Joint FAO/IAEA Programme
Nuclear Techniques in Food and Agriculture

Food & Environmental Protection Newsletter

Vol. 10, No. 2 July 2007

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

ISSN 1020-6671

Contents

To the Reader

Emergency planning and response to nuclear emergencies and radiological events are of growing importance in our joint international activities, particularly with regard to increasing the capabilities of FAO as a critical counterpart in defining and implementing agricultural countermeasures in response to such events. These FAO responsibilities are mandated through two major international conventions, namely, the *Convention on Early Notification of a Nuclear Accident*, whereby the FAO is responsible to "…. advise governments on acceptable levels of radionuclides appearing in agricultural, fisheries and forestry products entering national and international trade", and; through the *Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency*, whereby the FAO is responsible to "…. advise governments on measures to be taken in terms of the agricultural, fisheries and forestry practices to minimize the impact of radionuclides and to develop emergency procedures for alternative agricultural practices and for decontamination of agricultural, fisheries and forestry products, soil and water".

Pursuant to the obligations placed on it by these Conventions, the FAO regularly participates in the IAEA sponsored Interagency Committee on Response to Nuclear Accidents (IACRNA), whose purpose is to coordinate the arrangements of the relevant international intergovernmental organizations for preparing for and responding to nuclear and radiological emergencies. We are pleased to report that FAO hosted the most recent 19th Regular Meeting of IACRNA in Rome from 26 to

IAEA International Atomic Energy Agency

27 April 2007 to discuss, among other issues, the review and endorsement of revised IACRNA Terms of Reference, the development of an IACRNA Work Plan for the period between the 19th and 20th Regular Meetings, and to consider preparations for the forthcoming international nuclear emergency exercise (ConvEx-3) to be held in 2008. Fourteen representatives of nine international organisations (EC, FAO, IAEA, IMO, NATO, OECD/NEA, UNDSS, WHO and WMO) attended the Meeting and a representative of NATO participated as an observer.

Other collaborative activities helped to ensure the successful adoption of the revised Codex Guideline Levels for Radionuclides in Foods Contaminated Following a Nuclear or Radiological Emergency for Use in International Trade. As many of you are aware, the Joint FAO/WHO Codex Alimentarius Commission was created in 1963 by FAO and WHO to develop food standards, guidelines and related texts such as codes of practice under the Joint FAO/WHO Food Standards Programme. The main purposes of this programme are protecting health of consumers and ensuring fair practices in the food trade while promoting coordination of all food standards work undertaken by international governmental and non-governmental organizations.

FAO activities related to emergency preparedness and response also include their participation in the 22nd Meeting of the Radiation Safety Standards Committee (RASSC) at IAEA Headquarters from 10-13 April 2007. The RASSC is a standing body of senior experts in radiation safety, established by the Deputy Director General in the IAEA Department of Nuclear Safety and Security. RASSC advises the Deputy Director General on the overall programme for the development, review and revision of international standards relating to radiation safety.

These RASSC functions include the provision of advice on the approach and prioritization of the development of the radiation safety standards issued in the IAEA Safety Standards Series, covering Safety Fundamentals, Safety Requirements and Safety Guides, both thematic and practice specific. In this regard, the FAO plays a critical role in the development of emergency preparedness and response procedures related to food and agriculture as a co-sponsor of the IAEA Safety Standards, including through its participation in the international organization secretariat established for the review and revision of these standards.

The revision of the IAEA Basic Safety Standards also entails FAO participation at the Organization of Economic Cooperation and Development (OECD) Working Party on Nuclear Emergency Matters (WPNEM), most recently at the 27th WPNEM Meeting at the OECD Nuclear Energy Agency in Paris, France from 15-16 May 2007. The mission of the WPNEM is to improve nuclear emergency management systems (planning, preparedness, response, recovery) within member states in coordination with other related organizations, including FAO. Part of its work programme focuses on exploring and developing new concepts and future procedures to enhance national and international preparedness and response management, including through the preparation and conduct of the International Nuclear Emergency Exercise (INEX) series.

The Joint Division looks forward to its continued collaboration with FAO in assisting its Member States to effectively respond to nuclear emergencies through the provision of training and support and the development, coordination and implementation of procedures and response mechanisms.

In closing, I wish to convey my 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 Henry BYRON	Section Head	D.H.Byron@iaea.org	21638
Ian Glen FERRIS	Technical Officer	I.G.Ferris@iaea.org	21696
Tatiana RUBIO-CABELLO	Food Microbiologist	T.Rubio-Cabello@iaea.org	21639
Peter Josef BRODESSER	Food Safety Specialist	J.Brodesser@iaea.org	26058
Barbara Lynn MILLER	Secretary	B.L.Miller@iaea.org	26061
Christian VORNBERG	Secretary	C.Vornberg@iaea.org	21641

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

Name	Title	E-mail	Extension
Erik BUSCH-PETERSEN	Laboratory Head	E.Busch-Petersen@iaea.org	28267

Agrochemicals Unit

Andrew CANNAVAN	Unit Head	A.Cannavan@iaea.org	28395
Perihan AYSAL	Analytical Chemist	P.Aysal@iaea.org	28393
Marivil Dabalus ISLAM	Analytical Chemist	M.Islam@iaea.org	28394
Britt Marianna MAESTRONI	Training Officer	B.Maestroni@iaea.org	28398
Philipp Martin KLAUS	Laboratory Technician	P.Klaus@iaea.org	28327
Mohammad Nasir RATHOR	Laboratory Technician	N.Rathor@iaea.org	28397
Mariana SCHWEIKERT-TURCU	Laboratory Technician	M.Schweikert-Turcu@iaea.org	28373
Saju Kuriakose PADIKKAKUDY	Clerk	S.Padikkakudy@iaea.org	28362

Feature Article

Use of irradiation as a quarantine treatment for international trade

Technical Officer: Tatiana Rubio-Cabello

On April 26, 2007, the Krushi Utpadan Sanrakshan Kendra (KRUSHAK) Irradiation Facility at Lasalgaon, 250 km east of Mumbai in India, received a certificate of approval from USDA-APHIS for radiation processing of mango at a 400 Gy dose to mitigate mango stone weevil, enabling export of the fruit to the USA. The first consignment of mangoes of two varieties, 90 boxes (3.5 kg each) of Alphonso and 60 boxes of Keasr (total 525 kg), was despatched from Mumbai to New York Kennedy Airport on April 27, 2007. KRUSHAK now has the distinction of becoming the first cobalt-60 gamma irradiation facility in the world to be certified by USDA-APHIS for phytosanitary treatment.

India has grown mangoes for thousands of years, and produces half of the world's crop, but inadequate infrastructure and pest quarantines have limited its exports to less than 1 per cent of the global mango trade. Since India first applied to ship mangoes to the United States of America in 1989, the fruit has been barred because it can harbor mango weevils, pests absent from North America. A solution emerged in January 2006, when the Agriculture Department allowed the import of produce treated with low doses of irradiation to kill or sterilize insects — a somewhat controversial issue. On a visit to India last year, President George W. Bush cheered the news as he announced a pact on nuclear energy and trade. "The United States is looking forward to eating Indian mangoes," he said.

The first shipment of Indian mangoes to the USA has been the result of dedicated professionals working in India and the USA, but also is the result of a valuable effort done by thousands of scientists from many countries of the world and international organizations, including the Food and Agriculture Organization of the United Nations (FAO) and the International Atomic Energy Agency (IAEA).

The use of low doses of ionizing radiation as a quarantine treatment of fresh fruits and vegetables was first evaluated internationally in December 1970 by a group of experts convened by the FAO and the IAEA in Honolulu, Hawaii, USA, where scientists of the USA and India were also participating. Although it was recognized at that time that this technology was an effective quarantine treatment for fresh fruits, and offered unique advantages in comparison to conventional methods such as its high penetration, uniformity of treatment in sealed containers and no production of residues, there was no economic incentive for using it commercially in view of the wide application of fumigants to overcome quarantine barriers. However, the same group of experts urged FAO and IAEA to encourage international cooperation in order to continue working on the development and implementation of this technology due to the promising results already obtained.

Since that time, the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture, through its Food Irradiation Section (now Food and Environmental Protection Section), has implemented five Coordinated Research Projects (CRPs) and has organized many technical meetings on this subject, with the participation of scientists from different regions of the world. Important data on the radiation sensitivity of several fruit fly species, other insects and mites, as well as the technical and economic feasibility data to apply this technology at commercial scale, were generated during the last 30 years through these activities. The valuable data produced by the CRPs have been used to develop national and international regulations in the use of irradiation as a quarantine treatment in agricultural commodities. In fact, many of the specific irradiation treatment methods approved by the USA have been scientifically supported by these international efforts.

The Joint FAO/IAEA Division has also been actively involved in the development of the International Standard for Phytosanitary Measures, Guidelines for the Use of Irradiation as a Phytosanitary Measure (ISPM No. 18). These guidelines were adopted in 2003 during the Fifth Session of the Interim Commission on Phytosanitary Measures (ICPM) under the International Plant Protection Convention (IPPC), which is identified in the World Trade Organization Agreement on the Application of Sanitary and Phytosanitary Measures as the international organization responsible for setting phytosanitary standards.

