Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture and FAO/IAEA Agriculture and Biotechnology Laboratory, Seibersdorf

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To the Reader

Since 1964, the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture has been in a unique position to promote the mandates of both FAO in its efforts to eliminate world hunger and poverty through sustainable agricultural development, improved nutrition and food security and the IAEA through peaceful uses of atomic energy to accelerate and expand the contributions of these technologies to health and prosperity worldwide.

The Food and Environmental Protection Section of the Joint Division and the Agrochemicals Unit of the FAO/IAEA Agriculture and Biotechnology Laboratory in Seibersdorf comprise a sub-programme that provides assistance related to risk analysis methodologies and capacity building for compliance with food safety standards. These activities include the elaboration and application of international standards and guidelines on the use of irradiation as a sanitary and phytosanitary treatment for food and agricultural commodities as well as the use of analytical methods and strengthened capacities for risk analysis related to food

safety and pesticide management. Assistance is provided through program activities related to coordination and support in research, providing technical and advisory services, providing laboratory support and training, and collecting, analyzing and disseminating information.

The success of these activities is reflected in part by the publication of two IAEA technical documents in early 2005 on the use of Irradiation as a Phytosanitary Treatment of Food and Agricultural Commodities (IAEA TECDOC 1427) and on the Determination of Human Pathogen Profiles in Food by Quality Assured Microbial Assays (IAEA TECDOC 1431). In addition, one combined TECDOC on the Validation of Thin-Layer Chromatographic Screening Methods for Pesticide Residue Analysis and on Alternative Methods to Gas and High Performance Liquid Chromatography for Pesticide Residue Analysis in Grain will be published in the near future. Several documents are also currently under consideration or in the process of being adopted as Guidelines by the Codex Alimentarius Commission (see details in the *Past Events* section of this issue).

The future activities of the Food and Environmental Protection sub-programme will include a coordinated and comprehensive "farm to fork" approach to food production systems, i.e., strengthening compliance with food and environmental safety standards through good agricultural practices. This will include the enhancement of Member State capabilities to reduce food safety hazards and protect the environment through the application of nuclear and related analytical techniques and the identification, development and adoption of good agricultural practices that reduce the risks to food safety and the environment from chemical, microbiological and radionuclide contamination. These practices aim to limit the introduction of hazards at their source while at the same time emphasizing the application of agrochemicals in amounts and timing appropriate to agronomic, food safety and environmental requirements, including withholding periods.

Laboratories and trained staff capable of establishing reliable sampling and analytical regimes for quantifying potential hazards within specific production practices or in products are indispensable for informed decision making and improved food safety and environmental protection. In this regard, the Food and Environmental Protection Section has been assigned seventeen new IAEA technical cooperation projects for the 2005-2006 biennium covering, among other areas, the use of irradiation for sanitary and phytosanitary purposes and in the implementation of quality assurance and quality control procedures in both pesticide and veterinary drug residue laboratories.

The Joint Division also welcomes the strengthening of our current technical inputs to other inter-agency initiatives, including in the adaptation and validation of screening and confirmatory methodologies for veterinary drugs, pesticides and other contaminants; the training of trainers and auditors in the application of methods of analysis and sampling for compliance with maximum residue limits for contaminants, including pesticides and veterinary drugs; the creation of distance learning modules and other web based programmes on sampling and analysis of food products for contaminants, and; the promotion of additional research and provision of additional training in these areas. In the area of environmental contamination, our activities related to nuclear preparedness and response, including the application of agricultural countemeausures and the presentation of an information paper on Preparedness for Nuclear Emergencies (COAG/2005/Inf.2) at the 19th Session of the FAO Committee on Agriculture is also highlighted in the Feature Article of this Newletter.

An update on our ongoing collaborative inter-agency efforts with subsidiary bodies of the Codex Alimentarius Commission is highlighted in the *Past Events* section of this Newsletter, including our participation at the 26th Session of the Codex Committee on Methods of Analysis and Sampling, the 37th Session of the Codex Committee on Pesticide Residues and the 37th Session of the Codex Committee on Food Additives and Contaminants. These activities include our current initiative to incorporate the list of Codex methods of analysis for pesticide residues into our Food Contaminant and Residue Information System (INFOCRIS) as well as our efforts to update this database to include data provided by the Netherlands for methods of analysis, and in some cases validation data, for veterinary drug residues.

