



**IAEA**

**Joint FAO/IAEA Programme**  
Nuclear Techniques in Food and Agriculture

# Food & Environmental Protection Newsletter

Vol. 12, No. 2

July 2009

<http://www.naweb.iaea.org/nafa/index.html>  
[http://www.fao.org/ag/portal/index\\_en.html](http://www.fao.org/ag/portal/index_en.html)

ISSN 1020-6671



## Contents

▪ To the Reader	1
▪ Staff	3
▪ Feature Article	4
▪ Past Events	6
▪ Forthcoming Events	18
▪ Status of Coordinated Research Projects	19
▪ Current Technical Cooperation Projects	21
▪ Agrochemicals Unit, FAO/IAEA Agriculture & Biotechnology Laboratory, Seibersdorf	25
▪ Publications	28



## To the Reader

I am pleased to announce that Carl Blackburn has been selected to fill our Food Irradiation Specialist position within the Food and Environmental Protection Section of the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture. Mr. Blackburn (UK) has a PhD in irradiation, a post-doctorate diploma in radiological protection, a BSc in chemistry and a certificate in food irradiation process control. In addition to his extensive experience in the application of irradiation for sanitary and phytosanitary purposes, Mr. Blackburn also has wide-ranging qualifications in emergency preparedness and response to nuclear emergencies and radiological events affecting foodstuffs, which is another critical area of work within the subprogramme.

We are also pleased with the return of both Stella Attakpah and Nima Mashayekhi-Tabrizi to the Food and Environmental Protection subprogramme. Stella recently completed her two-year assignment with the Economic Commission for West African States (ECOWAS) in Dakar, Senegal, while Nima just completed a semester abroad program in the United States at Tulane University in New Orleans, Louisiana.

This most recent edition of our Food and Environmental Protection newsletter highlights our continuing efforts at strengthening inter-agency collaboration in activities related to food contamination, including our ongoing participation in subsidiary bodies of the Joint FAO/WHO Codex Alimentarius Commission.



**IAEA**  
International Atomic Energy Agency

Among other issues, we have reported on recent activities of our jointly managed (with our Monaco laboratories) Coordinated Research Project (CRP) on Applications of Radiotracer and Radioassay Technologies to Seafood Safety Risk Analysis, and on our Survey of Fumonisin B1 Contamination of Food Grade Commercial Maize Kernel Lots in Nigeria, at the recently held 3<sup>rd</sup> Session of the Codex Committee on Contaminants in Foods (CCCF). These discussions led to Codex agreement to consider research arising from the CRP in the establishment of maximum levels for cadmium (oysters, scallops and cephalopods) in seafood, as well as the consideration of the IAEA generated data on fumonisins.

Other inter-agency collaborative activities include our input to the recently held Fourth Session of the Commission on Phytosanitary Measures (CPM) under the International Plant Protection Convention (IPPC), particularly in relation to the development of standards for the use of irradiation as a quarantine treatment. These standards have been subjected to continuous technical support of the Food and Environment Protection and Insect Pest Control subprogrammes of the Joint Division during the last two years and in this regard, the CPM adopted as annexes to ISPM No. 28 “Phytosanitary Treatments for Regulated Pests” eight irradiation treatments for inclusion in the IPPC standards. These included six treatments related to several species of fruit flies (*Anastrepha ludens*, *A. obliqua*, *A. serpentina*, *Bactrocera jarvisi*, *B. tryoni* and *Rhagoletis pomonella*), one related to the codling moth (*Cydia pomonella*), and most importantly, one related to a generic irradiation treatment for fruit flies of the family Tephritidae.

It is anticipated that formal objections raised at the CPM concerning six additional drafts considered (weevils: *Conotrachelus nenuphar*, *Cylas formicarius elegantulus*, *Eusepeus postfasciatus*; moths: *Omphisa anastomosalis*,

*Grapholita molesta* and *Grapholita molesta*) will be further discussed at the forthcoming first research coordination meeting under our new CRP on the Development of Generic Irradiation Doses for Quarantine Treatments (see related article) so that they might be forwarded to the IPPC as high priority treatments for adoption by the CPM in 2010.

I would also like to highlight our recently rescheduled Train-the-Trainers Workshop on Screening/Post-screening Techniques for Veterinary Drug Residues that will be held at the FAO/IAEA Agriculture and Biotechnology Laboratory in Seibersdorf, Austria, from 12–23 October 2009. The purpose of the Workshop is to transfer information and strengthen the capabilities of developing country scientists and laboratory middle-management in analytical techniques and methodologies, relevant guidelines and regulations and the theoretical and technical aspects of screening and post screening techniques for the detection of veterinary drug residues, including, radio-assay, microbial inhibition, immunological, thin layer chromatographic (TLC) and high-performance liquid chromatographic (HPLC) techniques; quality assurance/quality control principles according to ISO Standard 17025 that are relevant to veterinary drug residue analysis; and, to discuss the various possible roles of quality assured laboratories in monitoring the effectiveness of good farming practices. The information and training material provided is intended to facilitate further training by the workshop participants of personnel in their home countries.

In closing, best wishes to you and your families for a safe, happy and healthy holiday this summer season.

Sincerely,

*David H. Byron*

# STAFF

**Joint FAO/IAEA Programme of  
Nuclear Techniques in Food and Agriculture,  
Vienna International Centre, Wagramer Strasse 5, P.O. Box 100,  
A-1400 Vienna, Austria  
Phone: +43 1 2600 + extension**

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

## Food and Environmental Protection Section

Name	Title	E-mail	Extension
David H. Byron	Section Head	D.H.Byron@iaea.org	21638
Carl Blackburn	Food Irradiation Specialist	C.Blackburn@iaea.org	21639
Josef Brodesser	Food Safety Specialist	J.Brodesser@iaea.org	26058
Ian G. Ferris	Technical Officer	I.G.Ferris@iaea.org	21696
Rajendra K. Patel	Consultant	R.Patel@iaea.org	21672
Stella A. Attakpah	Secretary	S.Attakpah@iaea.org	21641
Nima Mashayekhi-Tabrizi	Clerk	N.Mashayekhi-Tabrizi@iaea.org	26061

## FAO/IAEA Agriculture and Biotechnology Laboratory, Reaktorstrasse 1, A-2444 Seibersdorf, Austria.

Name	Title	E-mail	Extension
Vacant	Laboratory Head		28267

## Agrochemicals Unit

Andrew Cannavan	Unit Head	A.Cannavan@iaea.org	28395
Marivil D. Islam	Analytical Chemist	M.Islam@iaea.org	28394
Britt M. Maestroni	Training Officer	B.M.Maestroni@iaea.org	28398
Mohammad N. Rathor	Laboratory Technician	N.Rathor@iaea.org	28397
Alla Kist	Laboratory Technician	A.Kist@iaea.org	28393
James Sasanya	Consultant (Analytical Chemist)	J.Sasanya@iaea.org	28327
Rola Bou Khozam	Consultant (Analytical Chemist)	R.Bou-Khozam@iaea.org	28357
Zora Jandric	Consultant (Analytical Chemist)	Z.Jandric@iaea.org	28373
Kyoko Makovicky	Clerk	K.Makovicky@iaea.org	28362



## Feature Article

### **Second Research Coordination Meeting of the Coordinated Research Project on Integrated Analytical Approaches to Assess Indicators of the Effectiveness of Pesticide Management Practices at the Catchment Scale (D5.20.35); Vienna, Austria; 9-13 February 2009**

Technical officer: B. Maestroni

The Second Research Coordination Meeting (RCM) of Coordinated Research Project (CRP) on Integrated Analytical Approaches to Assess Indicators of the Effectiveness of Pesticide Management Practices at the Catchment Scale was held at IAEA Headquarters in Vienna, Austria, from 9-13 February 2009. The meeting was attended by research contract/agreement holders from Argentina, Australia, Brazil, Bulgaria, Chile, China, Costa Rica, Cyprus, Ecuador, Germany, Kenya, India and the Philippines, as well as observers from Costa Rica and Slovakia.

The objectives of the meeting were to share and disseminate the results of the first two years of the programme, to agree on a work plan for the next two years of the project and to strengthen the role of participating laboratories in the assessment of the implementation of good agricultural practices (GAP). Specifically, to:

- consolidate the network of laboratories to assess indicators of pesticide management practices in water and soil/sediment samples;
- disseminate information about the results obtained from the first two years of work;
- revise individual work plans for the next two years of the project;
- fine tune the risk assessment results using the pesticide impact rating index (PIRI);
- update skills in the analysis of pesticide residues in water/soil/sediments;
- disseminate information about bioassays relevant to the CRP, and;
- familiarize participants with the use of flow meters, GPS and GIS and new LIMS developments.

Discussions at the meeting included an update on the project's financial status; a reminder of the specific objectives of the CRP; a review of related regional initiatives (RLA5050 and RLA5053); a lecture on pesticides and their degradation products as emerging pollutants

in the context of risk assessment in European river basins; an insight into the processes of agricultural non point-source contamination and pesticide monitoring based on first tier risk assessment; an introduction to bioassays and to GIS; an update of current LIMS resources as well as a compendium of analytical methods, and; a lecture on the use of stable isotopes.

One day was spent at the Agrochemicals Unit laboratory at Seibersdorf and two analytical protocols were demonstrated to the participants as well as training on the use and deployment of a flow meter. All research contract holders presented their results to date under the CRP. The discussions among Research Contract/Agreement Holders during the RCM aided the revision of individual work plans.

The following conclusions and recommendations were agreed to by the meeting:

The Meeting, while noting the importance of:

1. Networking, training-the-trainers, and raising awareness of case studies on catchment monitoring, and the opportunities provided by the 12th IUPAC Pesticide Congress of pesticide chemistry;
2. Revising 2009 work plans to achieve preliminary outputs from the 2009 sampling campaigns and sharing findings with stakeholders;
3. Value-adding by harmonizing hazard identification, sampling approaches, analytical approaches and compliance with water quality standards achieved under the EU Water Framework Directive (WFD) and Groundwater Directive;
4. Sampling limitations and a concomitant risk of missing contamination events and the value of estimating pesticide loads;
5. Developing a better understanding of the tools and the initiatives by the FAO/IAEA Soil and Water Management & Crop Nutrition subprogramme to characterize processes contributing to contaminant transport at a landscape scale, and;
6. Value-adding through inter-laboratory comparisons and the use, where appropriate, of stable isotopes and radio-labelled pesticides for trouble-shooting, facilitating the establishment of method performance parameters, and to understand the transport pathways.

Agreed to the following recommendations:

1. To participate and interact as a group with international experts at the 12th IUPAC International Congress of Pesticide Chemistry (Melbourne,

Australia; 4-9 July 2010), present preliminary results from monitoring indicators of GAP and to hold the 3rd RCM in Melbourne, Australia, immediately before or after the IUPAC Congress.

2. To disseminate preliminary results to stakeholders and the scientific community from case studies showing the benefits of monitoring indicators of GAP, and the value of a research and development levy to facilitate work that will result in prevention of contamination at source.

3. To apply, where possible, harmonized approaches such as that of the EU Water Information System for Europe (WISE) project

4. To implement, where possible, sampling approaches to characterize pesticide loads from representative land management units by use of passive samplers, bioassays (in situ/laboratory), bioindicators, automated sampling techniques including Doppler flow meters for estimating stream flow.

5. To participate and contribute to working groups established under RLA5050 on updating first-tier risk assessment, analytical methodology (including QuECHERS for sediments/suspended particles), bioassays, mass spectrometry, GIS, LIMS, as well as the creation of a new working group on data quality.

6. To participate in further inter-laboratory comparisons and, where appropriate, use stable isotopes and radio-labelled pesticides to improve analytical skills, the establishment of method performance parameters and to investigate pesticide parameters.

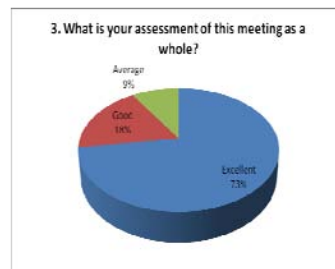
**Feedback from participants**

In order to improve FAO and IAEA efforts to promote good agricultural practices in member States, participants were given the opportunity to fill out an evaluation form at the end of the meeting. The results obtained showed that participants were largely satisfied with the activities of the program.

