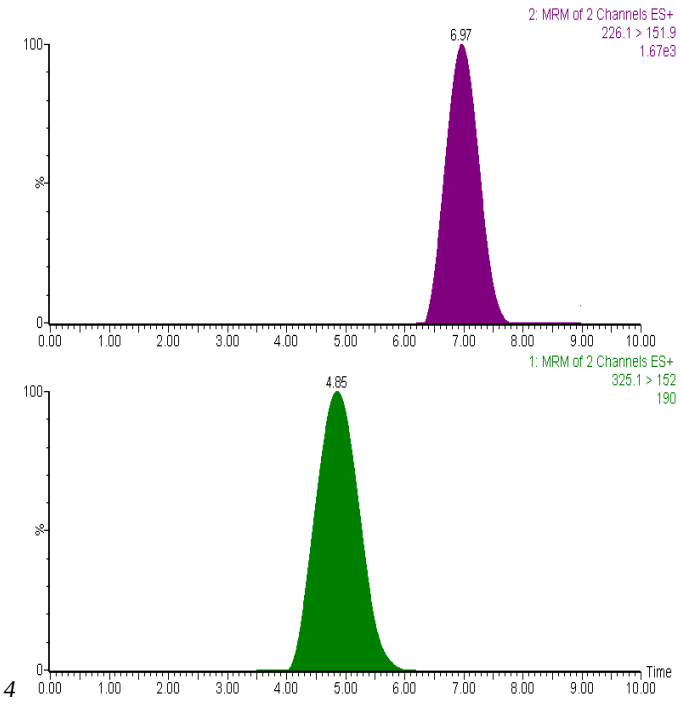


Figure 1. Chromatograms of the antiviral drugs acyclovir (retention time of 6.9 min) and Valacyclovir (retention time of 4.9 min) obtained following analysis of tse-tse fly matrix containing standards of the two drugs. Analysis was done using LC-MSMS-ESI-MRM (Sasanya et al. 2010).

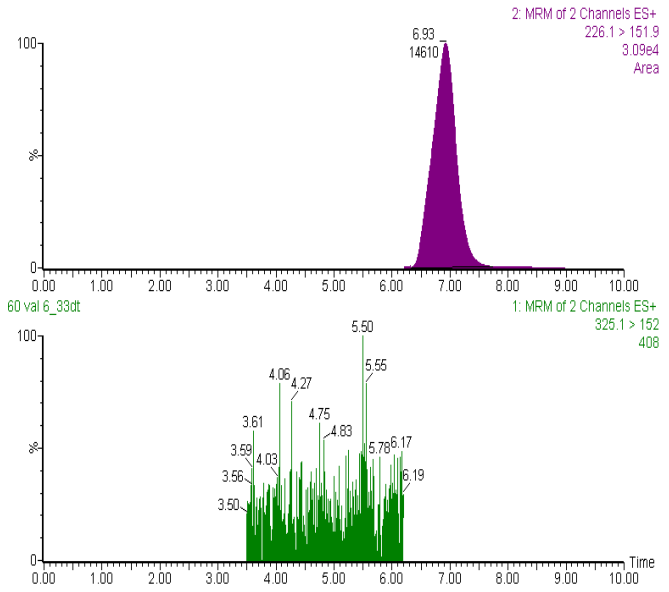


Figure 2. Chromatograms showing the presence of acyclovir and absence of valacyclovir in matrix of tse-tse flies that were fed with a blood meal containing valacyclovir.