I am also pleased to inform you that the Director General, together with the Director General of FAO, has appointed Mr. Liang Qu to the post of Director of the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture (NAFA). Mr. Qu will take up his duties on 1 August 2005 on the retirement of Mr. Jim Dargie.

Mr. Qu is from the People's Republic of China and holds a M.Sc. in Agronomy from the Chinese Academy of Agricultural Sciences. His former positions include Deputy Director General of the Institute for Application of Atomic Energy, Beijing; Director-General of the Department of International Cooperation and Industrial Development of the Chinese Academy of Agricultural Sciences; Permanent Representative of China to FAO and, his most recent position, Director-General, Department of International Cooperation in the Chinese Academy of Agricultural Sciences. In closing, I am sure that you will join me in welcoming Mr. Qu to the Department and wish him every success in his future endeavours.

Sincerely,

David H. Byron

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Feature Article

Emergency preparedness and response to a nuclear emergency affecting agriculture

The immediate (24 hours) and short-term (one-month) impact of a nuclear emergency can be effectively mitigated if emergency response plans in relation to food and agriculture are in place. A FAO Committee on Agriculture (COAG April 2005) information paper on "Preparedness for Nuclear Emergencies"[1]) provided an opportunity for FAO's Nuclear Emergencies Crisis Network (ECN) to highlight first actions for Member States[2]; the role of the Codex guideline levels for radionuclides in food moving in international trade following accidental contamination as generic action levels; the need for specifying intervention levels for use in emergency situations in advance; information resources online and under development; and the importance of all FAO and IAEA Member States ratifying the conventions on early notification[3] and assistance[4].

FAO and IAEA are both full parties to the conventions. Cooperative (working) 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 have been agreed[5] including key procedures and checklists. A ConvEx – 3 exercise provided an opportunity to test FAO's initial "activation" and response. The exercise was hosted by Romania and involved the IAEA together with 61 of its Member States and seven international organizations.[6] The exercise was started on 11 May 2005 and lasted 39 hours. The Cernavoda CANDU Nuclear Power Plant in Romania acted as the simulator of the nuclear accident and originator of the emergency messages. These messages were analyzed and routed by National Commission for Nuclear Activities Control (CNCAN), in Romania to IAEA in Vienna. The IAEA further relayed the messages to the international community including FAO's Nuclear Emergencies Crisis Network (ECN).

IAEA's Incident and Response Centre provided technical support within the ConvEx framework. Countermeasures were implemented in the Cernavoda town area by the General Inspectorate for Emergency Situations. Results of the exercise are still being evaluated. The initial conclusions of the exercise from FAO's perspective is that the arrangements for sharing information and the underlying procedures/checklists are adequate to meet requirements under the early notification and assistance conventions. However, further training and revisions are required to institutionalize the response and to ensure that FAO's information and analytical resources are more readily available to affected states, including relevant cost-effective agricultural countermeasures.[7]

In the medium- and longer-term, sustaining acceptable living and working conditions in contaminated areas requires practical and cost-effective strategies for restoring and managing contaminated agricultural land and food products. These strategies should consider site-specific factors. The Joint FAO/IAEA Division and the Planning and Economics Study Section (PESS) of the IAEA's Department of Nuclear Energy are collaborating with the Seibersdorf Laboratories to develop decision support tools to aid in selecting appropriate countermeasures. The Radionuclide Countermeasure Information System or RCMIS is a new approach to providing information for disaster recovery for nuclear emergency situations. The purpose of the system is to facilitate access to data on transfer factors and on radionuclide countermeasures. These countermeasures can be implemented on contaminated soil to help meet international standards such as Codex, and to improve the income of affected populations. RCMIS will provide easy access to relevant information about agricultural countermeasure projects as well as decision support tools for assessing the financial and economical viability of such projects in the local context. RCMIS inputs include data on the type of release, climate, transfer factors and crops. With the given data the system taps a number of relevant databases and provides a list of possible countermeasures suitable for the user's circumstances. It also aids the decision making process, in part by providing financial templates for assessing and comparing the economic viability of the different countermeasures. A demonstration of the future RCMIS is now available on CD-ROM showing the selection of appropriate/cost-effective countermeasures in contaminated areas. For a free copy contact the NAFA Webmaster (R.Cardenas@iaea.org).