The adoption of the ISPM No. 18, as well as other factors such as the ban on using certain fumigants (e.g. methyl bromide under the Montreal Protocol because causes depletion of the ozone layer), and the opening of the US market to import irradiated fresh fruits, has increased interest in food irradiation technology in many countries of the world. In fact, Thailand and potentially Mexico are also sending the first consignments of irradiated fresh fruits to the US market in 2007 and this example will be followed by other countries in Asia and Latin America.

To date, more than 30 countries list in their national regulations the use of irradiation technology as a phytosanitary/quarantine measure.

The interest in this technology as a quarantine treatment has also been reflected by the increased number of countries requesting technical assistance to the IAEA in order to implement it at commercial scale. The use of irradiation technology as a phytosanitary/quarantine treatment is now a reality in the international market and it can be considered as one of the success stories in the history of food irradiation technology as well as the role of the United Nations.

Food Irradiation Databases

The Food and Environmental Protection subprogramme is currently updating the Food Irradiation Facilities Database. This activity is in addition to the recently updated information contained in the online (see NUCLEUS) Food Irradiation Clearances Database.

The Food Irradiation Facilities Database (see Annex) contains a listing of multi-purpose facilities, i.e., establishments used for the treatment of food and other products. We estimate that there are approximately 180 facilities in use worldwide. However, if you have information on other irradiation facilities which are not included in this list, please send us an email to OfficialMail@iaea.org.

Forthcoming Events

30th Session of the Joint FAO/WHO Codex Alimentarius Commission; Rome, Italy, 2-7 July 2007

Technical Officer: David H. Byron

The 30th Session of the Joint FAO/WHO Codex Alimentarius Commission will be held at FAO Headquarters in Rome, Italy from 2-7 July 2007. The Commission is responsible for protecting the health of consumers, ensuring fair trade practices in the food trade and promoting the coordination of all food standards work undertaken by international governmental and non-governmental organizations.

It is anticipated that a representative of the Joint Division will attend the forthcoming Commission meeting to present an *Information Paper on Activities of the Joint FAO/IAEA Programme on Nuclear Techniques in Food and Agriculture Relevant to Codex Work* (CAC/30 INF/6). The document includes information on the:

- Coordinated Research Project on Use of Irradiation to Ensure the Hygienic Quality of Fresh, Pre-Cut Fruits and Vegetables, and Other Minimally Processed Food of Plant Origin
- Seibersdorf Training Workshop — Introduction to Screening and Confirmatory Methodology for Veterinary Drug Residues
- Coordinated Research Project on Applications of Radiotracer and Radioassay Technologies to Seafood Safety Risk Analysis.

Joint IAEA/FAO Regional Workshop on Integrated Analytical Approaches to Assess Good Agricultural Practices (GAP); San José, Costa Rica, 16-20 July 2007

Technical Officer: Ian Glen Ferris

A new regional technical cooperation project (RLA5050) commenced in 2007 to strengthen laboratory capacity to assess the implementation of good agricultural practices in the production of fruit and vegetables in Latin America. The first major activity of this project will be a joint IAEA/FAO regional workshop on integrated analytical approaches to assess GAP, to be held in San José, Costa Rica, 16 - 20 July 2007.

Growing agricultural exports and crops for energy production have increased regional pesticide sales. However, pesticides are an advanced technology often used in Latin America without the "safety net" that exists in developed countries. The result is import detentions, loss of markets/farm income and adverse local pesticide effects. Food safety, environmental safety, social welfare and human health are non-negotiable. The question is how these objectives might be accomplished given limited resources. RLA5050 focuses on strengthening the analytical laboratories to improve the assessment of good agricultural practices. Implementation involves technology transfer, accelerating capacity building and feeding back analytical results to decision makers.

Fresh fruits and vegetables are targeted as these represent the main export item for many developing countries and a major source of foreign exchange earnings. Sites were selected to take account of upstream benefits and downstream detriments of pesticides and include 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.

Where possible, recent advances in gas chromatography/mass spectrometry (GC/MS) and cost-effective methods are used since such analytical results can assure third parties (donors, distributors, consumers) of the safety of products and compliance with environmental objectives.

Risk assessment tools like the pesticide impact ranking index (PIRI) help identify possible problems and focus expensive analytical resources on pesticides having the highest impact ranking as well as determining the relative impact from different cropping systems. PIRI is calibrated with geo-referenced monitoring data and site-specific soil pesticide data.

Confirmation of analytical results is a key issue. Negative results (residues below the reporting limit) are considered confirmed if the recovery and the lowest calibrated level measurement for the batch are acceptable. Residues exceeding MRLs must be identified by the least equivocal technique or combination of available techniques, and must be quantitatively confirmed by analysis of at least one additional test portion.

Positive results (residues at or above the reporting limit) require confirmation. Confirmation of positive results for represented analytes must be supported by the appropriate concurrent calibration and recovery determinations. However, GC/MS provides an independent assessment.

The first phase of RLA5050 focuses on harmonizing methodology, reporting and meeting stakeholder expectations, including, for example, rural credit officers who may be involved in forward purchases of pesticides. When fully implemented, RLA5050 and similar technical cooperation projects have the potential to value add to commodity trade and foster the adoption of GAP using a more holistic food-chain approach.

IAEA/RCA Project Planning Meeting on Novel Applications of Food Irradiation Technology for Improving Socioeconomic Development; Bali, Indonesia; 16-20 July 2007

Technical Officer: Tatiana Rubio-Cabello

The participants will be the national project coordinators of the Regional Cooperative Agreement (RCA) Member States participating in the project RAS/5/046 on Novel Applications of Food Irradiation Technology for Improving Socioeconomic Development.

The specific objective of the meeting is to discuss a detailed work plan and the strategies to be used for the implementation of the project, based on the information given by the countries, and the common and specific needs found among the participating countries.

Regional Workshop on the Use of Irradiation as a Phytosanitary Treatment; Mexico D.F., Mexico 1-5 October 2007

Technical Officer: Tatiana Rubio-Cabello

The participants will be mainly senior officials from the American Region, who are responsible for policy and regulation in the area of phytosanitary measures for food, as well as quarantine officials, exporters and importers. The workshop is planned to be held at the Dirección General de Sanidad Vegetal, Mexico City, D.F., from 1 to 5 October 2007.

The purpose of the workshop is to provide up-to-date information on the use of irradiation as a quarantine treatment and to discuss potential future activities at the regional level.

Approximately 20 scientists and senior officials from IAEA and FAO Member States in the Americas and the Caribbean, as well as a representative from the Joint FAO/IAEA Division, are expected to attend the workshop.

Past Events

IPPC/CPM Technical Panel on Phytosanitary Treatments; IAEA Headquarters, Vienna, Austria, 4-8 December 2006

Technical Officer: David H. Byron

The International Plant Protection Convention (IPPC) is an international treaty relating to plant life and plant health, to which 161 governments (as of 08 March 2007) currently adhere. The Convention has been deposited with the Director-General of the Food and Agriculture Organization of the United Nations (FAO) since its initial adoption by the Conference of FAO at its Sixth Session in 1951. The IPPC is an international treaty to secure action to prevent the spread and introduction of pests of plants and plant products, and to promote appropriate

measures for their control. It is governed by the Commission on Phytosanitary Measures (CPM) which adopts International Standards for Phytosanitary Measures (ISPM). The IPPC Secretariat coordinates the activities of the Convention and is hosted by FAO.

At the First Session of the Commission on Phytosanitary Measures held in Rome from 3-7 April 2006, the representative of the Food and Environmental subprogramme introduced a paper (CPM 2006/CRP/7) outlining the activities of the Joint Division related to phytosanitary applications of irradiation. It was noted (CPM-1 (2006)/Report, para. 49) that following the approval of Guidelines for the Use of Irradiation as a Phytosanitary Measure (ISPM No. 18) in 2003, the Joint Division continued to support scientific studies in response to Member State requests related to the application of irradiation as a quarantine treatment, especially in the context of the completion of Annex 1 (Specific Approved Treatments) of ISPM No. 18. The meeting was further informed that these studies were being undertaken on the basis of recommendations arising from a consultants meeting held in collaboration with the IPPC on the Use of Irradiation as a Quarantine Treatment (IAEA Headquarters, 10 – 14 May 2004). As a result of these discussions, the CPM requested that the Technical Panel on Phytosanitary Treatments could consider developing Annex I of ISPM No. 18 in cooperation with IAEA (CPM-1 (2006)/Report, para. 82 and Appendix XII) as a high priority activity.

In consideration of the high priority given to this activity by the CPM and the IPPC Standards Committee, and in view of the continued importance of phytosanitary applications of irradiation to IAEA member states, the Joint Division hosted the third meeting of the IPPC/CPM Technical Panel on Phytosanitary Treatments (TPPT) at IAEA Headquarters from 4 – 8 December 2006. The report of the Technical Panel is available online at: https://www.ippc.int/servlet/CDSServlet?status=ND01OTIzNSY2PWVuJjMzPSomMzc9a29z.