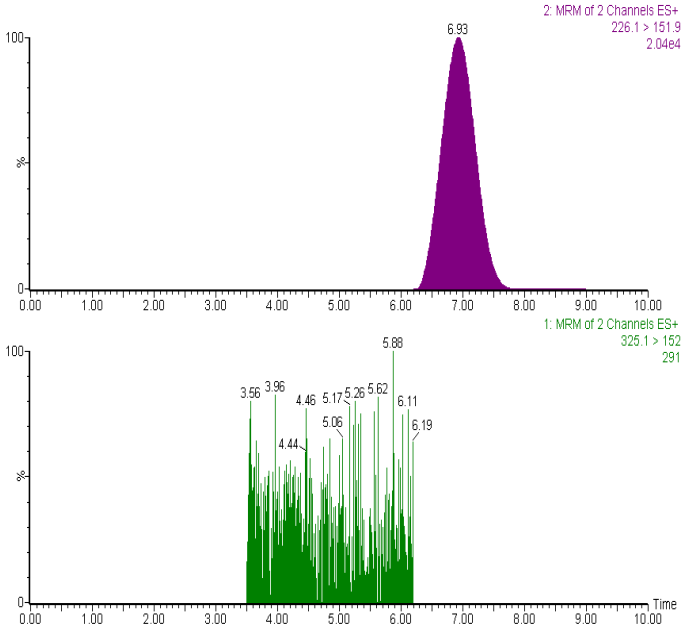


Figure 3. Chromatograms showing the presence of acyclovir and absence of valacyclovir in matrix of tse-tse flies that were fed with a blood meal containing acyclovir.

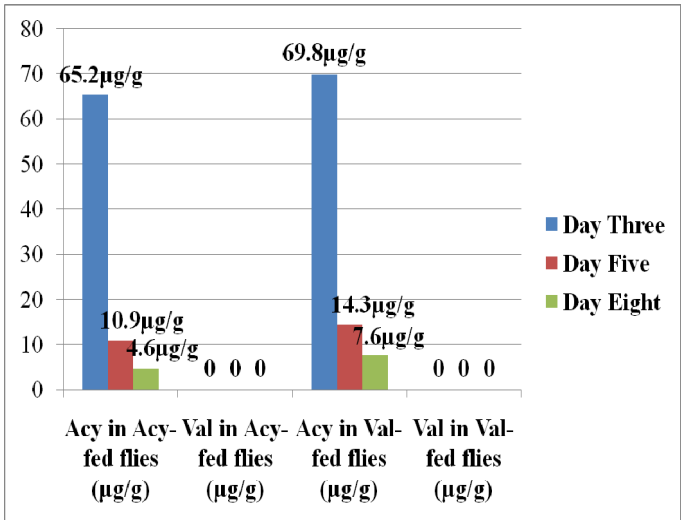


Figure 4. Biotransformation patterns of the antiviral drugs valacyclovir and acyclovir in tse-tse flies. Flies were fed with blood meals containing the two drugs before being frozen after 3, 5 and 8 days. Analysis was by LC-MS/MS.

Given these early findings, our current focus is to assess biotransformation of these two drugs after 3, 6, 24, 72 and 120 h, and also to determine how much of the drug remains unabsorbed in the gut. This will be determined by removing the gut followed by analysis of gut-less flies. Comparison will be made with flies whose guts are intact.

In summary, collaboration between FEPL and ICPL is providing solutions to challenges encountered by SIT initiatives to combat trypanosomosis and contribute to poverty eradication with subsequent improvement of well-being among concerned FAO/IAEA member states. This work involves analytical chemistry of two antiviral drugs, valacyclovir and acyclovir, in tsetse flies. The work aims to provide information for precise dosage and regimen determination when treating Glossina pallidipes Salivary Gland Hypertrophy, the viral infection that undermines the effectiveness and efficiency of SIT.

Study on the geographical origin of paprika

Technical Officer: Britt Maestroni

Within the project on food traceability, a study on the 16O/18O and 2H/1H isotopic composition of fresh fruits and vegetables at harvest as an indicator of the geographical origin was started at the Food and Environmental Protection Laboratory (FEPL). The specific research objectives were to study the contribution of different types of irrigation water on the stable isotope (16O/18O; 2H/1H) composition of paprika plants at harvest. The analyses of 18O/16O and 2H/1H isotopes from liquid water were carried out using a stable isotope analyzer using the principle of cavity ring down laser spectrometry (CRDS) recently installed at the FEPL.