[1] http://www.fao.org/unfao/bodies/coag/coag19/coag19_en.htm

[2] http://www.iaea.org/programmes/nafa/dx/emergency/index.html

[3] http://www.iaea.org/Publications/Documents/Conventions/cenna.html

[4] http://www.iaea.org/Publications/Documents/Conventions/cacnare.html

[5] http://www.iaea.org/programmes/nafa/dx/emergency/agreement.pdf

[6] http://www.iaea.org/NewsCenter/MediaAdvisory/2005/MA_200514.html

[7] http://www.iaea.org/programmes/nafa/dx/emergency/countermeasures.html.

Forthcoming Events

Workshop on Irradiation as a Quarantine Treatment; TUR/5/022; Ankara, Turkey; 23-27 May 2005

Technical Officer: Tatiana Rubio Cabello

Under the Technical Cooperation (TC) Project Implementation of Food Irradiation Technology in Turkey (TUR/5/022) a national workshop is being organized on irradiation as a quarantine treatment, to be held in Ankara from 23-27 May 2005. The target audience will be National Plant Protection Officials (NPPO's) from the different provinces of Turkey.

Final Research Coordination Meeting (RCM) on Use of Irradiation to Ensure Hygienic Quality of Fresh, Pre-cut Fruits and Vegetables and other Minimally Processed Food of Plant Origin, D6.10.22; Islamabad, Pakistan, 25-29 July 2005

Technical Officer: Tatiana Rubio Cabello

This RCM will be held at the Pakistan Atomic Energy Commission in Islamabad, Pakistan from 25-29 July 2005. The purpose of the meeting is to evaluate the research work done since the beginning of the Coordinated Research Project (CRP), especially since the second Research Coordination Meeting held in Belfast, UK in April 2003.

The participants have worked under this CRP in three different groups of products (fruits, vegetables and seeds/seed sprouts) and in the determination of the radiosensibility of more than a dozen different pathogenic bacteria. To carry out these experiments, the researchers have used internationally recognized standard methodologies including BAM, AOAC, AST.

The data generated under this CRP will provide a solid scientific base to develop guidelines for the use of irradiation as a preventive measure to ensure good hygienic quality of pre-cut and minimally processed fresh fruits and vegetables without affecting their sensorial and commercial quality.

Training Course on QA/QC Measures in Pesticide Residue Analytical Laboratories, Siebersdorf, Austria, 12 September-6 October 2005

Technical Officer: Andrew Cannavan

This training workshop will take place at the FAO/IAEA Training and Reference Centre for Food and Pesticide Control at Seiberdorf, Austria, 12 September-7 October 2005. The workshop is aimed at qualified analysts who are working in laboratories performing official control on behalf of their Governments. The objective is to introduce and discuss in detail the Quality Assurance/Quality Control (QA/QC) principles relevant to pesticide residue analysis. Practical examples and hands-on training will be used to demonstrate the general principles outlined in ISO guide 17025 and OECD GLP guidelines. Detailed information is available on our website[8]. The closing date for nominations was 15 May 2005, so no new nominations will be considered. Readers may be interested in the eLearning modules on pesticide residue analysis, pesticide management and laboratory prerequisites which candidates are recommended to study before participating in the workshop[9]. For more information, contact Andrew Cannavan (A.Cannavan@iaea.org) or Britt Maestroni (B.Maestroni@iaea.org).

[8] http://www.iaea.org/programmes/nafa/d5/index.html.