The questionnaire analysis showed that only 8% of those invited had never participated in other FAO/IAEA meetings, and the remaining 92% had all participated in the first RCM of this project in Costa Rica.

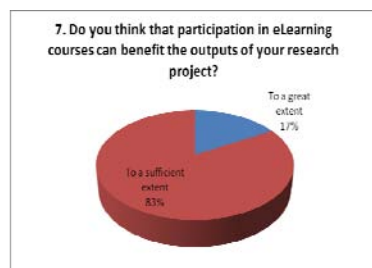


On assessing the meeting as a whole, 73% of participants were of the opinion that the organisation of the meeting was excellent, 18% thought it was good and 9% believed it was average. None thought it to be disappointing.

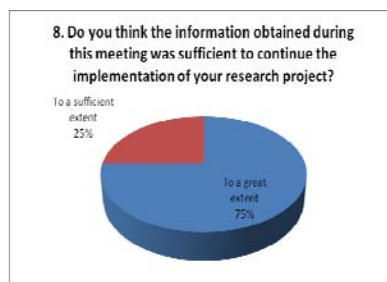


In determining whether the scope of the meeting was appropriate, 9% thought the scope was too narrow, 27% believed it to be too wide and 64% said it was just right. Regarding the technical level of the meeting, 9% felt it was too high and another 9% felt it was too low, but 82% felt it was just the right level. Regarding the duration of the meeting, only 10% of participants believed it was too short, while 90% thought it was just right.

On the question of whether participants thought eLearning might be a solution for an increased output of individual research projects, 17% of participants believed that eLearning would be helpful to a great extent, while 83% thought it would be beneficial to a sufficient extent. It is worth noting that in addition to the benefits that eLearning might bring to participants, this endeavour will also make the programme accessible to a larger number of experts in member states thereby increasing expertise in the field and higher public awareness of the activities of the Agency in the area of food safety and environmental protection.



Regarding the question of whether information obtained during this meeting was sufficient to continue the implementation of respective research projects, 25% believed it to be to a sufficient extent while 75% believed it to be to a great extent.



## Past Events

### **Second Research Coordination Meeting of the CRP on Applications of Radiotracer and Radioassay Technologies to Seafood Safety Risk Analysis (K4.10.10); International Centre for Theoretical Physics; Trieste, Italy; 8-12 December 2008**

Technical Officers: Ross Jeffree and David H. Byron

The 2<sup>nd</sup> Research Coordination Meeting (RCM) for the IAEA Research Coordination Project (CRP) on Applications of Radiotracer and Radioassay Technologies to Seafood Safety Risk Analysis met in Trieste, Italy from 8-12 December 2008 at the kind invitation of the International Centre for Theoretical Physics (ICTP).

The RCM recalled that the broad objective of the CRP was to generate data on priority contaminants in seafood organisms with regard to human consumption, sale and export, and to assess the application and relevance of these experimentally-derived and field-based data to the management of these contaminants in seafood.

The RCM noted that the general objectives of the meeting were to:

- Discuss and review the project reports presented by the individual participants, including in the context of the overall CRP objectives and the conclusions and recommendations of the 1<sup>st</sup> RCM
- Examine additional means of strengthening interaction between the participants
- Prepare revised conclusions and recommendations to facilitate the project tasks

In reviewing the objectives of the CRP and discussions at the 1<sup>st</sup> RCM, the participants confirmed that the CRP would optimally generate scientifically sound outputs and outcomes related to international standardization activities, including the:

- generation of quality-assured field data on contaminant levels in target biota, using reference material
- interpretation of data underpinned by mechanistic understandings, based on radio-assay/tracer experimental studies
- potential consideration of data by JECFA to facilitate decision making on acceptable background levels in seafood and/or advice from JECFA on what additional data would be needed

- JECFA and/or related expert committee assessments of seafood contaminants based on the CRP data provided, leading to the potential establishment of Codex maximum levels in seafood.

Among the topics of discussion, presentations were made to provide information on the further consideration of the CRP results within the international community. These presentations included:

- Recent Standardization Activities of the Joint FAO/WHO Codex Alimentarius Commission Related to Seafood and Seafood Safety
- Proposal Concerning the Establishment of the Marine Radioecology International Network (MARLIN)
- Status of Ongoing and Future IAEA Technical Cooperation Projects on the Use of Receptor Binding Assay for the Quantification of PSP and CFP Biotoxins in Seafood
- Country Presentations, Conclusions and Recommendations

The meeting presentations and discussions led to the following conclusions and recommendations:

#### ***Participating Laboratory Activities***

The meeting noted that the CRP had already facilitated increased collaboration among participants with regard to seafood safety investigations. However, it was further agreed that activities should be undertaken to further support laboratories in the implementation of the CRP, including:

- To conduct risk assessments on the bio-accessibility (including in vitro) of contaminants in specific edible seafood tissues traded internationally and intended for human consumption
- A focus on cadmium in oysters, scallops and cephalopods, including natural background contamination and considering exposures related to specific species and edible tissues, synergistic effects with other contaminants, geographical location, the state of processing (cooked, raw) and biokinetics related to aquaculture management
- A focus on harmful algal bloom paralytic shellfish poisoning toxin (PSP) and ciguatera fish poisoning (CFP), including in the application of monitoring programmes and radiotracer technologies.
- The receptor binding assay (RBA) is considered as an efficient method of analysis for both monitoring

and research for PSP and CFP as it is ten fold more sensitive than the mouse bioassay and it is specific to particular binding sites of the sodium channel receptor.

- However, in the case of CFP the clinically effective harmful dose for humans still needs to be established. This could be the RBA value designating non-toxic fish, taking into account that a specific dose should be set for each region of the world as toxin profiles differ among regions. In addition, the RBA technique needs to be improved with regard to its lower limits of detection, including analytical methodologies, in order to minimize the exposure risk to local populations.
- The IAEA should establish and maintain a protected website for interaction among CRP and other collaborators (e.g. WHO), including in the provision of internet access capabilities, training materials and information, and potentially considering the elaboration of a Marine Radioecology International Network (MARLIN).
- The IAEA and participating laboratory provision of inter-laboratory activities, including the inter-laboratory analysis of samples and the eventual establishment of laboratory quality assurance systems (preferably according to ISO/IEC 17025), leading to the collection of reliable data through standardized analytical methodologies and rigorous risk analysis procedures.

#### *Collaborative Activities*

- Advice should continue to be sought with regard to the submission of data packages to JECFA, including previous advice provided in the report of the 1<sup>st</sup> RCM and further information to be provided by the JECFA Secretariat
- To consider Codex and other international standards and information related to seafood safety in furthering the work of the CRP, including statistical trade and other data available from the FAO
- To urgently provide a brief executive summary of their current research results for compilation and presentation by the IAEA representatives at the forthcoming 3<sup>rd</sup> Session of the Codex Committee on Contaminants in Foods (Rotterdam, the Netherlands, 23-27 March 2009)
- The brief executive summary should include consumer exposure (consumption) data as well as (import/export) trade statistics on seafood, including species specific volumes and value of product traded and the identification of rejections/detentions and other issues related lost trading opportunities

- To urgently establish liaison with their National Codex Contact Point<sup>1</sup> and/or their country delegations participating at the Codex Committees on Contaminants in Food and on Fish and Fishery Products so as to further promote and encourage the prioritization and consideration of the establishment of maximum contaminant levels for seafood through JECFA and Codex on the basis of their work prioritization criteria and procedures
- To further develop the liaison established during the project formulation meeting with national counterparts of the ARCAL TC Regional Project RLA/2007/034, Regional Programme for the Bio-monitoring of Contaminants in Molluscs and Fish to Ensure Seafood Safety in Latin America and the Caribbean using Nuclear Analytical Techniques for the provision of information and to develop potential synergies between these TC and CRP activities.

### **FAO/IAEA Regional Training Workshop on the Application of International Standards related to Irradiation for Sanitary and Phytosanitary Purposes; Manila, Philippines; 8-12 December 2008**

Technical Officer: Gary Luckman

The effectiveness of irradiation as a broad spectrum quarantine treatment of fresh fruits and vegetables was recognized during the discussion and subsequent adoption (2001–2003) of the ISPM No 18 *Guidelines for the Use of Irradiation as a Phytosanitary Treatment* at the Interim Commission on Phytosanitary Measures (ICPM) meetings.

The discussion and adoption (2003) of texts by the Joint FAO/WHO Codex Alimentarius Commission relating to the General Standard for Irradiated Foods and its associated Recommended International Code of Practice for Radiation Processing of Food provided guidelines on how to incorporate these standards into national legislation and recognised that the implementation of irradiation as a food safety technology would, among other advantages, benefit public health.

The workshop was designed to create increased awareness of the existing international standards on irradiation with the appropriate quarantine and food safety authorities in FAO/IAEA member States; providing an opportunity to demonstrate how these standards are interpreted in existing national legislation, and; assist those involved in drafting new or updated national legislation on irradiation by providing them with technical input.

---

<sup>1</sup> [www.codexalimentarius.net](http://www.codexalimentarius.net)



To objective of the workshop was to enhance international understanding and provide up-to-date information on the application of international standards related to irradiation for sanitary and phytosanitary purposes so as to assist countries to improve food safety and facilitate international trade in foodstuffs treated by irradiation.

This workshop was held at the Crowne Plaza Galleria Manila Hotel, the Philippines, 8-12 December 2008 and was attended by nearly 30 participants from 10 countries. The participants were mainly senior officials from the Asian region who were responsible for policies and regulations in the area of sanitary and phytosanitary measures for food, quarantine officials, exporters and importers and professionals working in related fields. The national counterpart for this workshop was Ms. Alumanda dela Rosa.

The IAEA supported the attendance of fifteen participants through the FAO/IAEA Joint Division of Nuclear Techniques in Food and Agriculture. The remaining participants attended all or some of the workshop at their own cost or received support from their respective institutions.

The workshop was opened by the Hon Elmer C. Hernandez, Undersecretary, Department of Trade and Industry in the Philippines, who emphasized the importance of international standards relating to food irradiation and their importance to improving food safety and food security for trading countries. The opening of the workshop was one of the activities being celebrated as part of the Philippines 36<sup>th</sup> annual Atomic Energy Week and the 50<sup>th</sup> anniversary of the establishment of the Philippines Nuclear Research Institute (PNRI), who were the local hosts for the workshop.

During the opening ceremony, the Director of the PNRI, Ms Alumanda dela Rosa, also commented on the long and fruitful relationship between the Philippines, FAO and the IAEA and the important work on food irradiation and other activities that these agencies were providing assistance to the Philippines.

The reporting officer welcomed the participants on behalf of the Food and Environmental Protection (FEP) section and emphasized the objectives and outcomes expected from the workshop. The local workshop director, Ms Zenaida de Guzman of the PNRI was appointed the Chair of the meeting and the RO was appointed as the Rapporteur.

The workshop included presentations on the current state of international standards related to food irradiation, especially, the work of the Codex Alimentarius and the International Plant Protection Convention, and experiences and the regulatory aspects of irradiation as a sanitary and phytosanitary application in Australia and the United States of America.

Summaries of the irradiation activities from other countries were also presented as well as consumer attitudes and several advocacy programmes on food irradiation being supported in the Philippines. Particular interest was shown in several commercial initiatives on food irradiation that local exporters of mango products are developing in partnership with the Philippines government and local grower organisations, which was an excellent model for other countries to follow.

The workshop program also included a field trip to the only gamma irradiation facility currently operating in the Philippines, which was recently upgraded with the assistance of an IAEA Technical Cooperation project and the United States Department of Agriculture, to a semi-commercial facility.

The workshop was very successful in terms of objectives fulfilled and the interest generated. There was great interest expressed by the participants in the current efforts of the IAEA to develop regional training centres for food irradiation applications in both Latin America and in Republic of Korea. Each country participant indicated strong interest in nominating officers to attend future training courses in this technology. All the participants expressed their strong thanks for FAO/IAEA support for future training initiatives.