Paprika plants were purchased locally and transplanted into a previously characterised soil. Two different types of water were used for irrigation of the paprika plants: local ground water (IW) and water collected from a local

lake, the Neusiedler See (RW). The plants were divided into two groups according to the type of irrigation, and all paprika plants were grown in a glass house under the same controlled temperature and humidity conditions (Figure 1). Growth development stages were recorded at daily intervals. The 16O/18O and 2H/1H isotopic composition of the irrigation water is presented in table 1. After heavy irrigation over a two month period almost all plants started to produce fruits. At harvest, individual paprika fruits were collected and sealed in polyethylene bags and stored in a freezer until analysis (Figure 2). Water for analysis by CRDS was extracted from the homogenised paprika fruits by cryodistillation. The analysis of the isotopic composition of the paprika is ongoing.

	$\delta^{18}O$	$\delta^{2}H$
Seiberdorf ground water (IW)	-9.34 ± 0.21	-67.40 ± 1.14
Neusiedler see water (RW)	-2.97 ± 0.13	-29.56 ± 0.34

Table 1Isotopic composition of the irrigation water analysed by the CRDS instrument. Values are expressed as delta values (δ).

Paprika plants were grown in a glass house under controlled climatic conditions

Individual fruit were harvested in sealed plastic bags

Interns

Sorivan Chhem-Kieth from Canada joined the Food and Environmental Protection Laboratories as an intern in September 2010 and will stay as part of the team for one year. He completed his first cycle of university studies in Biochemistry at Concordia University in the province of Québec, Canada. It was his interest in Food Science that led him to apply for an internship in FEPL. He is currently working on food traceability studies, operating the liquid water isotopic analyser, and working on gas-chromatography and liquid chromatography coupled to mass spectrometry for contaminants analysis. Further work with the IAEA will include developing and validating methods for the traceability of various food products using chromatographic and isotope ratio analysis. At the end of his internship, Sorivan plans on continuing to conciliate his studies with his desire to travel.

Sorivan Chhem-Kieth

Ms. Patcharin Jankong from Thailand joined the Food and Environmental Protection Laboratory (FEPL) in the FAO/IAEA Agriculture and Biotechnology Laboratories

in Seibersdorf on 20 September 2010 for 3 months as an intern. Patcharin is currently assisting in greenhouse research investigation, laboratory work, and research data analysis related to food traceability and agrochemical residue analysis in support of the FEPL activities. Patcharin has a background in environmental science, specializing in pollutants analysis (particularly on arsenic and heavy metals) for contaminated land management from her PhD study at Mahidol University, Bangkok (Thailand) in collaboration with Karl-Franzen University, Graz (Austria).

Patcharin Jankong

Publications

Whitaker, T.B., Slate, A.B., Doko, M.B., Maestroni, B.M. and Cannavan, A. (eds) (2010). Sampling Procedures to Detect Mycotoxins in Agricultural Commodities. Springer, New York.

Jandric, Z., Rathor, M.N., Švarc-Gajić, J., Maestroni, B.M., Sasanya, J.J., Djurica, R. and Cannavan, A. (2010). Development of a liquid chromatography – tandem mass spectrometric method for simultaneous determination of tropane alkaloids and glycoalkaloids in grains. Book of abstracts of the World Mycotoxin Forum 6th Conference, Noordwijkerhout, The Netherlands, 8-10 November 2010, 144. (Poster presentation).

Cannavan, A, Maestroni, B.M. and Byron, D.H. (2010). Food safety, integrity and traceability. Proceedings of the KSEA 30th Anniversary International Symposium on Management and Strategy on Sustainable Environment Leading to Food Safety, Busan, Republic of Korea, 8-9 July 2010, 31-34.

Sasanya, J.J, Abd-Alla, A.M.M, Parker, A.G and Cannavan, A. (2010). Analysis of the antiviral drugs acyclovir and valacyclovir-hydrochloride in tsetse flies (*Glossina pallidipes*) using LC-MSMS. Journal of Chromatography B, Analytical Technologies in the Biomedical and Life Sciences, 878, 2384-90.