The Second Session of the Commission on Phytosanitary issues (Rome, 26-30 March 2007) noted the third TPPT meeting (CPM 2007/28), and supported the development of fruit fly and irradiation treatments under the fast-track process (CPM-2 (2007) / Report, paras. 83, 169 and Appendix 6).

Technical Meeting (TM) on Monitoring Radionuclides in Foodstuffs Traded Internationally; IAEA Headquarters, Vienna, Austria, 11-15 December 2006

Technical Officer: David H. Byron

The IAEA regularly receives requests from its Member States concerning technical cooperation in monitoring radionuclides in foodstuffs and it has implemented a number of such projects in various regions of the world. This suggests that the issue of monitoring radionuclides in foodstuffs remains of substantial international interest and needs further harmonization.

In view of this interest, the International Atomic Energy Agency held a *Technical Meeting (TM) on Monitoring Radionuclides in Foodstuffs Traded Internationally* at its Headquarters in Vienna from 11 to 15 December 2006. The meeting was attended by 42 participants from various IAEA Member States as well as representatives of the EC, IAEA, FAO and WHO.

The objectives of the meeting were primarily to: (i) discuss Member State strategies for monitoring of radionuclides in foodstuffs; (ii) provide for exchange of information between the IAEA Secretariat and its Member States on national practices of monitoring radionuclides in foodstuffs, both produced and consumed domestically, and traded internationally.

The FAO representative participated at the meeting to report on the recent adoption of the Codex Guideline Levels for Radionuclides in Foods Contaminated Following a Nuclear or Radiological Emergency for Use in International Trade.

The report of the Technical Meeting is available at:

http://www-ns.iaea.org/downloads/rw/fileshare/wss/default.asp?lg=a&fd=170.

International Conference on Radiation Processing of Agro and Allied Products: Recent Trends and Future Prospects; Hyderabad, 9-10 February and Delhi, India 12-13 February 2007

Technical Officer: Tatiana Rubio-Cabello

The Food and Environmental Protection Section was invited to participate in the International Conference organized by the Indian Nuclear Society in conjunction with the Acharya NG Ranga Agricultural University in Hyderabad (9-10 February) and the Shriram Institute for Industrial Research in Delhi (12-13 February). The program was developed by national and international experts from Belgium, Canada, China, Republic of Korea, USA and the IAEA.

The conference was attended by more than 160 delegates in Hyderabad and 275 delegates in Delhi, mainly representing industry, trade, NGOs and farmers organizations.

The conference covered different subjects related to developments in food irradiation technology; commercial irradiation facilities; design and engineering aspects of irradiation plants; design and adoption of electron beam facilities for food and agro products; synergy with complementary technologies; integrating packaging with food irradiation technology; economic and consumer aspects; forward and backward integration and linkages; national and international regulations; dosimetry protocols; and, industry perspectives.

Taking note of the unique benefits that radiation processing technology can confer on certain agro-food and allied products in India, the conference felt that this technology can effectively: a) prevent the waste of millions of tons of food grains that takes place every year due to insect infestation, and b) save thousands of lives by destroying pathogens including bacteria like E. coli O157H7, Salmonella, Shigella, Campylobacter, Vibrio, Protozoa and other parasites in food, thus improving food safety and food security. It was also concluded that this technology is an important tool to improve the quality of the food/food products to be exported from India. A special emphasis was placed on the possibility to soon export irradiated mangoes to the US market.

National Workshop on Optimized Use of a Gamma Irradiation Facility and Commercialization of Irradiated Products; Abuja, Nigeria, 28 March 2007

Technical Officer: Tatiana Rubio-Cabello

Under the Technical Cooperation Project on Optimized Use of an Industrial Gamma Irradiation Facility, a national workshop was organized at the National Science Village, Sheda Science and Technology Complex (SHETSCO), Abuja, Nigeria.

SHETSCO was established under the Ministry of Science and Technology as a multidisciplinary research and development centre to initiate and promote a rational and innovative programme for the socio-economic development of Nigeria. One of the Centres at this complex is the Nuclear Technology Centre (NTC), which has a multipurpose gamma irradiation facility (GIF) for both industrial and research applications. It has an innovative design, and fully automated operation.

The main objective of the workshop at SHETSCO was to create an opportunity for the stakeholders – mainly farmers and food exporters – to see for themselves the capacity and capability of the plant and sensitize them to take advantage and share the benefits of the irradiation technology. The program of this national workshop included general aspects of food irradiation, optimal use of the facility, and investment opportunities. The Workshop was attended by approximately 50 selected participants from the private and government (mainly decision makers) sectors.

Second Session of the Commission on Phytosanitary Measures (CPM); Rome, Italy, 26-30 March 2007

Technical Officer: Tatiana Rubio-Cabello

The Commission on Phytosanitary Measures (CPM), held its second session in Rome, Italy, 26-30 March 2007. The session was opened by Mr. Jacques Diouf, Director-General of FAO.

A representative of the Section attended the session to help ensure that the specific irradiation treatments for the completion of Annex 1 of ISPM 18 and approved by the Technical Panel on Phytosanitary Treatments (see above) during the last meeting (December 2006) would be sent for country consultation using the fast track procedure.

For information about the specific treatments, please see the web page of the International Phytosanitary Portal (IPP). https://www.ippc.int/IPP/En/default.jsp.

21st Meeting of the Radiation Safety Standards Committee (RASSC); IAEA Headquarters, Vienna, Austria, 10-13 April 2007

Technical Officer: David H. Byron

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

The functions of RASSC are:

- To advise on the approach to the development of the radiation safety standards issued in the IAEA Safety Standards Series, covering Safety Fundamentals, Safety Requirements and Safety Guides, both thematic and practice specific, and to advise on priorities.
- To review proposals for the development of new standards relating to radiation safety and to approve the relevant document preparation profiles (DPPs) prior to their submission to the Commission on Safety Standards.

- To review draft radiation safety standards, considering, throughout the preparation and review process, the value of each draft standard and the needs of users of the standards.
- To approve the text of draft radiation safety standards prior to their submission to Member States for comment and again prior to their submission to the Commission, in accordance with the established procedure.
- To ensure a broad international input in the preparation and review of radiation safety standards.
- To advise on radiation safety standards, relevant regulatory issues and activities for supporting the use and application of the Agency's safety standards.
- To advise on the timely review of and the need for revision of published safety standards.

Specialized international organizations and relevant non-governmental bodies may be invited by the IAEA Deputy Director General to attend the RASSC meetings and in this regard, a representative of the FAO attended the most recent 22nd Meeting of the RASSC to report on developments in the Inter-Agency Committee on Response to Nuclear Accidents (see related article), including in the application of the recently revised 2006 edition of the Joint Radiation Emergency Management Plan of the International Organizations (EPRJPLAN 2006) and other efforts of the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture towards assisting Member States in the application of agricultural countermeasures to alleviate adverse affects arising from these events.

The FAO representative also participated in discussions concerning the review and revision of the International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources (BSS) as a cosponsoring organization, particularly in regard to the development of emergency preparedness and response procedures for nuclear and radiological emergencies affecting agriculture.

The final report of the 22nd RASSC will soon be available at:

http://www-ns.iaea.org/committees/default.asp.

Asia/Pacific Food Safety Summit, Qingdao, China; 15-18 April 2007

Technical Officer: Andrew Cannavan

The Agrochemicals Unit Head participated in a Food Safety Summit for the Asia/Pacific region, which was jointly organized by the FAO/IAEA Joint Programme and Waters Corporation, with full funding from the latter. The programme was designed to build awareness in the region of international and national regulations and guidelines on food safety with regard to chemical residues and contaminants in food and the laboratory procedures and analytical techniques available to meet the requirements set down in these regulations and guidelines. The event had approximately sixty participants, mainly from China, the Republic of Korea and Malaysia.

The Unit Head introduced the food safety activities of theJoint FAO/IAEA Programme and presented a keynote lecture on International Guidelines for the Control of Veterinary Drug Residues in Food, and sat on an expert panel for question and answer sessions. The participants

Participants in the Asia/Pacific Food Safety Summit, Qingdao, China

interacted actively with the presenters and had many questions on guidelines and regulations, the 'farm to fork' approach for food safety, and technical aspects of residues analysis.

This was the second collaboration with Waters Corporation for this type of meeting and once again it proved very successful, both in terms of outreach for the Agency and awareness building amongst regulators in the region.

19th Regular Meeting of the Inter-Agency Committee for Response to Nuclear Accidents; FAO Headquarters, Rome, Italy, 26-27 April 2007

Technical Officer: David H. Byron

The most recent 19th Regular Meeting of the Inter-Agency Committee for Response to Nuclear Accidents (IACRNA) was hosted by the FAO in Rome from 26-27 April 2007.

The 19th IACRNA discussed the review and endorsement of revised IACRNA Terms of Reference and the development of an IACRNA Work Plan for the period between the 19th and 20th Regular Meetings. Preparations for the forthcoming international nuclear emergency exercise (ConvEx-3) to be held in Mexico in 2008 were also considered.

Fourteen representatives of nine international organizations (EC, FAO, IAEA, IMO, NATO, OECD/NEA, UNDSS, WHO and WMO) attended the Meeting and a representative of NATO participated as an observer. Discussions were also held with FAO staff on the ongoing revision of the Cooperative Arrangements between FAO and IAEA for Information Exchange and Technical Support in Relation to Food and Agriculture in the Case of a Nuclear or Radiological Emergency.