### **Workshop on the Pesticide Residue Laboratory as a Tool for the Implementation of Good Agricultural Practices; Panama City, Panama; 17 to 19 December 2008**

Technical Officer: B. Maestroni

A number of years of high application rates of agrochemicals on food crops have served the purpose of increasing yields and improving food security in Panama. Current fruit exports of banana, watermelon, melon and pineapple represent about 30% of the national exports. The agricultural activity in Panama uses about 90% of the pesticides that are entering the country, out of which 40% are herbicides, 28% fungicides, and 32% fungicides. In 2007 the imports of pesticides amounted to 7200 tons. Among the herbicides applied in the field glyphosate was the most used followed by 2,4-D and paraquat; among the insecticides the most used was terbufos followed by carbofuran and oxamil; among the fungicides the most applied was mancozeb followed by tridemorf and chlorotalonil. In 2007 it was calculated that the average use of pesticides amounted to 1.9 kg/person/year, about three times more than the average world pesticide use of about 0.6 kg/person/year. Panama's crop protection market, especially herbicides and insecticides, is expected to grow



at a steady rate. This is in response to producing higher and better quality staple commodities and biofuels.



*The workshop participants at the MIDA laboratories*

In this context, Ms. Maestroni participated as a resource person in a workshop on The Pesticide Residue Laboratory as a Tool for The Implementation of Good Agricultural Practices that was held in Panama City, Panama from 17 to 19 December 2008. Ms. Maestroni contributed several oral presentations on The Role of the Analytical Laboratory in Assessing Good Agricultural Practices, How food Safety is ensured in Europe, Demonstrating the Credibility of the Analytical Laboratory, The IAEA Modified QuEChERS Multiresidue method for the analysis of pesticides in melon and pineapple samples using GC-MS. The workshop covered several presentations on good agricultural practices for several commodities produced in Panama. It covered issues such as pesticide use and food production yields.

On the last day of the workshop, all participants visited a pineapple production farm (Finca El Establo, [elestablo@cwpanama.com](mailto:elestablo@cwpanama.com)) located 30 minutes away from MIDA laboratory. Ing. Maria Moreno, a governmental extension worker, lead the group and showed what good agricultural practices were applied in the fields, including seed management, treatment of diseases, fertilizer application, pesticide application and water management. The farm manager showed the processing of harvested pineapples, including the waxing of the crown with triadimephon.

*Ing. Moreno explaining pineapple pesticide application practices to the workshop participants*



A recommendation from the workshop was that the amounts of pesticides used in agriculture should not generate excessive residues in commodities for national use and exports and also should not create potential risks for the health of the population or barriers to trade and environmental contamination. The ministry of agricultural development (MIDA) in Panama will try to tackle this recommendation and will continue providing extension services to its producers to help prevent environmental contamination while ensuring optimal agricultural yields.

### **Third Meeting of the Work Group on Long Term Sustainability of Emergency Preparedness and Response Programmes (WG-EPR); Rabat, Morocco; 16-20 February 2009**

Technical Officer: David H. Byron

In July 2007, the 4<sup>th</sup> Meeting of Competent Authorities under the Early Notification and Assistance Conventions agreed that the Secretariat should establish a Work Group (WG) on sustainable infrastructure, as identified in the International Action Plan for Strengthening the International Preparedness and Response System for Nuclear and Radiological Emergencies. To respond to this suggestion, the Deputy Director General, Department of Nuclear Safety and Security, initiated the establishment of the *IEC Work Group on Long Term Sustainability of Emergency Preparedness and Response Programmes* (WG-EPR) to monitor and facilitate the Action Plan implementation and develop recommendations to ensure harmonization and long term sustainability of emergency preparedness and response programmes amongst Member States, the Secretariat and relevant international organizations.

Mr. David Byron participated as FAO representative at the third WG-EPR that met in Rabat, Morocco, from

16-20 February 2009. The WG-EPR plenary meeting reviewed and approved the November 2008 Meeting Minutes; revised the WG work plan task list and schedule of activities and reached agreement on future tasks and schedules for both sub-groups SG-I and SG-F; reviewed and agreed on the IEC evaluation documents, and; discussed and formulated the report to be presented to the CA Meeting in July 2009. The WG-EPR also discussed draft terms of reference for the potential establishment of a parent body to oversee, assist and ensure compatibility, harmonization, consistency, efficiency and optimization of the various components of emergency preparedness and response systems.

Tasks identified under the Work Group on Assistance of the International Action Plan for Strengthening the International Preparedness and Response System for Nuclear and Radiological Emergencies will be implemented under the (WG-EPR), including the further consideration of forming a Senior Emergency Preparedness and Response Advisory Group.

The fourth meeting of the WG-EPR is scheduled to be held in Rio de Janeiro, Brazil, from 22-26 June 2009.

### **First annual meeting of the EU 7th Framework Project on Contaminants in Food and Feed: Inexpensive Detection for Control of Exposure (CONffIDENCE); Barcelona, Spain; 5-6 March 2009**

Technical Officer: Andrew Cannavan

The first annual meeting of the EU 7th Framework Project Contaminants in Food and Feed: Inexpensive Detection for Control of Exposure (CONffIDENCE) took place in Barcelona on 5-6 March 2009. This 4-year project has 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 meeting had approximately 50 participants from the project consortium, management and advisory board.

The Agrochemicals Unit Head participated in the meeting as chair of the project advisory board (AB).

At the plenary session on the first day of the meeting, held at Institut d'Estudis Catalans, reports on the progress of the project were given by the project coordinator and by representatives of each of the workpackage clusters. Research and method development is, to a

large extent, progressing as planned. Questions, comments and discussion followed each presentation, and many points were raised by the AB members for clarification or consideration by the project consortium. Key points were the applicability of the methods and their suitability to cover a sufficiently broad scope of contaminants to effectively support EU policy and reflect risk assessments and scientific opinions published by the European Food Safety Authority (EFSA) and by bodies such as the Joint FAO/WHO Codex Alimentarius. Such risk assessments are important not only within the EU, but are used by many other countries as a basis for national legislation or guidelines.

The AB meeting was held in IIQAB on 6 March. Agenda items included a discussion on the response of the Project Management Board (PMB) to the first AB report, following the project kick-off meeting, comments on the progress of the research reported on the first day of the meeting, identification of potential additional members of the AB, and agreement on the timeline for the AB report to the PMB. In addition to the technical recommendations to be forwarded to the PMB, several names were suggested as additional AB members to broaden the scope of experience and expertise of the board. The other AB members agreed with a proposal from the chair that a representative from a developing country, with broad experience in the policy and practicalities of food contaminant monitoring in developing countries in general, would be a useful addition. An individual who has worked with IAEA in many projects in the past was suggested.

The technologies under development in CONffIDENCE will be of importance not only within the EU, but also in many countries worldwide, and will be especially relevant to those developing countries that must demonstrate equivalence of their food safety standards with those of the EU in order to establish or maintain trade with the EU in food commodities. The inclusion of a representative of developing countries on the project advisory board, will help to ensure that the technologies and methodology that result from the project will be, where appropriate, of benefit to countries outside the EU, particularly less developed countries. The technologies developed should be directly applicable in a number of current IAEA TCPs and would enhance the analytical and regulatory capabilities built under those projects.

### **3<sup>rd</sup> Session of the Codex Committee on Contaminants in Foods (CCCF); Rotterdam, the Netherlands; 23-27 March 2009**

Technical Officer: David H. Byron

The Technical officer represented NAFA/NAML at the 3<sup>rd</sup> Session of the Codex Committee on Contaminants in Foods (CCCF) to report on the Coordinated Research Project (CRP) on Applications of Radiotracer and Radio-assay Technologies to Seafood Safety Risk Analysis (K4.10.10) and on the Survey of Fumonisin B1 Contamination of Food Grade Commercial Maize Kernel Lots from Five Sampling Areas in Nigeria in 2002.

The 3<sup>rd</sup> Session of the CCCF was held in Rotterdam, the Netherlands, from 23-27 March 2009. The Session was attended by 65 Codex Member governments and 15 international governmental and non-governmental organizations, including UN agencies. Mrs. Anita Wouters, Director-General of the Ministry of Agriculture, Nature and Food Quality of the Netherlands, opened the meeting. The Session was chaired by Mr. Martijn Weijtens, Member of the Management Team of the Directorate of Food Quality and Animal Health of the same Ministry.

The reporting officer presented an information document on Matters of Interest Arising from International Atomic Energy Agency ([CX/CF 09/3/3-Add.1](#)), as follows:

***Coordinated Research Project on Applications of Radiotracer and Radio-assay Technologies to Seafood Safety Risk Analysis***

The representative of the International Atomic Energy Agency (IAEA) provided an update on recent activities of the IAEA *Coordinated Research Project (CRP) on Applications of Radiotracer and Radio-assay Technologies to Seafood Safety Risk Analysis*. It was recalled that the intent of the project was to provide research for the potential establishment of maximum levels in seafood for those contaminants already evaluated (cadmium), as well as contaminants not evaluated to date (harmful algal blooms, persistent organic pollutants and other toxins), through the Joint FAO/WHO Expert Committee on Food Additives (JECFA) and the Joint FAO/WHO Codex Alimentarius Commission.

The CCCF noted that subsequent to the Consultants Meeting and the First Research Coordination Meeting (RCM) held under the CRP, the Second Research Coordination Meeting met at the International Centre for Theoretical Physics in Trieste, Italy, from 8-12 December 2008. Among other activities, the 2<sup>nd</sup> RCM noted research reports presented by the CRP participants, including representatives from Chile, China, France, French Polynesia, Ghana, Japan, the Philippines, Thailand and Vietnam. The presentations included information on production and trade statistics related to seafood trade, including information and data on toxic metals, ciguatera fish poisoning and paralytic shellfish poisoning.

The IAEA representative offered to keep the next session of the CCCF apprised of additional information on continuing activities of the Coordinated Research Project.

***Survey of Fumonisin B1 Contamination of Food-Grade Commercial Maize Kernel Lots from Five Sampling Areas in Nigeria in 2002***

The representative of the International Atomic Energy Agency (IAEA) informed the Committee of the results of a study undertaken in collaboration with the Nigerian National Agency for Food and Drug Administration and Control (NAFDAC) designed to assess the incidence and contamination levels of fumonisin B1 in maize samples marketed in five geographical locations in Nigeria.

The study indicated that fumonisin B1 is a widespread contaminant of maize kernels in Nigeria and although various contamination levels were encountered across the five different areas, the overall results revealed relatively low levels of contamination. It was noted that the enforcement of good agricultural practices, including the disposal of visibly damaged kernels, screenings and fines through cleaning procedures, and wet food processing, were strongly recommended to reduce the fumonisin B1 content, thus preventing exposure of consumers to harmful toxins in food.

The representative of the IAEA offered to make the full results of the study available to the JECFA and the CCCF for the proposed future evaluation of fumonisins.

The CCCF, while acknowledging that maize was a staple food in many countries and that fumonisins in maize was a public health concern, agreed to initiate work on establishing maximum levels and developing a sampling plan for fumonisins in maize and maize-based products subject to approval by the 32<sup>nd</sup> Session of the Joint FAO/WHO Codex Alimentarius Commission in July 2009. It was further agreed to request JECFA to review the available toxicology and occurrence data in order to carry out a re-evaluation of fumonisins in maize and maize products and that, based on the outcome of this JECFA re-evaluation, the maximum level might be revised.

***Priority List of Contaminants and Naturally Occurring Toxicants Proposed for Evaluation by JECFA***

Subsequent to his presentation made to the full plenary meeting, the reporting officer attended the in-session physical Working Group on Priorities of Contaminants and Naturally Occurring Toxicants Proposed for Evaluation by the JECFA. In discussing the IAEA proposal for Codex to consider research arising from the CRP in the establishment of maximum levels for cadmium (oysters, scallops and cephalopods) in seafood,



the Working Group followed the recommendation of the JECFA Secretariat and other Codex Member governments to include both cadmium and lead in the priority list with high priority for possible scheduling of the evaluation of these compounds at the 73rd meeting of JECFA planned for June 2010. The IAEA representative noted that data on cadmium in seafood would be submitted as soon as possible, i.e. no later than the end of 2010.