Maestroni, B., Ferris, I., Kookana, R., Cannavan, A., Byron, D. and Dercon, G. (2010). Sampling surface waters to monitor the effectiveness of good agricultural practices at a catchment scale. Book of abstracts of the 21st Annual Conference of The International Environmetrics Society (TIES), Margarita Island, Venezuela, 20-25 June 2010, 39. (Poster presentation).

Berendsen, B., Stolker, L, de Jong, J. Nielen, M., Tserendorj E., Sodnomdarjaa, R., Cannavan, A. and Elliott, C. (2010). Evidence of natural occurrence of the banned antibiotic chloramphenicol in herbs and grass. Analytical and Bioanalytical Chemistry, 397, 1955-63.

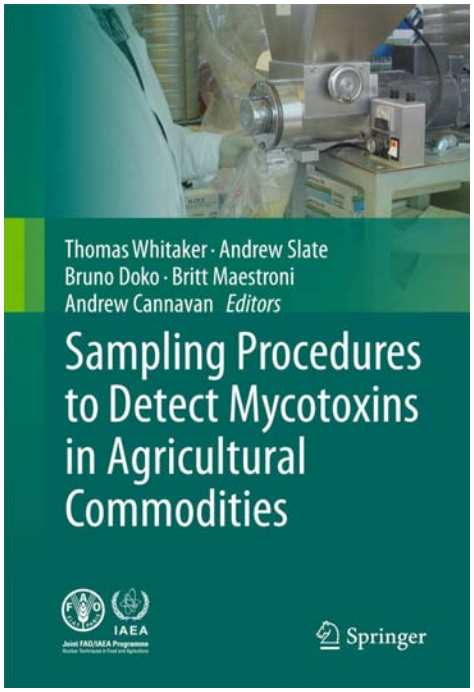
Berendsen, B., Stolker, A.A.M., de Jong, J.A.M. Nielen, M.W.F., Tserendorj E., Cannavan, A. and Elliott, C. (2010). Evidence of natural occurrence of the banned antibiotic chloramphenicol in herbs and grass. Book of abstracts of the 6th International Symposium on Hormone and Veterinary Drug Residue Analysis, Ghent, Belgium, 1-4 June 2010, 27.

Cannavan, A. and Maestroni, B.M. (2010). Analytical methodology for food safety and traceability in developing countries. Agro Food Industry Hi-Tech, supplement, Focus on Food Analysis, 9-12.

Sampling Procedures to Detect Mycotoxins in Agricultural Commodities

Th.B. Whitaker, North Carolina State University, Raleigh, NC, USA; A.B. Slate, North Carolina State University, Raleigh, NC, USA; M.B. Doko, International Atomic Energy Agency, Vienna; B.M. Maestroni, International Atomic Energy Agency, Vienna; A. Cannavan, International Atomic Energy Agency, Vienna (Eds.)

Springer, Dordrecht, Heidleberg, London, New York, ISBN 978-90-481-9633-3



Adherence to regulatory limits for mycotoxins in agricultural commodities is important to safeguard consumers and to permit trade in affected commodities across international borders. Reliable estimates of mycotoxin concentrations are required to implement regulatory decisions on the suitability of lots of produce for consumption or trade. Effective schemes to test for mycotoxins depend not only upon sound analytical methods, but also on well designed and implemented sampling plans. This manual provides information to food analysts and regulatory officials on effective sampling plans to detect mycotoxins in food. The concepts of uncertainty and variability in mycotoxin test procedures are discussed as well as the importance of ensuring that samples are representative of the lot being sampled, and the consequences of a poorly designed sampling plan on the reliability of the measured levels of mycotoxins, possibly resulting in legal disputes and barriers to trade.

This manual discusses the mycotoxin sampling plan in the context of the multi-stage mycotoxin test procedure; sampling, sample preparation and analysis, explores uncertainty and variability in mycotoxin test procedures, and describes the design of sampling plans, the use of operating characteristic curves and the calculation of acceptance probability.

Impressum

Food and Environmental Protection Newsletter Vol. 14, No. 1

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

International Atomic Energy Agency
Vienna International Centre, PO Box 100, 1400 Vienna, Austria
Printed by the IAEA in Austria, January 2011.

10-52571