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

http://www-ns.iaea.org/tech-areas/emergency/iacrna/login.asp?accessdenied=%2Ftech%2Dareas%2Femergency%2Fiacrna%2FDefault%2Easp.

Codex Committee on Pesticide Residues (CCPR); 7-12 May 2007, Beijing, China

Technical Officer: Josef Brodesser

The 39th CCPR Meeting was held in Beijing, China, from 7-12 May 2007. Within the Codex Alimentarius system and in collaboration with FAO and WHO, the IAEA through its Joint IAEA/FAO Joint Division/Food and Environmental Protection Section, is continuing to assist Member States in the elaboration of Codex standards and guidelines related to pesticide residues and food safety. The proposal for elaborating a guideline for applying the Measurement Uncertainty concept, particularly in pesticide residue analysis, was accepted by the Joint FAO/WHO Meeting on Pesticide Residues (JMPR) in 2006. Nevertheless, a major problem in applying theoretical formulas underlying the estimation of measurement uncertainty lies in the difficulty to translate the statistical concept of the so called bottom-up approach into the daily practical laboratory routine. Also the combination of huge numbers of indidvidual active ingredients, plus their metabolites and a multitude of different matrices at different concentration levels, makes a systematic calculation of up to thousands of individual uncertainty budgets extremely laborious. In addition, the complexity of residue procedures with its many analytical steps, method calibration and chemical derivatiations incurred is found extremely difficult to overcome by many laboratories. However, due to the continuing problems and reservations against the implementation of the concept the CCPR Ad hoc Working Group on Analytical Methods, chaired by IAEA, proposed to CCPR to work on a more simplified approach on measurement uncertainty.

New solutions based on a rather empirical top-down approach currently are sought, particularily driven forward by European countries. Above all, results of proficiency testing schemes in conjunction with individual method validation data of laboratories are targeted in that context to estimate general and unified Measurement Uncertainty values. Empirical measurement uncertainty values based on the Horwitz approach, which is used for the prediction of the distribution of results depending on the concentration of compounds, would be acceptable e.g. at ±50 %, if supported by laboratory validation data and proficiency testing results.

Accordingly, in the CCPR plenary meeting such a new approach was discussed. A new electronic Working Group was established towards finding new ways towards a simplified procedure on estimating measurement uncertainty based on top-down approaches. The electronic working group received broad support and will start with about ten members that will communicate to prepare to collect information and data towards a proposal at the next CCPR Meeting which will take place in China in 2008. IAEA hosts and coordinates the respective work.

Further aspects treated by the ad hoc working group are related to analytical methods for the determination of pesticides in milk fat or in whole milk, respectively. There are no unambiguous procedures for separating fat from milk. Therefore, the analytical determination of pesticide residues in milk may be based on different ways of sample preparation. This may lead to disturbance in international trade since the comparability of results may be questionable. A solution for this open question was required. The ad hoc working group did not have sufficient information on how this matter is treated in different countries. Therefore, further information will be sought from member countries in a circular letter to be issued by the Codex Secretariat.

The IAEA website hosting abstracts and collections of validated or official analytical methods used worldwide has been extended. It now comprises information and full methods, respectively, from Canada, USA, Costa Rica, Brazil, Argentina, Germany, UK and the Netherlands. More methods from the Republic of Korea, China, Denmark and others will be included later on. Method collections or abstracts, respectively, can be downloaded as pdf files, see http://www-infocris.iaea.org/Download/_Methods-Main.pdf and the links given therein.

The current 2007 CCPR full meeting report can be downloaded from the Codex Alimentarius web site, see http://www.codexalimentarius.net/download/report/680/al34_20e.pdf. Beyond the scope of activities of the Ad hoc Working Group described above it comprises the full range of discussions and decisions made.

27th Meeting of the Organization for Economic Cooperation and Development (OECD) Working Party on Nuclear Emergency Matters (WPNEM); OECD/Nuclear Energy Agency (NEA) Headquarters, Paris, France, 15-16 May 2007

Technical Officer: David H. Byron

A representative of the FAO attended the most recent 27th Meeting of the OECD Working Party on Nuclear Emergency Matters at the OECD/NEA Headquarters in Paris, France, from 15-16 May 2007. The mission of the WPNEM is to improve nuclear emergency management systems (planning, preparedness, response, recovery) within Member States in coordination with other related organizations, including FAO. Part of its work programme focuses on exploring and developing new concepts and future procedures to enhance national and international preparedness and response management, including through the preparation and conduct of the International Nuclear Emergency Exercise (INEX) series.

Among other issues, the meeting discussed follow up actions to the INEX-3 exercise, options for a new INEX series of emergency exercises, current preparations for the forthcoming ConvEx-3 (2008) exercise and other inter-agency coordination activities. Additional discussions included the consideration of proposed terms of reference for the recently established WPNEM Expert Group on Recovery, Agriculture and Food as well as discussions concerning the ongoing revision of the IAEA Basic Safety Standards. A presentation was also made on the development of the prototype Radionuclide Countermeasure Information System (RCMIS).

Additional information on the Working Party on Nuclear Emergency Matters is available at http://www.nea.fr/html/rp/wpnem.html.

XIIth International IUPAC Symposium on Mycotoxins and Phycotoxins; Istanbul, Turkey, 21-25 May 2007

Technical Officer: Andrew Cannavan

The Agrochemicals Unit Head participated in the XIIth International IUPAC Symposium on Mycotoxins and Phycotoxins in Istanbul, 21-25 May 2007. A poster was presented on research performed in the Agrochemicals Unit on a Simple, Economical and Efficient Sample Processing Procedure for Fumonisin B1 Analysis in Maize. The poster was well received and several participants requested further information.

The Unit Head also participated as an invited panel member in a FAO workshop on Sampling Procedures for Mycotoxins Determination in Food and Feed Products (including sampling and sample preparation). The FAO workshop comprised a viewing of a training video produced by the FAO Plant Production and Protection Division (AGP) in conjunction with the Italian National Institute of Health followed by a question and answer session, at which the participants were also informed of a manual on sampling procedures for the detection of mycotoxins in food and feeds which is being produced by the Food and Environmental Protection Sub-programme and which will complement the FAO video.

The Unit Head also participated in the annual meeting of the EU 6th Framework Project 'BioCop' as a member of the project's Advisory Board. It was recommended that more effort should be invested in building awareness in developing countries of the new technologies being developed in the project, since the new approach is likely to form the basis of future EU legislation with regard to food safety, including requirements for import from third countries. The recommendation was accepted and discussions were initiated with the leader of the project work programme on training and information dissemination on possible collaborations with IAEA in the organization of training activities.

The symposium provided an opportunity for constructive collaboration with FAO colleagues, European Commission representatives, scientists and industry representatives. Various other individual and group meetings were held which should further collaboration and assist in meeting the objectives of the Food and Environmental Protection Sub-programme.

.

Status of Coordinated Research Projects

Quality Control of Pesticide Products; D5.40.03

Technical Officer: Josef Brodesser

The aim of the CRP was combining and merging single component analytical methods towards multi-method approaches. New methodologies to be developed were based on peer verified CIPAC and AOAC methods for pesticide formulation analysis. The overall goal of the CRP research activities was broadening of the scope and the simplification of time and resource intensive single component analytical methods. Several validated multi-methods equivalent to widely used single methods were elaborated.

The multi-method approach investigated in the CRP was verified by using real and synthetic formulation samples, also in interlaboratory validation trials by the CRP participants. The CRP outcomes are being evaluated towards compilation of the respective technical document for publication by late 2007.

Testing the Efficiency and Uncertainty of Sample Processing for Analysis of Food Contaminants; D6.10.23

Technical Officer: Josef Brodesser

The overall goal of the CRP is to develop research-based information about the behaviour of pesticide residues under different conditions of sample preparation. Degradation of pesticide active ingredients under cryogenic or room temperature conditions can be different due to varying activities of plant enzymes in the homogenisation and extraction process.

The current CRP work programme is concluding the fifth and last CRP phase. Its focus is on extended food commodities and new pesticide components. Additional investigations are being conducted concerning the stability of active ingredients under cryogenic processing and ambient temperature. Particular attention is paid to alternate commodities and large crops, like water melons, jack fruits etc, where residue concentrations may vary considerably on individual crops, which could be broadening the variability of residue concentrations in relation to minor crops and consignments. Particularly, sampling of large commodities is prone to larger variabilty than for small crops in which variations between individual crops are levelled out by the huge number of individual crops per test sample. The inherent variabilty and uncertainty of measurement therefore is thought to be considerably underestimated in terms of the representativeness of sampling.

The third and final Research Coordination Meeting is to be held at the facilities of the University of Buenos Aires in Neuquen, Argentina, from 1-5 October 2007. In connection with the CRP a regional conference organized by the University will take place there from 26-28 September. The Regional XV Congreso Argentina Toxicología will address pesticide toxicology and food safety matters, laboratory techniques and quality management. IAEA will contribute with lecturing and in workshop activities.