In discussing the availability of data on fumonisins from the IAEA and other Codex Member governments, the Working Group also decided to include fumonisins in the priority list.

On the basis of the Working Group deliberations, the CCCF concluded and agreed to include fumonisins and cyanogenic glycosides (foods and feeds) and cadmium and lead in the priority list for future evaluation by JECFA.

The Priority List of Contaminants and Naturally Occurring Toxicants Proposed for Evaluation by JECFA will be reproduced as Appendix XI of the report of the 3rd Codex Committee on Contaminants in Foods, [ALINORM 09/32/41](#)

### **Joint FAO/IAEA Inception Mission on FAO Technical Cooperation Project on Strengthening the Bishkek Laboratory for Quality and Safety of Agrochemicals (TCP/KYR/3103); Bishkek, Kyrgyzstan, 23-27 March 2009**

Technical Officer: Josef Brodesser

The joint project inception mission was undertaken on the request of FAO for technical support in the inception of a new FAO project on Strengthening the Bishkek Laboratory for Quality and Safety of Agrochemicals. The team of the mission consisted of Mr. Mohamed Ammati, Pesticide Management Officer, AGPP, FAO, Rome, Mr. Fawzi Taher, FAOSEC, Ankara, Turkey, and the reporting officer. The purpose of the mission was to discuss and eventually revise the planned project plan and activities and to evaluate the conditions for its execution on site. The pesticide quality control laboratory as the core project executing institution and the Ministry of Agriculture and its Department of Chemicalization were visited. Discussions were held with the counterparts at the Ministry of Agriculture to discuss the necessary steps for implementing the planned project activities.

In carrying out the mission, the original project work plan was discussed, revised and agreed according to the needs identified by the mission team and the project counterpart during a one day workshop.

According to the findings and discussions on site, the mission reached the following conclusions:

1. A new deep well should be drilled and necessary pumping and water storage devices need to be procured and installed to reliably provide the laboratory with water.
2. Special water purification devices should be made available to provide water at the quality needed in an analytical laboratory. Water distillation devices and ultrapure water supply including desalination or reverse osmosis are needed.
3. Stable electricity supplies should be provided, preferably by an electricity generator, and eventually a diesel driven generator. Also, appropriate voltage stabilizers will be needed for enabling the safe and reliable use of analytical equipment at constant voltage.
4. The laboratory building needs to be equipped with heating and air conditioning devices to provide the environmental conditions for running the laboratory under suitable working conditions.
5. Training of laboratory staff in contemporary analytical methods of pesticide formulation analysis should be conducted.
6. The basic upgrading and reconstruction works should be planned and supervised by local building experts.

It was agreed within the inception mission team that close cooperation with the counterpart should be maintained. Continuous interaction between the project participants and shareholders, including technical backstopping, will be needed to bring the project activities forward towards the intended project outputs and outcomes.

### **International Conference on Advancing Beef Safety through Research and Innovation; Dublin, Ireland; 25-26 March 2009**

Technical Officer: Andrew Cannavan

The Agrochemicals Unit Head participated in the international conference on Advancing Beef Safety through Research and innovation, which was hosted by the Teagasc Ashtown Food Research Centre, Dublin, Ireland, under the EU 6th Framework Project "ProSafe-Beef", 25-26 March 2009.

The Unit Head presented a poster entitled A multi-residue isotope dilution liquid chromatography-tandem mass spectrometry (LC-MSMS) method to support risk assessment for anthelmintic drug residues in beef which summarised development work carried out by the Agrochemicals Unit of the FAO/IAEA Agriculture and

Biotechnology Laboratory, Seibersdorf as a partner in the ProSafeBeef project. The focus of the development work was the adaptation and validation of new methodology for transfer to laboratories in less developed countries, with Microbóticos Laboratories in Brazil as the primary counterpart. Further dissemination of the method will be achieved through training carried out in Microbóticos laboratories, including fellowship training under the regional TCP RLA/5/055 on Establishing a South American Regional Network of National and Reference Laboratories for Pharmacologically Active Substances and Contaminants in Food of Animal Origin through the Implementation of Approved Nuclear & Conventional Analytical Techniques (ARCAL CIV).

On 26 April, the Unit Head chaired the conference session on chemical contaminants, which covered various aspects of analytical methodology for screening and determination of contaminants such as veterinary drugs, dioxins and dioxin-like PCBs in food, and risk management strategies and case studies.

The conference presented various interesting approaches to assuring the quality and safety of beef products, addressing the issue from a holistic farm-to-fork angle, with control issues throughout the production, processing, distribution and consumer phases. Many of the concepts introduced will be considered for application in IAEA projects.

The isotope dilution method for anthelmintic residues developed under the ProSafeBeef project is an extremely powerful tool both for risk assessment studies and for regulatory control of the residues. The Agency has an important role to play in both the adaptation of the method for its application in developing countries and in transfer of the technology. The method will benefit laboratories not only in Europe, but also in many IAEA TC counterpart laboratories and in countries throughout the world.

### **Latin American Regional Technical Cooperation Project Meeting on the Implementation of a Diagnosis System to Assess the Impact of Pesticide Contamination in Food and Environmental Compartments at a Catchment Scale (RLA5053); Santiago, Chile; 31 March – 4 April 2009**

Technical Officers: Ian G. Ferris, Britt Maestroni and Gerd Dercon

Latin America's crop protection market is expected to grow by over 3% per annum until 2010. The driving factors are well understood: control of disease vectors, food safety, market requirements, and ensuring envi-

ronmental sustainability. However, misuse of agrochemicals increases the likelihood of resistance, excessive residues in commodity exports, as well as potential adverse impacts on applicators and non-target species. A preceding regional project RLA5050 was able to create/re-define the role of the analytical laboratory as part of a wider group in fostering good agricultural practices. In parallel, indicators were identified under a coordinated research project D5.20.35 that provided a



*Participants at the 1st RLA5053 coordinators' meeting, Santiago, Chile*

practical strategy for monitoring as well as a harmonized set of training materials and tools. The analytical laboratory, in collaboration with extension services and consultant services, monitors the impact of the application of GAP through the use of environmental indicators and tools to obtain meaningful georeferenced data thus identifying and helping to remedy bad agricultural practices at the source.

RLA5053 is a new three-year project intended to cover a wider range of agricultural systems and to estimate contaminant loads to the environment. RLA5053 coordinators from Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Haiti, Jamaica, Nicaragua, Paraguay, Peru, Spain, Uruguay, and Venezuela met in Santiago, Chile 31 March to 4 April 2009. A total of 35 participants, including technical experts, attended the inaugural meeting hosted by Comisión Chilena de Energía Nuclear.

The objectives of the first coordination meeting were to discuss the proposed project activities, exchange information, agree on how to accelerate technology transfer amongst participating analytical laboratories, and to strengthen the role of participating laboratories in the implementation of good agricultural practice (GAP).

Meeting highlights included:

- a presentation about FAO microcatchment strategy and how RLA5053 participating laboratories could

- provide objective indicators of successful implementation;
- development of a blueprint for RLA5053 implementation that should enhance the coordination and harmonization of analytical approaches in participating laboratories;
- inspection of the regional demonstration and reference site at Apalta and the Servicio Agrícola y Ganadero (SAG) laboratory, Lo Aguirre;
- presentations on analysis of agrochemical residues, and application of integrated pesticide exposure assessment, including soil input parameters to improve human and environmental safety as well as to facilitate international trade and regional development;
- presentations by the quality management/laboratory information management system (LIMS), mass spectrometry, bioindicators, and analytical working groups;
- videos and eLearning resources addressing communication barriers and fostering multi-disciplinary teamwork, and;
- preliminary results from Ecuador showing the importance of spray drift and the need for understanding the mechanisms of off-site movement of agrochemicals.

RLA5053 coordinators identified six major issues and recommended actions covering future activities.

1. FAO is making progress under the REDLACH micro catchment initiative and there are value-adding opportunities that RLA5053 participants should explore, specifically objective indicators for GAP at a microcatchment scale. Action: Search for opportunities to collaborate with REDLACH in Latin America.

2. Accelerated laboratory capacity building is necessary to address national and regional food and environmental issues. Action: Establish ad hoc agreed (twinning) partnerships between laboratories by initiating expert missions, group fellowships, transferring knowledge at conferences, and meeting with relevant Stakeholders.

3. Ad hoc working groups contributed substantially to the results obtained under RLA5050 by address technical issues and barriers to achieve the necessary national and regional outcomes. Action: Utilize the experience acquired under RLA5050 to establish realistic milestones for the new RLA5053 project.

4. Progress by the analytical quality management/LIMS, mass spectrometry, bioassay approaches and analytical working groups in toto provide an integrated monitoring strategy and thus a safety net for those countries in Latin America with weak regulatory

infrastructure for controlling agrochemicals. Action: Use effective communication mechanisms to facilitate active participation in relevant technical working groups.

5. Nuclear and related techniques offer to investigate the processes affecting the transport of pesticides at a landscape scale and a sound basis to extrapolate monitoring data. Action: Estimate the load of agrochemical to the environment and its risk using GIS and programs such as PIRI.

6. Successful RLA5053 implementation needs the essential procurements and complementary information about the project implementation tools to accelerate capacity building and knowledge transfer. Action: Implement as soon as possible procurements for a Doppler flow meter, laptop/workstation and GPS (all new laboratories), agreed procurements for the regional demonstration site and two-week training course in Costa Rica planned for 4th quarter 2009. In addition, all participating laboratories in Latin America should be provided essential texts: Analysis of Pesticides in Food and Environmental Samples, Pesticides and the Environment (upcoming Spanish edition), and Handbook of GC/MS. Further that the English texts are used to produce Spanish eLearning courses including information on spray drift and translation of the FAO/IAEA course on project management.



*RLA5053 regional demonstration and reference*

## **International Conference on Food Research in Support of Science-Based Regulations: Challenges for Producers and Consumers; Prague, Czech Republic; 21-22 April 2009**

Technical Officer: Andrew Cannavan

The conference on Food Research in Support of Science-Based Regulations: Challenges for Producers and Consumers, held under the Czech Republic's Presidency of the European Union, was organised by the Ministry of Agriculture of the Czech Republic, Institute of Chemical Technology in Prague and the European



Food Safety Authority. The aims of the conference were to support the use of food research for better assessment of risks and drafting of legislation necessary to ensure safe and high-quality food and to strengthen cooperation on both national and international level. The conference had approximately 200 participants from regulatory agencies, scientific institutions, academia and industry, mainly from Europe, but also including representatives of, for example, USA, New Zealand, Australia and Canada.

The conference was opened by the Minister of Agriculture of the Czech Republic, Mr. Petr Gandalovič, who stressed the importance of the topic within the Czech Republic, in the EU and on a global basis. Presentations were given by a number of Czech Governmental and Public Sector representatives and by representatives of European Institutions.

Presentations focused on topical themes including issues that are perceived as particularly sensitive by consumers, such as residues, pesticides, microbiological risks and additives as well as newly emerging risks. Plenary sessions were held on the EU position in the food safety area and international collaborations, food quality and safety control, consumers and food safety issues, and new technologies for food production. Parallel sessions, including round-table discussions, were held on food safety regulation and research challenges and perspectives of the food industry – meeting consumers' demands.

The Agrochemicals Unit Head was invited to give a presentation on Research and capacity building to meet food safety regulations – a global perspective, focusing on the research activities in the field of food safety and quality undertaken through the Joint FAO/IAEA Programme in less developed countries, with emphasis on the objectives, modalities and problems of implementation, outputs, outcomes and contributions to sustainable capacity building. The need for networking and collaboration with developed country research institutes was stressed.

Discussions with the conference organisers and various

participants outside the plenary sessions revealed that the role played by FAO/IAEA in helping developing countries to attain equivalence of their food safety systems with those of the EU is well recognised and the impacts appreciated.