The evaluation of the overall CRP results will be compiled as a technical document in 2008.

Final Research Coordination Meeting of the CRP on Development of Strategies for the Effective Monitoring of Veterinary Drug Residues in Livestock and Livestock Products in Developing Countries; D3.20.22

Technical Officer: Andrew Cannavan

The Agrochemicals Unit Head was the Scientific Secretary and Project Officer for the 4th and final Research Coordination Meeting (RCM) of the FAO/IAEA Coordinated Research Project (CRP) Development of Strategies for the Effective Monitoring of Veterinary Drug Residues in Livestock and Livestock Products in Developing Countries (D3.20.22), which was held in Freising, Germany, 27 November – 1 December 2006.

The RCM was hosted by a research agreement holder, Prof. Dr. Heinrich Meyer, Professor of Physiology in the Centre for Life Sciences, Munich Technical University, Weihenstephan, Freising, and was officially opened by Prof. Dr. Anna Maria Reichlmayr-Lais, representing the President of Munich Technical University. Eleven of the twelve research contract holders, two research agreement holders, two technical contract holders and the Scientific Secretary attended the RCM and presented the results of their research. In addition, Dr. Iris Lange, a former technical contract holder and Head of the Veterinary Drug Residue Laboratory of the Bavarian State Institute for Food and Hygiene (LGL) participated in the meeting as an observer and conducted a tour of the LGL laboratories. Dr. John McEvoy, of the European Commission (EC) DG Sanco Food and Veterinary Office (FVO) also participated in the meeting for one day (funded by the EC) and Dr. Andreas Daxenberger, Head of the Certification Unit of the Food and Feed Department of TÜV SÜV Management Service GmbH, Munich, gave a guest presentation.

Summary of CRP results

Development, characterization and comparison of immunoassay screening methods

Good quality polyclonal antibodies against chloramphenicol were produced by the research group in Kenya in several species, most significantly in camels, potentially providing a plentiful supply of antisera for all members of the CRP and for the African region. Protocols were elaborated for enzyme-linked immunosorbent assays (ELISA) using these antisera for chloramphenicol residues in sheep tissues and serum. The ELISA methods were applied to elaborate pharmacokinetic parameters of chloramphenicol in sheep and have been used to monitor tissues of sheep at slaughter for chloramphenicol residues. Polyclonal antibodies were also produced in Indonesia and were successfully lyophilized for long-term storage. The antisera were tested in an ELISA format which enables screening for chlorasmphenicol residues in approximately two hours. This method will be developed by the research group into kit format for transfer to regional laboratories in Indonesia. In Malta, commercial ELISA test kits and extraction procedures for chloramphenicol were evaluated and compared to identify and address problems with poor kit performance (low optical density readings, high false positive rate, poor precision). With the assistance of one of the commercial manufacturers, the main cause of the problems was identified as the handling and storage of kits during delivery to the laboratory. Whilst this could be overcome to some degree in Malta, it was concluded that in many countries these problems would render the kits ineffective. Other causes of problems with kit performance included operator errors in pipetting, cross-contamination of wells and timing of operations and carry over of solvents from the extraction phase. Appropriate training in the use of the kits could minimize these factors. The commercial kit was validated in-house for the analysis of chloramphenicol in milk. Commercial kits were also compared and validated by the research group in Sri Lanka and Cyprus. The research group in Cyprus, in addition to optimizing extraction/clean-up and reagent stabilization procedures, produced swine tissues incurred with chloramphenicol at various levels for use by the CRP partners in method development and validation and for possible future use in inter-laboratory comparison studies. The research group in Brazil successfully expanded the scope of a commercially available radioimmunoassay (RIA) kit for the analysis of animal tissues for the β-agonist, clenbuterol, to include a range of β-agonists by utilizing the cross-reactivity of an available antiserum with the structurally related β-agonists. Tritiated clenbuterol was used as the label in the competitive assay, and extraction and clean-up techniques were developed to facilitate the analysis of both phenolic- and aniline-type β-agonists. The method was exhaustively validated for 7 analytes by applying the validation protocol developed in the CRP, and can now be routinely applied for regulatory screening purposes in Brazil. This research group has also undertaken the elaboration of a novel ^{125}I-RIA for chloramphenicol which was developed by a technical contract holder in the first phase of the project. A member of the Brazilian group has now been trained in the protocol at the laboratory of the technical contract holder in Munich Technical University. This work has been transferred from the original research group in Turkey, which withdrew from the CRP after that group failed to perform satisfactorily due to various factors including lack of support from their top management. The development has not, therefore, been completed, but work is ongoing even after completion of the CRP and the results will be published in due course.

Participants in the final RCM of CRP D3.20.22, Munich Technical University, November 2006

Confirmatory methods

Confirmatory methods for chloramphenicol residues in animal tissues and honey using liquid chromatography–tandem mass spectrometry (LC-MSMS) were developed and validated in Thailand, Argentina and the Republic of Korea. Methods for the major metabolites of the four main nitrofuran drugs were also developed and validated in Thailand and Argentina. These laboratories are now capable of providing confirmatory analyses for

residues in food of the compounds that have been the major causes of trade disputes over the past few years, in the regions worst affected by those disputes.

A number of investigations into the possible natural occurrence of chloramphenicol in poultry litter were carried out by the researchers in Thailand, using the sensitive LC-MSMS method developed. The objective was to test the hypothesis that poultry found to contain residues of chloramphenicol was contaminated by the antibiotic produced naturally by Streptomyces venezuelae rather than through illegal use of the drug. After exhaustive experimentation, no evidence was found that chloramphenicol was naturally produced in chicken litter under normal production conditions. This is an important result which has significant implications with regard to the illegal use of the drug in food-producing animals in various countries.

Chromatographic screening/quantitative methods

Extraction and clean-up techniques for the analysis of nitrofuran metabolites by high performance liquid chromatography (HPLC) were developed in South Africa and Namibia. The application of flurometric detection was investigated in South Africa, but was demonstrated to have no advantage over previously published HPLC methods using ultra-violet (UV) detection. Nitrofuran metabolite derivatives for use in the HPLC-UV method were prepared in Namibia and shown to be of similar quality to commercially available, but expensive, products. After completion of the CRP, the two groups will continue to work together to develop the method using the South African clean-up procedure and the Namibian analytical procedure, which promises to provide increased sensitivity over the previously published HPLC methods, thereby meeting the requirements for screening for these banned compounds. An HPLC method was also developed and validated for chloramphenicol in Indonesia. The method was applied to samples from aquaculture production and some positives were detected in both shrimps and shrimp feed.

Quality control and sampling

The method validation protocol developed in the CRP is now being applied by all partners both for commercially available kits and for methods developed in-house. The institute of the research group in Korea has implemented a laboratory quality system and has attained accreditation to the ISO 17025 standard, which is an important factor in maintaining international trade capabilities for animal-derived food commodities. The same institute has initiated a collaboration, facilitated through participation in the CRP, with the Residues Section of the State Central Veterinary Laboratory (SCVL) in Ulaan Baatar, Mongolia (currently a TCP counterpart laboratory) resulting in the training of two Mongolian Scientists in the Republic of Korea and provision of chromatography equipment to the SCVL with funding from the Korean International Cooperation Agency. Other important outcomes of the CRP include the instigation of an agreement between the institutes of the partners in Brazil and South Africa, resulting in exchange visits of personnel and transfer/sharing of methods and quality assurance protocols to the benefit of both institutes, training of personnel from South Africa and Brazil in Munich Technical University, and the establishment of a collaborative network comprising the CRP research groups, technical contract and agreement holders and other partners who have become involved throughout the duration of the project.

The Scientific Secretary wishes to express his gratitude to Prof. Heinrich Meyer, Dr. Iris Lange, Ms. Martina Reiter, Ms. Renata Schöpf and the local TUM organizing team for their assistance in holding the meeting and to acknowledge the support of Bayern-Leverkeusen GmbH for sponsorship of coffee breaks/lunches and the RCM dinner.

Current Technical Cooperation Projects

Project Number	Title	Technical Officer
ALG5025	Strengthening Capabilities to Control Veterinary Drug Residues in Foodstuffs	D. H. Byron
ANG5003	Veterinary Drug Residue Monitoring Programme	D. H. Byron & A. Cannavan
ARG5011	The Use of Ionizing Radiation for the Phytosanitary Treatment of Fresh Fruit	T. Rubio-Cabello
BEN5003	Veterinary Drug Residue Monitoring Programme	G. J. Viljoen (APHS), D. H. Byron & A. Cannavan
BEN5004	Regulatory Control and Monitoring of Mycotoxins to Facilitate Trade	J. Brodesser
BGD5024	Phytosanitary Treatment for Insect Pests Infesting Fresh Fruits and Vegetables	T. Rubio-Cabello
BKF5005	Regulatory Control and Monitoring of Contaminants and Residues	J. Brodesser & B. Maestroni
BOL5015	Developing Pesticide Residue Monitoring Capabilities in Support of Cash Crops	I. G. Ferris
BOL5017	Capacity for Monitoring Pesticide Residues for Compliance with Minimum Risk Levels and Good Agricultural Practice According to ISO 17025	I. G. Ferris & B. Maestroni
BRA5058	Applying Ionizing Radiation for Food Security and Healthcare	T. Rubio-Cabello
CHI5046	Certification of Exported Animal Products Using Nuclear and Other Analytical Techniques	D. H. Byron & A. Cannavan
CHI5048	Integrated Watershed Management for the Sustainability of Agricultural Lands	I. G. Ferris & L. Mabit (SWMCN)
CMR5014	Creation of a Nuclear Analysis Laboratory in CATEN for Food Safety	I. G. Ferris
COS5026	Management and Appropriate Use of Insecticide-nematicides	I. G. Ferris
CPR5016	Strengthening the Quality Assurance System for Food Irradiation	T. Rubio-Cabello
ERI5005	Zoonotic (diseases that can be transmitted from animals to humans) Disease Control and Analysis of Veterinary Residues in Foods	D. H. Byron & H. Unger (APHS)
GUA5015	Establishing a Food Irradiation Plant	T. Rubio-Cabello
HAI5003	Enhancing Crop Productivity through the Application of Isotope Nuclear Techniques	P. M. Chalk (SWMCN) & I. G. Ferris
INS5033	Enhancement of Quality Assurance for the Analysis of Veterinary Drug Residues	D. H. Byron & A. Cannavan
IVC5027	Monitoring of Pesticide Residues in Food Products	J. Brodesser & B. Maestroni
JAM5009	Developing Soil Fertility Management	P. M. Chalk (SWMCN) & I. G. Ferris
MAK5005	Upgrading of Food Safety System	J. Brodesser & B. M. Maestroni
MLI5018	Regulatory Control and Monitoring of Pesticides and Residues in Fresh Produce	J. Brodesser & T. Rubio-Cabello

Project Number	Title	Technical Officer
MNE8002	Upgrading a Persistent Organic Pollutant Laboratory towards Accreditation for Environmental Monitoring	M. Rossbach (NAPC) & J. Brodesser
MON5012	Monitoring of Residues in Livestock Products and Surveillance of Animal Diseases	A. Cannavan & J. Crowther (APHS)
MOR5024	Industrial Application of Irradiation	T. Rubio-Cabello
MYA5015	Strengthening the National Capacity for the Production of Veterinary Vaccines	J. Crowther (APHS) & A. Cannavan
NIC5007	Determining Drug Residues in Bovine Meat Exports	D. H. Byron, A. Cannavan & J. Brodesser
NIR5033	Improvement of Quality Management and Food Safety Monitoring Using Isotope Techniques	J. Brodesser & D. H. Byron
NIR5034	Feasibility Study on the Optimal Use of an Industrial Gamma Irradiation Facility	M.H. Sampa (NAPC) & T. Rubio-Cabello
PAN5017	Monitoring Pesticide Residues in the Production of Tropical Fruit (Pineapples and Melons) and Controlling Analytical Quality with the Aid of Nuclear Techniques	I. G. Ferris & B. Maestroni
PHI5030	Upgrading the Gamma Irradiation Facility	M. H. Sampa, (NAPC), S. M. Haji-Saeid, (NAPC), T. Rubio-Cabello
RAS5046	Novel Applications of Food Irradiation Technology for Improving Socioeconomic Development (RCA)	T. Rubio-Cabello
RER9074	Long-Term Countermeasure Strategies and Monitoring of Human Exposure in Rural Areas Affected by the Chernobyl Accident	V. Berkovskyy (NSRW), I. G. Ferris, S. Fesenko (NAAL)
RLA5050	Strengthening Laboratory Capacity to Assess the Implementation of Good Agricultural Practices in the Production of Fruit and Vegetables in Latin America	B. Maestroni, I. G. Ferris & P. M. Chalk (SWMCN)
ROK5034	Nutrient Efficient Crops and Safe Use of Pesticides in Sustainable Crop Production	I. G. Ferris
SEN5027	Regulatory Control and Monitoring of Contaminants and Residues in Fresh Produce	D. H. Byron & J. Brodesser
SLO5002	Protecting Groundwater and Soil against Pollutants Using Nuclear Techniques	J. Adu-Gyamfi (NAAL) & I. G. Ferris
SRL5039	Monitoring of Chemical Residues and Food-borne Pathogens	A. Cannavan
SRL8019	Technical Support for the Establishment and Operation of a Multi-Purpose Gamma Irradiation Facility	M.H. Sampa (NAPC) & T. Rubio-Cabello
SYR5020	Implementation of Quality Assurance and Quality Control Procedures in Pesticide Residue Analysis Laboratories	J. Brodesser & D. H. Byron
THA5047	Application of Food Irradiation for Sanitary and Phytosanitary Certification	T. Rubio-Cabello
URT5024	Nuclear Techniques for the Monitoring of the Food Quality in the United Republic of Tanzania	D. H. Byron

FAO/IAEA Agriculture & Biotechnology Laboratory, Seibersdorf

Expert Mission – TC Project PAN 5/015 Quality Assurance in Pesticide Residue Analysis for Agriculture Production

Technical Officer: Britt Maestroni

Mr. N. Rathor undertook an expert mission to the laboratory of Ministerio de Desarrollo Agropecuario, Dirección Nacional de Sanidad Vegetal (MIDA) in Panama, from 5 to 16 February 2007. His tasks were to train the laboratory staff on pesticide residue analysis in fruit commodities, including radiotracer techniques using 14C-radiolabelled pesticides. Work undertaken consisted of theoretical and practical exercises on:

- Safety of laboratory operations;
- Sampling of fresh fruits and vegetables;
- Sample preparation and processing;
- Sample extraction;
- Clean up;
- Determination of pesticide residues using GC-NPD and GC-MSD, including maintenance and troubleshooting;
- Calibration and quantification calculations;
- Use, handling and routine maintenance of general analytical equipment;
- Principles of method validation;
- Daily applications of quality assurance/control measures according to ISO17025, including establishment and use of control charts;
- Preparation of SOPs;
- QUeChERS multiresidue method.

Fellows, Scientific Visitors and Trainees

Two fellows from the Laboratoire Central Vétérinaire, Bamako, Mali commenced training in the Agrochemicals Unit in March 2007. Ms. Safiatou Berthé Dem was trained for 4 months on pesticide and veterinary drug residue analysis and Mr. Mamadou Diallo received 4 weeks training on laboratory quality assurance/quality control. Mr. Jean Pierre Ouattara, a fellow from the Laboratoire National de Santé Publique in Ouagadougou, Burkina Faso, commenced a 4-month training programme on pesticide residue analysis, including the application of isotopic techniques, in April.

Two Scientific Visitors from Panama, Ms. Brenda Checa Orrego and Ms. Llarys Aparicio Aguilar, visited the Unit for 8 days as a follow-up to a training mission carried out in February by Mr. Nasir Rathor to the Ministerio de Desarrollo Agropecuario laboratories in Panama under TCP PAN/5/015, Quality Assurance in Pesticide Residue Analysis for Agriculture Production. The objective of the visit was to revisit the concepts of quality assurance and quality control measures for pesticide residue analysis in agricultural production in Panama, and to receive training on quick, cheap and rugged multiresidue procedures for pesticide residues in fruit and vegetables.

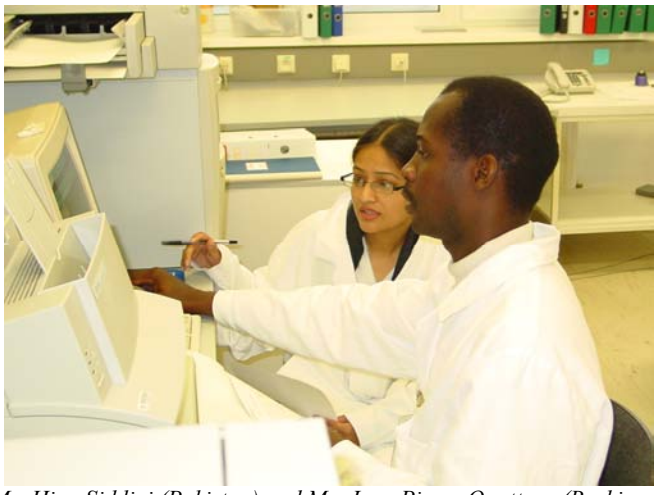
Ms. Brenda Checa Orrego, a Scientific Visitor from Panama, preparing samples for pesticide residue analysis in the Agrochemicals Unit, Seibersdorf

Ms. Larys Aparicio Aguilar (Panama) training in sample preparation

The laboratory exercises specifically aimed at studying the stability of selected organophosphorus pesticide residues in pineapple under cryogenic and ambient processing conditions. Project PAN5/015 will end by December 2007 and will be replaced by a new project PAN/5/017 on Monitoring Pesticide Residues in the Production of Tropical Fruit (Pineapples and Melons) and Controlling Analytical Quality with the Aid of Nuclear Techniques. The objective of the new technical cooperation project is to improve food safety in the production of tropical fruits in Panama.

A scientist from the Centre for Environmental Studies, PCSIR Laboratories, Karachi, Pakistan, joined the Unit

in April for a 5 month period. Ms. Hina Siddiqi is currently studying for her PhD in analytical chemistry and will receive training and contribute to the research activities of the Unit related to pesticide residue analysis in water, soil and agricultural products.