Discussions were held with individuals from various institutes who indicated that they would be pleased to collaborate with the Agency in current and future food safety projects, including Prof. Dr. Franz Ulberth, Head of the Food Safety and Quality Unit of the European Commission Joint Research Centre – Institute for Reference Materials and Measurements, Prof. Dr. Michel Nielen, RIKILT Institute of Food Safety, University of Wageningen, the Netherlands, and Prof. Dr. Reiner Witowski, Vice President of the Federal Institute for Risk Assessment, Berlin, Germany, who was interested in collaborating on future activities in the field of food traceability.

After the conclusion of the conference, the Unit Head was invited by Prof. Jana Hajšlová to visit the food safety research laboratories at the Institute of Chemical Technology, Prague. Discussions were held on analytical techniques to support food traceability and Prof. Hajšlová presented the work of her department in this field, including several promising techniques that could be used in conjunction with stable isotope ratio measurements to provide a powerful suite of tools for global traceability of various food and feed products. Prof. Hajšlová welcomed future collaboration with the Agrochemicals Unit at Seibersdorf in this work.

## **41<sup>st</sup> Session of the Codex Committee on Pesticide Residues (CCPR); Beijing, China; 20-25 April 2009**

Technical Officer: Josef Brodesser

The IAEA representative participated at the 41<sup>st</sup> Session of the Codex Committee on Pesticide Residues (CCPR). The main task was chairing the Ad hoc Working Group (WG) on Methods of Analysis, which regularly is dealing with analytical problems relevant to CCPR. In particular the revision of the Guidelines on the Estimation of Uncertainty of Results (CAC/GL 59-2006), proposed as new work and approved at the 31<sup>st</sup> Session of the Codex Alimentarius Commission, was considered.

About 40 participants attended the WG to discuss and revise the respective draft Guidelines (CX/PR 09/41/5) submitted by the IAEA to the Codex Secretariat for circulation and comment in December 2008. The aim of the Guidelines is to provide specific practical examples related to pesticide residue analysis in food to be added to the existing Codex Standard.



On the basis of the WG discussions, the Committee decided to circulate the revised Guidelines for further comments by Codex Member States. An updated document would be re-submitted for consideration at the next 42<sup>nd</sup> Session of the CCPR in 2010.

The IAEA looks forward to the continued consideration of issues related to methods of analysis for pesticide residues through the Codex Committee on Pesticide Residues, including the Chairmanship of the CCPR ad hoc Working Group on Methods of Analysis.

### **18<sup>th</sup> Session of the Codex Committee on Residues of Veterinary Drugs in Foods; Natal, Brazil; 11-15 May 2009**

Technical Officer: Raj Patel

A representative of the IAEA attended the 18<sup>th</sup> Session of the Codex Committee on Residues of Veterinary Drugs in Foods, and reported ([CX/CF 09/18/3-Add. 1](#)) on several matters of interest to the Committee.

The IAEA representative noted that a new Coordinated Research Project (CRP) on the Development of Radio-metric and Allied Analytical Methods to strengthen national residue control programs for antibiotic and anthelmintic veterinary drug residues had been initiated. The main purpose of the CRP is to assist FAO and IAEA Member State laboratories in meeting the need for effective and appropriate monitoring methods for residues of selected antibiotic and anthelmintic veterinary medicines. Multi-analyte immunochemical screening methods utilizing radioactive tracers and physico-chemical screening techniques, including high performance thin layer chromatography (HPTLC) with optical scanning and/or autoradiography, will be developed. Confirmatory assays meeting the requirements of regulatory authorities will also be developed and validated. Information on the first Research Coordination Meeting to be held under this project (Vienna, Austria, 19-23 October 2009) was also provided.

The IAEA representative noted that the Animal Health Service of the FAO and the International Federation for Animal Health have signed a Memorandum of Understanding to address the widespread marketing and use of counterfeit and poor quality isometamidium and diminazene based trypanocidal drugs in sub-Saharan Africa. The FAO Animal Health Service, in partnership with the Joint FAO/IAEA Division and the International Federation for Animal Health, cooperate to develop standards and protocols for quality control/quality assurance for trypanocidal drugs and other classes of veterinary drugs, including insecticides, acaricides and anthelmintics. The United Nations Industrial Development Organization and Strathclyde University are also associated with this initiative.

Additional partners cooperating with this initiative are the United Nations Office on Drugs and Crime and the International Fund for Agricultural Development. The outcomes of this activity will be brought to the attention of the appropriate bodies of the Codex Alimentarius Commission and presented to the OIE for adoption through their usual procedures.

The purpose of the Project is to provide validated protocols for drug quality control to the relevant regulatory bodies in countries where these drugs are most used and transfer the developed technical analytical methods to Africa-based laboratories. The establishment of standards for drug quality and protocols for their assessment will allow pharmaceutical companies and laboratories, including local/small companies, to market and compete on an equal basis following internationally agreed quality control/quality assurance protocols.

The IAEA representative noted that the Food and Environmental Protection Subprogramme is responsible for providing scientific and technical support for over 40 national and regional FAO and IAEA Technical Cooperation (TC) Projects, including several associated with veterinary drug residues. These projects provide recipient countries with equipment, expert advice and training, and are financed by both the FAO and IAEA Technical Cooperation Programmes and through trust funds provided by donor countries and international funding agencies

The IAEA looks forward to the continued consideration of issues related to veterinary drug residues through the Codex Committee on Residues of Veterinary Drugs in Foods.

### **CSL/JIFSAN Joint Symposium on Food Safety and Nutrition: Methods and Systems for tracking, Tracing and Verifying Foods; Greenbelt, Maryland, USA; 13-15 May 2009**

Technical Officer: Andrew Cannavan

A combination of the increasingly global food market, involving complex production and distribution patterns, and the growing number of food related health incidents has led to a need for greater transparency of food supply chains. Creating this transparency requires the ability to trace food products and ingredients rapidly and precisely. The main drivers for this are food safety, certification requirements, compliance management, production control and rationalisation, supply chain communication and competitive advantage.

A main focus of the work of the Food and Environmental subprogramme in the next biennium and beyond will be the application of stable isotope measurement

techniques for food traceability, authentication and the detection of food adulteration. Stable isotope analysis provides a powerful investigative and regulatory tool to address these issues. Research and capacity building in this field is in line with current and past Agency activities in the application of nuclear and related techniques for the development of holistic farm-to-fork food safety systems through the development of laboratory capabilities and regulatory systems. The Agency is in a unique position to coordinate and lead the integration of isotope measurement methods with complimentary techniques to provide feasible systems for food traceability, verification of authenticity and detection of adulteration on a global basis.

In pursuit of these objectives, the Agrochemicals Unit Head participated in the 2009 CSL/JIFSAN (Central Science Laboratory, UK/Joint FDA-University of Maryland Institute for Food Safety and Applied Nutrition, USA) Joint Symposium on Food Safety and Nutrition: Methods and Systems for tracking, Tracing and Verifying Foods, 13-15 May 2009, Greenbelt, Maryland, USA.

The focus of this, the 10<sup>th</sup> annual CSL/JIFSAN symposium, was on tracking, tracing and verifying food throughout the supply chain. The symposium provided an overview of advances in research related to the traceability of foods and ingredients and tools for electronic exchange of product information within the food supply chain. The meeting had approximately 100 participants. Presentations were given by speakers from regulatory agencies, public interest groups, universities and research institutions in Europe and North America and researchers involved with the EU TRACE project. Symposium sessions include discussions on advances in analytical technologies to characterise the origin of food products, application of technologies for tracking food through the supply chain, IT tools for electronic exchange of information and barriers to adopting these technologies.

The Unit Head presented a poster entitled Food traceability and authenticity in developing countries through isotope ratio techniques. The poster outlined the need, in the context of farm-to-fork food safety systems, for techniques to trace food products to their source in order to facilitate corrective actions when contamination is detected, emphasised the related issues and problems in less-developed countries, including traceability, au-

thenticity and food adulteration, and presented a planned IAEA coordinated research project to address these issues through the development and application of stable isotope measurement techniques. The outcomes of the project are expected to be enhanced food safety and consumer protection and compliance with standards for food composition and identity, resulting in the ability to meet regulatory requirements and the expansion of international trade in foodstuffs.

Data collected during the EU-funded TRACE project formed the basis for discussions on methods for model development and verification using a holistic approach, with emphasis on the translation of laboratory studies into the marketplace and on the provision of easily understood measurement indicators of relevance to the international consumer. During the discussion sessions it became clear that research into food traceability technology was fragmented and largely uncoordinated. The EU TRACE project, which will be completed in 2009, has resulted in a number of new applicable technologies for certain applications, but as yet these technologies have not been integrated into food safety systems. The coordination by the Joint FAO/IAEA Programme of a project to integrate isotope ratio techniques and other complimentary methodology to enhance traceability on an international basis and in a farm-to-fork food safety context was welcomed.

A number of research institutes have volunteered to collaborate with the Agency in this field, including, the Institute for the Application of Atomic Energy, Chinese Academy of Agricultural Sciences (CAAS); the Institute of Agro-Food Science and Technology, CAAS; the Nuclear Chemistry Research Division, Korea Atomic Energy Research Institute; the ASSET Centre, Queens University Belfast, UK; the Institute of Chemical Technology, Prague, Czech Republic; the European Commission Joint Research Centre; the Federal Institute for Risk Assessment, Berlin, Germany; the Institute of Food Research, Norwich, UK; Teagasc (Ireland's Agriculture and Food Development Agency) and the Austrian Research Centre (ARC Seibersdorf GmbH). Possible collaboration was also welcomed by symposium delegates representing, *inter alia*, JIFSAN, Iowa State University, University of Utah, and the Norwegian Institute of Food, Fisheries and Aquaculture Research.



## Forthcoming Events

### **First Research Coordination Meeting of the CRP on the Development of Generic Irradiation Doses for Quarantine Treatments (D6.20.08); Vienna, Austria; 5-9 October 2009**

Technical Officers: David Byron and Carl Blackburn

As reported in the January 2009 issue of the Food and Environmental Protection newsletter, the new CRP on the Development of generic irradiation doses to be used as quarantine treatments was approved to commence in 2009.

Proposals have been received from a number of scientists who are scheduled to meet at the First Research Coordination Meeting, which will be held from 5-9 October 2009. It is anticipated that the meeting will elaborate work plans for the research to be performed by each participant and protocols and procedures to be used will be agreed.

The CRP participants will be contacted directly in due course with respect to the organisation of the RCM.

### **First Research Coordination Meeting of the CRP on the Development of Radiometric and Allied Analytical Methods to Strengthen National Residue Control Programmes for Antibiotics and Anthelmintic Veterinary Drug Residues (D5.20.36); Vienna, Austria; 19-23 October 2009**

Technical Officers: Andrew Cannavan and Raj Patel

As reported in the January 2009 issue of the Food and Environmental Protection newsletter, the new CRP on the Development of radiometric and allied analytical methods to strengthen national residue control programmes for antibiotics and anthelmintic veterinary drug residues was approved to commence in 2009.

Eleven research contracts and five research agreements have now been awarded under this CRP. The first research coordination meeting (RCM) will be held in Vienna, 19-23 October 2009. At the meeting, work plans for the research to be performed by each participant will be elaborated and protocols and procedures to be used will be agreed.

The CRP participants will be contacted directly in due course with respect to the organisation of the RCM.

### **Joint FAO/IAEA Train-the-Trainers Workshop on Screening/Post-screening Techniques for Veterinary Drug Residues; Agency's Laboratories, Seibersdorf, Austria; 12 to 23 October 2009**

Scientific Secretary: Andrew Cannavan

A train-the-trainers workshop on screening and post-screening quantitative techniques for veterinary drug residues in animal tissues and animal-derived foods will be held in the Training and Reference Centre for Food and Pesticide Control, IAEA Laboratories, Seibersdorf, Austria from 12-23 October 2009.