Ms. Hina Siddiqi (Pakistan) and Mr. Jean Pierre Ouattara (Burkina Faso) processing pesticide residue data

EU 6th Framework Project on ProSafeBeef

The EU Framework 6 Integrated Project on ProSafeBeef, in which the Agrochemicals Unit is a partner, has been approved by the European Commission and commenced on 1st March 2007. The project work package in which the Unit is involved deals with analytical methodology to underpin risk assessment related to the use of anthelmintic compounds in animal production, primarily beef. The Agrochemicals Unit Head participated in the start-up meeting for the project, which was held at Ashtown Food Research Centre, Ireland, 26-30 March. The work plan was elaborated for the first 18 months for the work package on chemical residues. The Agrochemicals Unit will act in an expert consultancy role, as liaison with a partner laboratory in Brazil and in the development & validation of liquid chromatography-mass spectrometry methods for anthelmintics.

New eLearning Course

Technical Officer: Ian Glen Ferris

The Food and Environmental Protection subprogramme eLearning courses aim to accelerate capacity building in Member States and to ensure that all participants of FAO/IAEA sponsored training courses, workshops and TC projects have the necessary pre-requisite skills. In addition to pesticide residue analysis, pesticide management, and laboratory pre-requisites 1, a new course is now available – ecological risk assessments of pesticides. This course is intended for all who share an interest in proper use of pesticides and reducing risks.

Ecological risk assessments of pesticides focuses on the risk assessment process and how it is used to evaluate potential pesticide impacts in agricultural environments. The course is an all-in-one collection of methods, tools, data, definitions, and process descriptions that can be used to evaluate the potential ecological risk of using a pesticide. It shows how to use an ecological risk assessment to help manage hazards from pesticides.

Click the link and log in to view the course. To take the exams, you enroll as follows. Go to the home page of the course and select the Enroll button next to the course title. This will open a new page with another Enroll button. Click on this Enroll button. This will automatically add you to the course enrollment list, without the need for instructor approval.

If you are not yet registered, you can create a new account from the login page. All eLearning courses are free and anyone can join the above courses any time.

Publications

Maestroni, B.M., Rathor, M.N. and Cannavan, A. (2007). A simple, economical and efficient sample processing procedure for fumonisin B1 analysis in maize. Book of abstracts of the XII International IUPAC Symposium on Mycotoxins and Phycotoxins, Istanbul, Turkey, 21-25 May 2007, abstract 1474.

Aysal, P. and Cannavan, A. (2007) .The IAEA-ethyl acetate multi-residue method to determine pesticide residues in fruits and wheat flour. Book of abstracts "Multiple stressors for the environment and human health - present and future challenges and perspectives" of the SETAC (Society of Environmental Toxicology and Chemistry) Europe 17th Annual Meeting, Porto, Portugal 20-24 May 2007, p 107.

Fodey, T., Murilla, G., **Cannavan, A**. and Elliott, C. (2007). Characterisation of antibodies to chloramphenicol produced in different species by ELISA and biosensor technologies. Analytica Chimica Acta, 592, 51-57.

Aysal, P., Ambrus, Á., Lehotay, S.J. and **Cannavan, A**. (2007). Validation of an efficient method for the determination of pesticide residues in fruits and vegetables using ethyl acetate for extraction. Journal of Envi-

ronmental Science and Health B, in press (Vol.B42, No.5).

Wesongah, J., Murilla, G., Guantai, A., Elliott, C., Fodey, T. and **Cannavan, A.** (2007). A competitive enzyme-linked immunosorbent assay for determination of chloramphenicol. Journal of Veterinary Pharmacology and Therapeutics, 30, 68-73.

Fussell, R. J., Hetmanski, M. T., MacArthur, R., Findlay, D., Smith, F., Ambrus, Á. and **Brodesser, P.J.** (2007). Measurement uncertainty associated with sample processing of oranges and tomatoes for pesticide residue analysis. Journal of Agricultural Food Chemistry, 55, 1062-1070.

Annex: Food Irradiation Facilities Database

The Food Irradiation Facilities Database contains a listing of multi-purpose facilities, i.e. establishments used for the treatment of food and other products. We estimate that there are approximately 180 facilities in use worldwide. However, if you have information on other irradiation facilities which are not included in this list, please send us an email to OfficialMail@iaea.org.

FOOD IRRADIATION FACILITIES DATABASE		
Country	**Facility Address**	**Type of Source**
Argentina	Planta de Irradiación Semi-Industrial (PISI), Presbítero Juan González y Aragón No. 15, Ezeiza – Buenos Aires, B1802AYA	Co-60
	IONICS S.A; José Ingenieros y Marcos Sastro (Tigre) Buenos Aires	Co-60
	Sinercom S.A. Asesoramiento Tecnológico: Dean Funes 97 1st floor, Salta	Co-60
Australia	Steritech Pty. Ltd Dandenong, 160 South Gippsland Hwy. Dandenong, VIC 3175	Co-60
	Wetherill Park, 5 Widemere Rd., Wetherill Park, NSW 2164	Co-60
	Narangba, 180 Potassium St., Narangba, QLD 4504	Co-60
Bangladesh	Bangladesh Atomic Energy Commission, IFRB, POB 3787 Dhaka, 1000	Co-60
Belgium	I. Sterigenics Belgium, Zoning Industriel, Fleurus, 6220	Co-60
	II Sterigenics Belgium, Zoning Industriel, Fleurus, 6220	Co-60
Brazil	Embrarad Empresa Brasileira de Radiacões Ltda., Rua Agostinho Togneri 399, São Paulo-SP, 04690-090	Co-60
	Embrarad Empresa Brasileira de Radiacões Ltda., Av. Cruzada Bandeirante 269, Cotia-SP, 06700-000	Co-60
	CBE-Companhia Brasileira de Esterilizacão, Rod. D. Pedro I, km 89,5, POB 149, Jarinu, São Paulo-SP, 13240-000	Co-60
	Multipurpose gamma irradiator CTR/IPEN, Av. Prof Lineu Prestes 2242, Cidade Universitária – São Paulo/SP- Brazil-CEP05508-000	Co-60
Bulgaria	Stambolijski, Hristo Botev St, "Plodohranilishte", 72 Tsarigradsko shose Blvd., 1784 Sofia	Co-60
Canada	Canadian Irradiation Center, 535 Cartier Ouest, Laval, P.Q., H7V 3S8, Québec	Co-60
Chile	Multipurpose Irradiation Plant, Amunátegui 95, Santiago	Co-60
China	Xinsha Depot of China Grain Reserves, China Grain Irradiation Engineering Center Guangzhou, Innovation Plaza A1218, Tsinghua University, Beijing 100084	E-beam
	Suzhou CNNC Huadong Radiation Co.,LTD; Bei-qi-li-qiao, Songling Town, Wujiang City 215200, Jiangsu Province	Co-60
	Hongyisifang Rad. Technique Co. Ltd, No. 18 Guangli Street, Industry Exploitation Area Tongzhou Beijing, 101113	Co-60
	Nanjing Radiation Center, 50 Zhongling St., Xiaolingwei, Nanjing, 210014	Co-60
	Beijing Yongzhu Mayak Rad. New Technique Co. Ltd. No. 6 (A) Dayangfang, Andingmen Wai, Beijing, 100012	Co-60
	Yunnan Nuclear Technology Application Center, 6 Kunling Rd., Kunming Economy & Techn.Dev.Zone, Kunming, 650214	Co-60
	Shan Dong Irradiation Center, 198 Gong Ye Bei Rd., Jinan, 250100	Co-60
	Hunan Institute for Appl. of Atomic Energy in Agriculture, Mapuling, Changsha, 410125	Co-60
	China National Nuclear Corp., Dalian Institute of Applied Technology, 455 Haiyan St., Ganjingzi District, Dalian,116031	Co-60
	Guangzhou R&D Centre for Irradiation Technology, Jiangang Zhonglun Town, PanYu District, Guangzhou City, 511495	Co-60
Colombia	Facilidad Gamma, INGEOMINAS. Carrera 50 No. 26-00, Bogotá, D.C.	Co-60
Croatia	Ruder Boskovic Institute, Bijenicka cesta 54, Zagreb, 10000	Co-60
Cuba	Centro de Irradiación de Alimentos, Km. 3 ½ Carretera del Guatao, La Lisa Cp. 19200, Habana	Co-60
Czech Republic	PERUN ARTIM Co., Ltd., Radiova 1, CZ-10227, Prague	Co-60
Ecuador	Escuela Politécnica Nacional P.O.Box 17-01-2759	E-beam
Egypt	Mega Gamma-1, National Center for Rad. Research & Technology 3, Ahmad El-Zomor St., 8th Sector, Nasr City, Cairo, POB 29	Co-60
France	Isotron, Provence SA, MIN 7123-Arnavaux, Rue Jean Queillau, 13323 Marseille Cedex 14	Co-60
	Ionisos, Z.I. Les Chartinières, 01120 Dagneux	Co-60
	Ionisos, Z.I. de l'Aubrée, 72300 Sable-sur-Sarthe	Co-60