The objectives of the workshop are to provide information and strengthen the awareness of scientists and laboratory middle-management of the relevant guidelines and regulations and the theoretical and technical aspects of screening and post screening techniques for the detection of veterinary drug residues; including radio-assay, microbial inhibition, immunological, thin layer chromatographic (TLC) and high-performance liquid chromatographic (HPLC) techniques; to introduce the quality assurance/quality control principles according to ISO Standard 17025 that are relevant to veterinary drug residue analysis; and to discuss the various possible roles of quality assured laboratories in monitoring the effectiveness of good farming practices. This workshop will not address mass spectrometric confirmatory methods.

The workshop is open to analysts from Member States of FAO or IAEA. The analysts should come from laboratories involved in monitoring veterinary drug residues in food commodities for food safety and to comply with national or international regulations or guidelines.

The information and training material provided is intended to facilitate further training of personnel in their home countries by the workshop participants.

Official notification of the workshop will be circulated shortly through official channels. For further information, please contact the scientific secretary for the workshop, Mr. Andrew Cannavan (official-mail@iaea.org).

Please note that The International Atomic Energy Agency requires potential candidates for the training workshop to be officially nominated by their governments.

# Status of Coordinated Research Projects

## **D5.20.36 Development of Radiometric and Allied Analytical Methods to Strengthen National Residue Control Programs for Antibiotic and Anthelmintic Veterinary Drug Residues**

Technical Officers: Raj Patel and Andrew Cannavan

There has been rapid growth in livestock and aquaculture sectors in many developing countries as a result of growing economies, resulting in changing production practices and an increase in international trade in food products of animal origin. However this growth has been accompanied by a rise in disease outbreaks and the use of veterinary medicines, in particular antibiotics and anthelmintics. Although many countries encourage responsible use of these medicines, there are significant constraints, including availability of suitable analytical methods to detect the presence of residues resulting from their use.

The project was developed after extensive consultation with stakeholders including participants in previous CRPs, regulatory and scientific experts of authorities in member states and consultants to identify areas of concern to less developed countries. The main purpose of the CRP is to assist National Reference Laboratories of FAO and IAEA member states in meeting the need for effective and appropriate monitoring methods for residues of selected antibiotic and anthelmintic veterinary medicines through the development and application of screening methods that exploit the advantages (robustness, sensitivity, transferability) of radiotracer detection methods, in conjunction with confirmatory techniques using stable-isotope labelled molecules.

This CRP aims to develop multi-analyte screening methods utilising radioactive labelled streptavidin in a competitive immunoassay format. Other screening techniques, including High Performance Thin Layer Chromatography (HPTLC) with optical scanning and/or autoradiography, will also be investigated together with confirmatory assays meeting the requirements of regulatory authorities.

Eleven research contracts and five research agreements have now been awarded under this CRP. The participants are scheduled to meet at the First Research Coordination Meeting scheduled to be held in October this year, at the IAEA Headquarters in Vienna.

In order to promote effective control policies to prevent /minimize drug resistance, emphasis will be placed on

anti-parasitic drugs widely used in developing countries, and compounds highlighted by the Joint FAO/WHO/OIE Expert Meeting on Critically Important Antimicrobials. The project will establish a harmonised network of expertise able to share knowledge and transfer technology to strengthen national residue control programs of Member States to improve food safety, combat drug resistance and comply with harmonized Codex standards.

Direct transfer of information from the CRP to local stakeholders is essential and results from the First Research Coordination Meeting Scheduled to take place in October will be published in national and international scientific journals, local technical reports and official IAEA documents.

## **D6.20.08 Development of Generic Irradiation Doses for Quarantine Treatments**

Technical Officers: Carl Blackburn and David Byron

Regulatory authorities and scientists from many internationally recognised institutions have studied research data on the effectiveness of irradiation as a quarantine treatment against a large range of insect pest species infesting various fruits and vegetables.

The project was developed after extensive consultation with stakeholders including participants in previous CRP's, regulatory and scientific experts of authorities in member states and consultants to identify areas of concern to less developed countries. The main purpose of the CRP is to validate generic treatment doses for groups of arthropods of quarantine significance in international trade. Secondary objectives include an examination of the effects of low oxygen commodity storage and dose rate on efficacy and commodity tolerances. Research may result in a reduction in the existing 400 Gy dose levels for Insecta (except for pupae and adults of Lepidoptera).

A specific irradiation dose that has been shown scientifically to inactivate a species of quarantine importance in various commodities will also inactivate all related arthropod species within that genus and negate the need to develop or validate specific irradiation doses tailored to individual arthropod species. The project will establish validated irradiation doses for non fruit fly species of quarantine significance.

Proposals have been received from a number of scientists who are scheduled to meet at the First Research

Coordination Meeting scheduled to be held in October this year, at the IAEA Headquarters in Vienna.

The work to be done under this CRP will assist setting doses for the phylum Arthropoda and a few subgroups within that phylum as well as specific minimum doses that provide quarantine security against pests in various commodities.

The project results will strengthen existing irradiation standards developed by the International Plant Protec-

tion Convention. It will help international trade if Member States accept generic irradiation doses for a wide range of quarantine pests.

Direct transfer of information from the CRP to local stakeholders is essential and results from the First Research Coordination Meeting Scheduled to take place in October will be published in national and international scientific journals, local technical reports and official IAEA documents.



## Current Technical Cooperation Projects

Project Number	Title and Project Objectives	Technical Officer
ALG5025	<p><b>Strengthening Capabilities to Control Veterinary Drug Residues in Foodstuffs</b></p> <p>To improve consumer protection and facilitate trade through increased capacity in the determination of veterinary drug residues in foods.</p>	Patel, Rajendra Kumar P. (NAFA) Cannavan, Andrew (NAAL)
ANG5003	<p><b>Veterinary Drug Residue Monitoring Programme</b></p> <p>To establish a capability to determine veterinary drug residues in livestock products.</p>	Patel, Rajendra Kumar P. (NAFA) Cannavan, Andrew (NAAL)
ARG5011	<p><b>The Use of Ionizing Radiation for the Phytosanitary Treatment of Fresh Fruit</b></p> <p>To strengthen the national technological capacity for the establishment of irradiation services for phytosanitary treatment.</p>	Byron, David Henry (NAFA)
BEN5003	<p><b>Veterinary Drug Residue Monitoring Programme</b></p> <p>To develop a capacity for veterinary drug residue monitoring in livestock products.</p>	Viljoen, Gerrit Johannes (NAFA) Cannavan, Andrew (NAAL) Patel, Rajendra Kumar P. (NAFA)
BEN5004	<p><b>Regulatory Control and Monitoring of Mycotoxins to Facilitate Trade</b></p> <p>To establish laboratory capacities and analytical procedures for mycotoxin control.</p>	Brodesser, Peter Josef (NAFA) Byron, David Henry (NAFA)
BGD5027	<p><b>Establishing a Veterinary Drug Residue Laboratory</b></p> <p>To establish a laboratory complying with international standards for surveillance of veterinary drug residues and prohibited substances in food of animal origin.</p>	Patel, Rajendra Kumar P. (NAFA) Cannavan, Andrew (NAAL)
BKF5005	<p><b>Regulatory Control and Monitoring of Contaminants and Residues</b></p> <p>To strengthen the technical capabilities of the National Public Health Laboratory (LNSP) in analysis, monitoring and surveillance of food and the environment by establishing an improved quality process and procedures to perform contaminant and pesticide residue analysis in foodstuff to comply with international standards.</p>	Brodesser, Peter Josef (NAFA) Maestroni, Britt Marianna (NAFA)
BOL5017	<p><b>Capacity for Monitoring Pesticide Residues for Compliance with Minimum Risk Levels and Good Agricultural Practice According to ISO 17025</b></p> <p>To improve food safety and environmental quality in Bolivia and the competitiveness of Bolivian farmers.</p>	Ferris, Ian Glen (NAFA) Maestroni, Britt Marianna (NAFA)

Project Number	Title and Project Objectives	Technical Officer
BRA5058	<p><b>Applying Ionizing Radiation for Food Security and Healthcare</b></p> <p>The main goal is 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.</p>	Byron, David Henry (NAFA)
CHI5046	<p><b>Certification of Exported Animal Products Using Nuclear and Other Analytical Techniques</b></p> <p>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.</p>	Patel, Rajendra Kumar P. (NAFA) Cannavan, Andrew (NAAL)
CMR5014	<p><b>Creation of a Nuclear Analysis Laboratory in CATEN for Food Safety</b></p> <p>Improving the assessment of good agricultural practices at a catchment scale using laboratory analytical support.</p>	Brodesser, Peter Josef (NAFA) Ferris, Ian Glen (NAFA) Padilla Alvarez, Roman (NAAL) Kis-Benedek, Gyula (NAAL)
CPR5018	<p><b>Building Technological Capacity for Food Traceability and Testing of Pesticide Residues in Food</b></p> <p>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.</p>	Brodesser, Peter Josef (NAFA)
COL5021	<p><b>Cost Benefit Assessment for the Modernization of an Irradiator in Colombia</b></p> <p>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.</p>	Byron, David Henry (NAFA), Sampa, Maria Helena de O. (NAPC) Pacheco Jimenez, Ronald Enrique (NSRW)
COL5022	<p><b>Assessment of the Impact of Pesticide Use in Lake Tota, Boyacá, Colombia</b></p> <p>General: to improve quality of life, water quality and environmental quality. Specific: 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.</p>	Ferris, Ian Glen (NAFA) Maestroni, Britt Marianna (NAFA)

Project Number	Title and Project Objectives	Technical Officer
COS5026	<p><b>Management and Appropriate Use of Insecticide-nematicides</b></p> <p>To reduce the adverse impact of insecticide-nematicides through the application of water management and nuclear techniques.</p>	Ferris, Ian Glen (NAFA)
CPR5016	<p><b>Strengthening the Quality Assurance System for Food Irradiation</b></p> <p>To strengthen the quality assurance system and enhance the capacity of implementing quality standards and evaluation of existing and established standards on food irradiation in order to raise the quality and quantity of irradiated food.</p>	Byron, David Henry (NAFA)
ERI5005	<p><b>Zoonotic (diseases that can be transmitted from animals to humans) Disease Control and Analysis of Veterinary Residues in Foods</b></p> <p>The objective of the project is to determine: 1. The epidemiological prevalence of brucellosis and tuberculosis in the major dairy producing areas; 2. Baseline data on veterinary drug residues in milk and meat products.</p>	Patel, Rajendra Kumar P. (NAFA) Unger, Hermann (NAFA)
GUA5015	<p><b>Establishing a Food Irradiation Plant</b></p> <p>To establish the technical conditions for setting up a food irradiation plant in Guatemala in order to support agriculture exports.</p>	Byron, David Henry (NAFA)
HAI5003	<p><b>Enhancing Crop Productivity through the Application of Isotope Nuclear Techniques</b></p> <p>To enhance the national capabilities to apply suitable agricultural practices and nuclear techniques to increase crop productivity to meet the national requirements for food security.</p>	Heng, Lee Kheng (NAFA) Ferris, Ian Glen (NAFA)
INS5033	<p><b>Enhancement of Quality Assurance for the Analysis of Veterinary Drug Residues</b></p> <p>To enhance the national capacity to ensure the safety of food products of animal origin.</p>	Patel, Rajendra Kumar P. (NAFA) Cannavan, Andrew (NAAL)
IVC5027	<p><b>Monitoring of Pesticide Residues in Food Products</b></p> <p>To establish a sustainable capacity for control and monitoring of pesticide residues in food products.</p>	Brodesser, Peter Josef (NAFA) Maestroni, Britt Marianna (NAFA)
JAM5011	<p><b>Supporting Food Irradiation of Selected Economically Important Crops</b></p> <p>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.</p>	Byron, David Henry (NAFA)



Project Number	Title and Project Objectives	Technical Officer
MAK5005	<p><b>Upgrading of Food Safety System</b></p> <p>To improve the food safety system in the country.</p>	<p>Brodesser, Peter Josef (NAFA) Maestroni, Britt Marianna (NAFA)</p>
MNE8002	<p><b>Upgrading a Persistent Organic Pollutant Laboratory towards Accreditation for Environmental Monitoring</b></p> <p>Overall objective: 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. Specific objective: 1. To organize adequate monitoring of POPs in existing polluted areas in Montenegro in order to establish a plan of decontamination, recovery and risk assessment. 2. To prepare the inventory and database for the national plan for implementation of the Stockholm Convention, 3. To establish CETI as a reference laboratory in the West Balkan countries for the UNEP Global Monitoring Programme for POPs. 4. To facilitate the ratification of the Stockholm Convention, implementation of the Basle Convention on the Control of Transboundary Movement of Hazardous Waste, and hazardous waste determination and control in Montenegro. This instrument is also needed for implementation of the Rotterdam Convention on Chemical Management. 5. To promote the development and sharing of information on the 12 specified POPs. 6. To produce an inventory of POPs in Montenegro, especially dioxins and dioxin-like substances.</p>	<p>Safrany, Agnes (NAPC) Brodesser, Peter Josef (NAFA)</p>
MON5012	<p><b>Monitoring of Residues in Livestock Products and Surveillance of Animal Diseases</b></p> <p>To develop a capacity for veterinary drug residue and contaminant monitoring in livestock products and to expand serosurveillance capabilities to achieve rinderpest and foot and mouth disease (FMD) free status in the country or specific zones.</p>	<p>Cannavan, Andrew (NAAL) Luckins, Antony George (NAAL)</p>
MOR5024	<p><b>Industrial Application of Irradiation</b></p> <p>To reduce staple food losses, increase the microbiological safety of foods, and facilitate food trade through the use of irradiation technology.</p>	<p>Byron, David Henry (NAFA)</p>
MOR5029	<p><b>Conserving and Improving the Quality of Aromatic and Medicinal Plants through Irradiation, and Transfer of this Procedure on an Industrial Scale</b></p> <p>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.</p>	<p>Byron, David Henry (NAFA) Sampa, Maria Helena de O. (NAPC)</p>

Project Number	Title and Project Objectives	Technical Officer
MYA5015	<p><b>Strengthening the National Capacity for the Production of Veterinary Vaccines</b></p> <p>To enhance the national capacity for quality vaccine production to support efforts to control infectious diseases in livestock production, particularly FMD.</p>	Crowther, John Richard (NAFA) Cannavan, Andrew (NAAL)
NIC5007	<p><b>Determining Drug Residues in Bovine Meat Exports</b></p> <p>To determine veterinary medicine residues and growth promoters through nuclear and complementary techniques to improve production, product quality and diagnostic techniques.</p>	Patel, Rajendra Kumar P. (NAFA) Cannavan, Andrew (NAAL) Brodeser, Peter Josef (NAFA)
NIR5033	<p><b>Improvement of Quality Management and Food Safety Monitoring Using Isotope Techniques</b></p> <p>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.</p>	Brodeser, Peter Josef (NAFA) Byron, David Henry (NAFA)
NIR5034	<p><b>Feasibility Study on the Optimal Use of an Industrial Gamma Irradiation Facility</b></p> <p>To conduct a feasibility study on the optimal use of the new Gamma Irradiation Facility for industrial application in Nigeria.</p>	Sampa, Maria Helena de O. (NAPC) Byron, David Henry (NAFA)
PAN5017	<p><b>Monitoring Pesticide Residues in the Production of Tropical Fruit (Pineapples and Melons) and Controlling Analytical Quality with the Aid of Nuclear Techniques</b></p> <p>To improve food safety in the production of tropical fruits in Panama.</p>	Ferris, Ian Glen (NAFA) Maestroni, Britt Marianna (NAFA)
PHI5030	<p><b>Upgrading the Gamma Irradiation Facility</b></p> <p>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.</p>	Sampa, Maria Helena de O. (NAPC) Haji-Saeid, Seyed Mohammad (NAPC) Byron, David Henry (NAFA)

Project Number	Title and Project Objectives	Technical Officer
RAS5046	<p><b>Novel Applications of Food Irradiation Technology for Improving Socioeconomic Development (RCA)</b></p> <p>The overall objective of this project is 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. The specific objectives are: 1) To elaborate and expand the phytosanitary or quarantine treatment protocols of irradiation technology for up to five identified fruits of the region, with a view to encouraging greater intraregional trade and consumption; 2) To develop process parameters for sanitary application of radiation using electron beam irradiation of selected food items, and other irradiation applications for critical food items such as prepared foods for hospitals; 3) To create awareness of these technologies with the appropriate quarantine and food control authorities in RCA Member States and to assist those involved in drafting application legislation by providing them with technical input.</p>	Byron, David Henry (NAFA)
RAS5050	<p><b>Enhancing Sanitary and Phytosanitary Treatment of Regional Products for Export by Irradiation (RCA)</b></p> <p>To enhance treatment of and trade in irradiated products of economic importance in the Asia Pacific region.</p>	Byron, David Henry (NAFA)
RER9074	<p><b>Long-Term Countermeasure Strategies and Monitoring of Human Exposure in Rural Areas Affected by the Chernobyl Accident</b></p> <p>To develop a decision support system for countermeasure strategies in populated rural areas affected by the Chernobyl accident, and enhance capabilities to monitor associated long-term human exposure.</p>	Berkovskyy, Volodymyr (NSRW) Ferris, Ian Glen (NAFA) Fesenko, Sergey (NAAL)
RLA5050	<p><b>Strengthening Laboratory Capacity to Assess the Implementation of Good Agricultural Practices in the Production of Fruit and Vegetables in Latin America</b></p> <p>To improve the assessment of good agricultural practices, with the support of analytical laboratories, in the following basins: Alto Valle del Rio Negro and Neuquén, valleys of the Ribeira river in Brazil and the Apalta river in Chile, Lake Tota in Colombia, the Machuca-Jesús María river in Costa Rica, Ariguanabo in Cuba, Guayas in Ecuador and Salto in Uruguay.</p>	Ferris, Ian Glen (NAFA) Dercon, Gerd (NAFA) Maestroni, Britt Marianna (NAFA)



Project Number	Title and Project Objectives	Technical Officer
RLA5053	<p><b>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)</b></p> <p>To apply a diagnosis and assesment system for evaluating the impact of pesticide contamination in food and environmental compartments in the following basins: Alto Valle del Rio Negro and Neuquén in Argentina, valleys of the Ribeira river in Brazil and the Apalta in Chile, Lake Tota in Colombia, the Machuca-Jesús María river in Costa Rica, Ariguanabo in Cuba, Jambeli and Saquimala rivers in Ecuador, Chapare in Bolivia, Salto in Uruguay and Artibonite Valley in Haiti.</p>	<p>Ferris, Ian Glen (NAFA)  Maestroni, Britt Marianna (NAFA)  Dercon, Gerd (NAFA)</p>
RLA5055	<p><b>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 and Conventional Analytical Techniques (ARCAL CIV)</b></p> <p>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.</p>	<p>Patel, Rajendra Kumar P. (NAFA)  Cannavan, Andrew (NAAL)</p>
ROK5034	<p><b>Nutrient Efficient Crops and Safe Use of Pesticides in Sustainable Crop Production</b></p> <p>To analyze the behaviour of pesticides and evaluate their persistence in vegetables grown under greenhouse conditions, and to investigate the ability of crops to access nutrient reserves, with special reference to phosphorus, in the volcanic ash soils of Cheju Island.</p>	<p>Ferris, Ian Glen (NAFA)</p>
SLO5002	<p><b>Protecting Groundwater and Soil against Pollutants Using Nuclear Techniques</b></p> <p>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. The results will provide reliable data (e.g., soil parameters, climate conditions) for soil and groundwater protection against pesticide and nitrate pollution in Slovenia. This will help Slovenia comply with the EU Water Framework Directive (2000/60/EC) by 2013.</p>	<p>Adu-Gyamfi, Joseph Jackson (NAAL)  Ferris, Ian Glen (NAFA)</p>

Project Number	Title and Project Objectives	Technical Officer
SRL5039	<p><b>Monitoring of Chemical Residues and Food-borne Pathogens</b></p> <p>To extend the residue screening and testing capability through upgrading the food microbiology laboratory for monitoring of nitrofurans group of residues and food-borne pathogens.</p>	Cannavan, Andrew (NAAL)
SRL8019	<p><b>Technical Support for the Establishment and Operation of a Multi-Purpose Gamma Irradiation Facility</b></p> <p>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.</p>	Sampa, Maria Helena de O. (NAPC) Byron, David Henry (NAFA)
SYR5020	<p><b>Implementation of Quality Assurance and Quality Control Procedures in Pesticide Residue Analysis Laboratories</b></p> <p>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.</p>	Brodesser, Peter Josef (NAFA) Byron, David Henry (NAFA)
TAD5004	<p><b>Improving Laboratory Capacity for Food Safety</b></p> <p>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.</p>	Fasenko, Sergey (NAAL) Ferris, Ian Glenn (NAFA) Maestroni, Britt Mariana (NAAL)
URT5024	<p><b>Nuclear Techniques for the Monitoring of the Food Quality in the United Republic Of Tanzania</b></p> <p>To improve consumer protection and facilitate trade.</p>	Brodesser, Peter Josef (NAFA) Byron, David Henry (NAFA)
URU5025	<p><b>Determining Pesticide and Antibiotic Residues in Food for Local and Export Consumption</b></p> <p>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 <sup>14</sup>C-labelled pesticides.</p>	Maestroni, Britt Mariana (NAAL) Ferris, Ian Glen (NAFA)
URU5027	<p><b>Preparing for the Introduction of Irradiation Techniques</b></p> <p>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.</p>	Byron, David Henry (NAFA)

# Agrochemicals Unit, FAO/IAEA Agriculture & Biotechnology Laboratory, Seibersdorf

## Method development and technology transfer

There are several method development/validation and applied research activities ongoing in the Agrochemicals Unit. Methods currently under development and/or validation include multiresidue methods for polar and non-polar pesticides in water with analysis by gas chromatography-mass spectrometry, for application by a number of contract holders under the CRP "Integrated analytical approaches to assess indicators of the effectiveness of pesticide management practices at the catchment scale" (D5.20.35) and in counterpart laboratories in the Latin American regional TCP "Strengthening laboratory capacity to assess the implementation of good agricultural practices in the production of fruit and vegetables in Latin America" (RLA/5/050).

A multiresidue isotope-dilution liquid chromatography-tandem mass spectrometry method for the analysis of residues of 38 anthelmintic veterinary drugs has been developed in the Unit in collaboration with Ashtown Food Research Centre, Dublin, Ireland, under the EU 6<sup>th</sup> Framework Project "ProSafeBeef". The method is currently being validated in the Unit for transfer initially to a partner laboratory in Brazil, and thereafter to contract holders under the new CRP "Development of radiometric and allied analytical methods to strengthen national residue control programmes for antibiotics and anthelmintic veterinary drug residues" (D5.20.36) and TCP counterparts in the project on 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 (RLA/5/055, ARCAL CIV).

The Unit also provides analytical services and assistance with research problems for other Units and Sections within the Agency. For example, the Agrochemicals is currently assisting the Entomology Unit in their research activities through the development of a method to monitor levels of antiviral drugs used in rearing Tse-tse flies.

Other method development and transfer activities include those listed below under the fellows section of this newsletter.

## Fellows

Developing analytical methods for transfer to Member state laboratories and training fellows or interns for capacity building are key activities of the Agrochemicals unit as part of its mandate to promote food safety and security among IAEA Member countries. Ms. Siya Assey, a TC fellow from the Republic of Tanzania, who participated in a training workshop on the quality control/quality assurance measures in pesticide residue analysis last 13 October to 7 November 2008 along with 22 other scientists from various developing countries, continued her fellowship in the Unit until 9 January 2009. During this period, Ms. Assey received more detailed and intensive training on the operation of gas chromatograph (GC) instrumentation, method validation, and statistical evaluation of results. Under the close supervision of the Unit staff, Ms. Assey completed a validation study on a method for the analysis of pyrethroids in beef tissue.