	Ionisos, Zi de Monitaut, 85700 Pouzages	Co-60
	Ionisos, Le Flachée, 56230 Berric	E-beam
	Ionisos, Domaine de Corbeville, BP 35, 91402 Orsay, Cedex	E-beam
	Ionisos, 10500 Brienne le Château, Chaumesnil	E-beam
Germany	BGS-Gamma-Service GmbH & Co. KG, Fritz-Kotz Str. 16, 51674 Wiehl	Co-60
	Willy Ruesch GmbH, Willy Ruesch Str. 4, 71394 Kernen	Co-60
	Isotron Deutschland GmbH, Kesselbodenstr. 7, 85391 Allershausen	Co-60
Ghana	Ghana Atomic Energy Commission, P.O. Box LG80, Legon	Co-60
Hungary	Agroster Irradiation Co Ltd, Jaszberenyi ut. 5, Budapest, 1106	Co-60
	SLL-01 Gamma Irradiator, Konkoly Thege Miklos 29-33, Budapest 1121	Co-60
India	Isomed, BARC South Site, Mumbai, 400 085	Co-60
	Spice Irradiation Plant, Sector 20, Vashi Complex, Navi Mumbai, 400 705	Co-60
	Shriram Applied Radiation Center (SARC), 19 University Rd. Delhi, 110 007	Co-60
	Food Package Irradiator, Food Technology Division, FIPly, Trombay, Mumbai-400 085	Co-60
	Krushni Utpadan & Sanrakshan Kendra, KRUSHAK, BARC, PO Lasalgaon, Kotamgaon Rd., Dist. Nashik	Co-60
	Universal ISO-MED, (A Div. of Universal Medicap Ltd.) Bhagwan Park, At: Dashrath – 391740, Dist. Vadodara, Gujarat	Co-60
	A. V. Processors Pvt. Ltd, E-52, Anandnagar MIDC, Ambernath - 421506	Co-60
	VIKIRAN, Panchghara, Durgapur Express Highway, Dankuni, Hooghly	Co-60
	GAMMA AGRO-MEDICAL PROCESSINGS PVT LTD B-5, CIE, Balanagar, Hyderbad-500 037	Co-60
Indonesia	Pt. Rel-ion Sterilization Services, Desa Ganda Mekar, Kec. Cibitung, Bekasi, 17520	Co-60
Islamic Republic of Iran	Radiation Application Research School (formerly Gamma Irradiation Center), PO Box 11365-8486, NSTRI, AEOI, Tehran	Co-60
Israel	Sor-Van Radiation Ltd, Kiryat Sorq, POB 214, Javne, 81800	Co-60
Italy	GAMMA 2 - Italia SPA, Marzabotto 4, 40050 Ca' de Fabbri (BO)	Co-60
Japan	Isotope Irradiation Center, Shihoro	Co-60
Republic of Korea	Greenpia Technology Inc, 329 Shinji-Ri, Neungseo-Myun, Yeoju-Kun, Kyungki-Do, 469-810	Co-60
	Advanced Radiation Technology Institute, 1266 Sinjeongdong, Jeongup, Chonbuk, 580-185	Co-60
	Advanced Radiation Technology Institute, Korea Atomic Energy Research Institute, 1266 Sinjeongdong, Jeongup, Chonbuk, 580-185.	E-beam
Malaysia	Malaysian Institute for Nuclear Technology Research, XX, Kajang, 43000	Co-60
	Isotron Malaysia, Plot 203 – Kuala Ketil Industrial Park, 09300 Kuala Ketil, Kedah	Co-60
Mexico	Departamento del Irradiator Gamma, Carretera México-Toluca S/N, La Marquesa, Ocoyoacac, Estado de México, CP 52750	Co-60
	Sterigenics, Norte 7 S/N Parque Industrial Tepeji, Tepeji del Rio de O. Edo. De Hidalgo, 42851	Co-60
Netherlands	Isotron Nederland, Moresestraat 3, Ede 6716 AH	Co-60
Nigeria	SHETSCO, Abuja, 900001	Co-60
Peru	Instituto Peruano de Energía Nuclear (IPEN), Av. Metropolitana s/n Santa Anita, Lima, Lima 43	Co-60
Philippines	Philippine Nuclear Research Institute (PNRI), Multi-Purpose Irradiation Facility, Commonweath Ave. Diliman, Quezon City, 1101	Co-60
Poland	Technical University of Lodz, Institute of Applied Radiation Chemistry, Wrobleskiego 15, 93-590 Lodz	Co-60
	Institute of Nuclear Chemistry and Technology, Pilot Plant for Food Irradiation, Fasolowa 1A, 02-482 Warsaw	E-beam
Portugal	UTR – Radiation Technologies Unit, Estrada Nacional no. 10, Sacavem, 2686-953 (CHIP, S.A)	Co-60
Serbia	Institute of Nuclear Sciences Vinca, POB 522, Belgrade, 11001	Co-60
South Africa	Isotron South Africa (Pty) Ltd, P.O. Box 3219, Kempton Park, 1620	Co-60
Spain	ARAGOGAMMA, Ctra. Granollers a Cardedeu Km. 3.5, 08520 Les Franqueses del Valles	Co-60
	Pol. Industrial Tarancón Sur, C/ Rocinante, Parcela 50, 16400 Tarancon, Cuenca	E-beam
	ELECTRON SERVICE LINE (ESERLINE) S.L, Av. Menéndez Pelayo, 2, 3º Dcha, 280009 Madrid	E-beam

Syrian Arab Republic	Atomic Energy Commission of Syria, P.O. Box 6091 Damascus	Co-60
Thailand	Isotron (Thailand Ltd.), Bangpakong Industrial Park II, 700/465 Moo 7, T. Donhuaroh, A. Muang, Chonburi, 20000	Co-60
	Thai Irradiation Centre, OAEP Demonstration Irradiator 37 Moo 3, Klong 5, Klong Luang, Pathumthani, 12120	Co-60
Turkey	Saraykoy Nuclear Research and Training Center, Istanbul Yolu 30 Km Saray, Kazan, 06983, Ankara	Co-60
	Gamma-Pak Sterilizasyon San. ve TİC.A.Ş, Yünsa Yolu No:4 Organize San. Böl. Çerkezköy – Tekirdağ, 59500	Co-60
United Status of America	National Center for Electron Beam Food Research, 400 Discovery Drive, College Station TX 77845	E-beam
	Sadex Corporation, 2650 Murray Street, Sioux City IA 51111	E-beam
	Hawaii Pride, LLC, 16-664 Milo St, Keaau HI 96749	E-beam
	STERIS Corporation, STERIS Isomedix Services, 2072 Southport Road, Spartanburg SC 29306	Co-60
	Ion Beam Applications, Sterigenics, 10811 Withers Cove Park Drive, Charlotte NC 28273	Co-60
	Ion Beam Applications Inc., 344 Bonnie Circle, Corona CA 91720	Co-60
	Ion Beam Applications Inc., 3125 Wichita Court, Fort Worth TX 76140	Co-60
	Ion Beam Applications Inc., 5900 Obata Way, Gilroy CA 95020	Co-60
	Ion Beam Applications Inc., 1003 Lakeside Drive, Gurnee IL 60031	Co-60
	Ion Beam Applications Inc., 1148 Porter Avenue, Haw River NC 27258	Co-60
	Ion Beam Applications Inc., 2311 Lincoln Avenue, Hayward CA 94545	Co-60
	Ion Beam Applications Inc., 108 Lake Denmark Road, Rockaway NJ 07866	Co-60
	Steris ISOMEDIX Services, 2072 Southport Road, Spartanburg SC 29306	Co-60
	Ion Beam Applications Inc., 711 East Cooper Court, Schaumburg IL 60173	Co-60
	Ion Beam Applications Inc., 210 Clyde Road, Somerset NJ 08873	Co-60
	Ion Beam Applications Inc., 1401 Morgan Circle, Tustin CA 92780	Co-60
	Ion Beam Applications Inc., 1700 North Airport Road, West Memphis AR 72301	Co-60
	Ion Beam Applications Inc., 305 Enterprise Drive, Westerville OH 43081	Co-60
Venezuela	PEGAMMA (Planta de esterilización por rayos Gamma), Carretera Panamericana, Km 11, Altos de Pipe, Estado Miranda. Instituto Venezolano de Investigaciones Científicas (IVIC)	Co-60
Vietnam	VINAGAMMA, Research and Develop. Center for Radiation Technology 202 A, Street 11,, Linh Xuan Ward, Thu Duc District, Ho Chi Minh City	Co-60
	1B Hamlet, An Phu Commune, Thuan AN District, Binh Duong Province	Co-60
	Institute for Nuclear Science and Technology (INST), Hoang Quoc Viet Street, Cau Giay District, Hanoi City	Co-60
	Son Son Co., Ltd , 4E/52 1A Highway, Block 5, Binh Tri Dong Ward, Binh Tan District, Ho Chi Minh City	E-beam

IAEA
International Atomic Energy Agency

Food and Environmental Protection Newsletter Vol. 10, No. 2

July 2007

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,
A-1400 Wien, Austria

Printed by the IAEA in Austria,
July 2007

07-22131