The method was based on a QuEChERS type extraction and clean-up and used GC equipped with electron capture detector (ECD) for the detection of four target pyrethroid analytes. Pyrethroids are a group of man-made pesticides similar to the natural pesticide pyrethrum,



*Fellows working in the Agrochemicals Unit on method development and instrumental analysis*



which is produced from chrysanthemum flowers. The pyrethroids being studied were  $\lambda$ -cyhalothrin, cyfluthrin, cypermethrin, and deltamethrin. These compounds are commonly used as ectoparasiticides to control insect pests in the household or on cattle. Cyhalothrin, for example, is typically used in cattle



and horse housing whereas cypermethrin and deltamethrin are applied topically on cattle to control ticks, fleas, lice, and blowflies. It is important, therefore, to have methods in place to check for contamination by these substances in food of animal origin.

The validated method gave a typical recovery of 97.3 % and typical reproducibility of 14.5 %. A quick and simple procedure has been developed within the Agrochemicals Unit to assess the efficiency of an analytical method in terms of trueness and precision and to estimate the uncertainty of the analytical results through the use of  $^{14}\text{C}$ -labelled compounds. The overall uncertainty, estimated by a 'bottom-up' approach using  $^{14}\text{C}$ , labelled deltamethrin and liquid scintillation counting was 12.3 %. An estimation of the uncertainty by an alternative, top-down' method applied to the GC validation results gave a value of 14.3 %.

The validated method will be implemented in Ms. Assey's home laboratory and is suitable for use in many other member state laboratories.

Another fellow, Mr. Khaled El-Hawari from Lebanon, who also participated in the above-mentioned QA/QC training workshop, remained with the Agrochemicals Unit until 9 April 2009 to train intensively on the use of gas chromatography-mass spectrometry (GC-MS) for residues analysis. Mr El Hawari also participated in a one-month intensive group fellowship training on GC-MS (see related report in this issue) held in the Unit where he gained additional knowledge on various aspects of GC-MS theory and troubleshooting techniques.

Mr. El Hawari worked with ACU staff on the adaptation and validation of a multiresidue isotope-dilution method for the determination of agrochemicals in water which will be applied in CRP D5.20.35. In addition, he also contributed to the Unit's work by performing GC-MS analysis of mosquito net samples submitted by Entomology unit for residue testing.

### **Training Course on the Application of Gas Chromatography-mass Spectrometry for the Control of Food and Environmental Contaminants; Agency's Laboratories, Seibersdorf, Austria; 10 November – 5 December 2008**

Technical Officers: Britt Maestroni and Ian Ferris

An intensive fellowship training course on gas chromatography-mass spectrometry (GC-MS) was held in the Agrochemicals Unit from 10 November to 5 December 2008, funded under TCP RLA/5/050.

Recently in Latin America there have been significant improvements in the availability and use of advanced analytical instrumentation. Equipment such as GC-MS

has been purchased and installed in many laboratories with the intent to contribute to better food and environmental safety. To help facilitate the optimal use of the GC-MS instruments for screening and confirmatory analysis of contaminants in food and the environment a four week theoretical and practical GC-MS training course was organized.

Six analysts from Argentina, Brazil, Bolivia, Chile, Colombia, Costa Rica and Lebanon participated for the whole duration of the training, while two additional analysts from the Republic of Tanzania and Slovenia participated at the first week of the course.

The training was organised in four different modules, each supervised by a different expert.

The first module was provided by Mr. Rick Parmely, from Restek Corporation, who gave technical training on the theory of gas chromatography-mass spectrometry and provided extensive information on the maintenance and troubleshooting of the Agilent 5975c MSD system, which was used as a model system for the training. Detailed training was provided on technical aspects of the theory of mass spectroscopy, gas chromatography, the instrument inlets, capillary column selection, the mass-selective detector (MSD), the vacuum system, ion sources, the quadrupole mass filter, GC detectors, data acquisition methods, and troubleshooting.

The second module was run by Mr Eddie Fonseca from CICA laboratory, Costa Rica and Mr Berthold Kettner from ILAU laboratory, Germany. Mr Fonseca presented some practical information on the use of the GC-MS for pesticide residue analysis in Costa Rica. Mr Kettner introduced the concepts of mass spectral interpretation and gave practical demonstrations on data analysis.

The third module was covered by Mr Jaume Santamaria, from Agilent, Spain. The Agilent expert gave very detailed information on the use of the instrument as well as demonstrating the use of the Chemstation software to set up data acquisition and data analysis methods, retention time locking (RTL), and the use of deconvolution software.

Ms Celine Lesueur, from LVA laboratory, Austria, supervised the final module, which focused on the QuEChERS extraction/clean-up method and the use of the GC-MS software to quantify and confirm pesticide residues in food and environmental matrices. One day was spent at the LVA laboratory to give the participants an understanding of the requirements of a routine laboratory in terms of quality and confirmatory aspects.

During the course the participants used the Agrochemicals Unit's GC-MS instrument, gaining hands-on experience of maintenance and trouble shooting proce-

dures such as cleaning the ion source, disassembling and reassembling the MS interface, changing liner and septa, connecting and disconnecting the column, performing splitter calculations for different split ratios to ECD, NPD and MSD, evaluating tune reports, and checking for leakages.

The training course was very positively evaluated by all participants. The participants recommended that a second training event should be organised as soon as possible.

### **A multi-class method for anthelmintics to investigate their behaviour in a soil-plant-water system using $^{14}\text{C}$ -labelling**

Technical Officer: Marivil Islam

The use of anthelmintic drugs has become inevitable in the sustainable production of livestock animals to promote food safety and security. Since the administered drugs are usually eliminated from the body in the animals' faeces, they can be found in the manure. Animal excrement from the livestock industry is a cost-effective fertilizer frequently applied to agricultural land to regenerate the depleted minerals and organic substances consumed in crop production, especially in the production of bio-crops. Along with excreta from grazing animals treated with the drugs, this may result in significant amounts of these drugs in soil and ground water, and consequently in the plants growing on the affected land. The increasing use of anthelmintics to improve animal production could, therefore, affect the ecological system. Various researchers have demonstrated that water sources used for irrigation can contain organic contaminants, often in significant amounts. Recycling of the drugs through grazing animals on these grasses may also be a cause of residues in food-producing animals and could add to the problem of anthelmintic resistance. Unlike pesticides, which have been extensively studied in the past, the impact of veterinary drugs to the environment has not been suffi-



*Studies on anthelmintic recycling in alfalfa using  $^{14}\text{C}$ -labelled levamisole*

ciently considered. Determination of the concentrations and characterization of the behaviour of these drugs as trace contaminants in crops, soil, and the aquatic system would provide very useful information for future considerations on the impact of these drugs on the environment, and their possible recycling into animal tissue.

A lysimeter study was initiated in 2008 to examine the behaviour of anthelmintics in a soil-plant-water system. The first phase of the study involved the development of a multi-class method for anthelmintics in soil, water and plants. Experiments were also initiated on a small, greenhouse scale using a  $^{14}\text{C}$ -labelled compound to optimise the design of the lysimeter experiments.

To develop the multi-class method and the lysimeter



*Studies on anthelmintic behaviour in soil using  $^{14}\text{C}$ -labelled levamisole*

study, one representative substance was chosen from each of three main anthelmintic classes. The method developed covered the following groups: imidazothiazoles (represented by levamisole), benzimidazoles (fenbendazole and its sulfoxide and sulphone metabolites), and macrocyclic lactones (eprinomectin). For water, a solid phase extraction technique was used to extract and concentrate the analytes. For soil, a QuEChERS-type method was used for the extraction and clean-up. The extracts were separated by reversed phase chromatography on a C18 column and analysed a Waters Quattro-Micro triple-quadrupole mass spectrometer. Multiple reaction monitoring was used with electrospray ionization in positive mode for all analytes studied. Preliminary validation of the method indicated that the analytical recoveries obtained for water and soil were acceptable and the method is undergoing full validation. Further optimisation of the method for plant material is ongoing and is expected to be completed shortly.

The preliminary small-scale experiments using  $^{14}\text{C}$ -labelled levamisole have commenced.

## Annual Meeting of Work Package 1.4, Chemical Residues of the EU 6<sup>th</sup> Framework Project ProSafeBeef; Dublin, Ireland; 27 March 2009

Technical Officer: Andrew Cannavan

A meeting of the partners involved in workpackage 1.4, "Chemical Residues" of the EU 6<sup>th</sup> Framework project "Advancing beef quality and safety through research and innovation" (ProSafeBeef), was convened in Ash-town Food Research Centre (AFRC), Dublin, Ireland on 27 March 2009. The Agrochemicals Unit Head represented the Unit as a partner in the project.

The meeting discussed the progress of method development, which is on schedule, and technology transfer,

which is the responsibility of the IAEA partner (Agrochemicals Unit, Seibersdorf), and sampling plans and protocols for risk assessment.

The multi-residue isotope dilution method for residues of 38 anthelmintic drugs in meat is already operational in the Agrochemicals Unit. As a follow-up to the meeting, a member of the Unit staff spent one week at the AFRC laboratory in Ireland to refine the method and harmonise data analysis protocols. A scientist from the Microbionics laboratory in Brazil will join the Agrochemicals Unit in June for two months, funded by the ProSafeBeef project, to be trained in the method and assist in its validation, thereby facilitating transfer to Microbionics and to other South American laboratories thereafter.

## Publications

1. Byron, D.H., Cannavan, A., and Patel, R.K.P. (2009). Report on Activities of the International Atomic Energy Agency (IAEA) Relevant to Codex Work (CX/RVDF 09/18/3-Add 1.). Eighteenth Session of the Joint FAO/WHO Codex Committee On Residues of Veterinary Drugs in Foods, Natal, Brazil, 11 – 15 May 2009
2. Byron, D.H. (2009) Report on Activities of the International Atomic Energy Agency (IAEA) Relevant to Codex Work (CX/CF 09/3/3-Add. 1). Third Session of the Joint FAO/WHO Codex Committee On Contaminants In Foods, Rotterdam, The Netherlands, 23 - 27 March 2009
3. Cannavan, A., Brodesser, P.J. and Byron, D.H. (2009). Food Traceability and Authenticity in Developing Countries through Isotope Ratio Techniques. Book of Abstracts of the 10<sup>th</sup> CSL/JIFSAN Joint Symposium, Food Safety and Nutrition: Methods and Systems for Tracking, Tracing and Verifying Foods, Greenbelt, Maryland, USA, 13-15 May 2009, 59-60.
4. Cannavan, A. (2009). Research and Capacity Building to Meet Food Safety Regulations – a Global Perspective. Book of abstracts of the conference Food Research in Support of Science-Based Regulations: Challenges for Producers and Consumers, Prague, Czech Republic, 21-22 April 2009, 49.
5. Sasanya, J., Islam, M., Kist, A., Danaher, M., Whelan, M., Granja, R. and Cannavan, A. (2009). A Multi-residue Isotope Dilution LC-MSMS Method to Support Risk Assessment for Anthelmintic Drug Residues in Beef. Proceedings of the International Conference Advancing Beef Safety through Research and Innovation, Dublin, Ireland, 25-26 March 2009, 96.
6. Danaher, M., Whelan, M., Kinsella, B., Cantwell, H., McCormack, M., Byrne, P., Cooper, K., Kennedy, G., Cannavan, A., Montes Nino, A. Granja, R., Trigueros, G., van Asselt, E., Furey, A., and Lehotay, S. (2009). Detection of Anthelmintic Residues in Food Using Rapid Polarity Switching UPLC MS/MS Combined with QuEChERS Technology. Proceedings of the International Conference Advancing Beef Safety through Research and Innovation, Dublin, Ireland, 25-26 March 2009
7. Byron, D.H. (2009) Report on Activities of the International Atomic Energy Agency (IAEA) Relevant to Codex Work (CAC/32 INF/6). Thirty-second Session of the Joint FAO/WHO Codex Alimentarius Commission, Rome, Italy, 29 June – 4 July 2009.



**IAEA**  
International Atomic Energy Agency

Food and Environmental Protection  
Newsletter Vol. 12, No. 2

July 2009

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  
Wagramer Strasse 5, P.O. Box 100,  
1400 Vienna, Austria

Printed by the IAEA in Austria,  
July 2009