[9] http://www.iaea.org/Atutor/login.php

Past Events

Second Research Coordination Meeting (RCM) and Workshop on Testing the Efficiency and Uncertainty of Sample Processing for Analysis of Food Contaminants, (D6.10.23); Madurai, India; 21-26 February 2005

Technical Officer: Josef Brodesser

The second RCM on the above CRP was held from 21-25 February 2005 with the active contribution of nine CRP participants from Argentina, China, Colombia, Croatia, Hungary, India, Thailand and the UK. Josef Brodesser was heading the meeting, with Mr. Árpád Ambrus taking care of the technical management of the meeting. The results and outcomes of the research activities of the past two years were presented and discussed, and a new work plan for the coming phase elaborated. In the frame of the subsequent symposium, the RCM participants and Prof. Jayapragasam from the University of Coimbatore, India, as a guest speaker, reported about the impact and implications of the use of pesticides in their respective countries. Computational details concerning the theoretical background of the ongoing CRP were also explained and discussed.

It was agreed among the participants that in the coming CRP phase the core group should further focus on details and the elaboration of open questions regarding sample homogenisation, loss of target compounds during sample preparation and the rationalisation of the sample extraction process. The research work done thus far shows that pesticide residues adsorbed on the surface of the commodity partly degrade during the homogenisation and extraction process.

l. to r.: J. Brodesser, J. Solomon, Prof. Jayapragasam, Á.. Ambrus

This CRP and other publications indicate that this is due to the interaction of residues with enzymes which does not occur as long as the commodity is intact. The sample processing primarily leads to lower recovery values in the regular laboratory quality assurance programme, but more importantly, to less than the true value and to expanded measurement uncertainties. On the larger scale, these effects are not sufficiently taken into consideration, but neglecting these facts leads to underestimated levels of the real residues. As a wider consequence of this, the unclarity about the influence of the sample extraction gives rise to disputes about true values of residues. This is of particular relevance in food trade as soon as maximum residue limits are concerned.

It is intended to prolong the last phase of the CRP until the end of 2007 to allow the CRP participants to resolve open points according to the tasks defined in the ambitious work plan agreed upon. The focus of the coming phase will be an extended list of active ingredients and large food crops like jackfruits or melons where sampling and sample size play a major role in the analytical results. The way analytical samples are taken will have a huge influence on the residue values, facts that are to be investigated in more detail.

IAEA/RCA Final Review Meeting on the Application of Food Irradiation for Food, Security, Safety and Trade (RAS/5/042); Daejeon, Republic of Korea; 21-25 February 2005

Technical Officer: Tatiana Rubio Cabello

The objective of the project RAS/5/042 was to improve food security, food safety and trade of food products treated with irradiation. The specific objectives were to facilitate the expansion of the use of food irradiation in Regional Cooperative Agreement (RCA) countries and to improve international trade in irradiated food within the region through the implementation of harmonized regulations on food irradiation; conducting inter-country market trials of irradiated food commodities; training of personnel in specific fields; and continued public awareness and acceptance of radiation processing of food for sanitary and phytosanitary purposes.

A further objective of the meeting which took place in Daejon, Korea was to review the achievements of the RCA participating member countries, especially during the 2003-2004 period.

The meeting was attended by the national project coordinators of 11 countries (Australia, China, India, Indonesia, Korea, Malaysia, Pakistan, Philippines, Sri Lanka, Thailand and Vietnam), some local observers, and the Technical Officer of the project.

The meeting was opened by Mr. Il Hyun Kuk, Vice President, Korea Atomic Energy Research Institute (KAERI). Mr. Kuk welcomed the delegates from the participating countries and he emphasized the need to continue working in the application of radiation technology for improving food security, safety and trade in the re-

gion. The Technical Officer extended her appreciation to KAERI on behalf of the Director Generals of FAO and IAEA for hosting the meeting and informed the delegates of the present situation of the use of food irradiation technology in some countries, and specifically in some of the countries involved in the project.

After the opening ceremony the program officer of the Regional Cooperation Agreement (RCA) Regional Office, Mr. John Chung, described in detail the organizational structure of the IAEA, RCA and Regional Cooperation Agreement Office (RCAO).

The country reports were presented on the first and second day of the meeting. The meeting continued on the third day with discussions by member countries on their major activities, achievements, limitations and shortcomings of the project.

They finished the third day with a visit to the Co-60 commercial irradiation facility in Korea, which has been in operation since 1987. The plant is located in Yeoju, about 70 km from Seoul. During the last two days of the meeting, the participants wrote the report and discussed a new TC regional project on food irradiation to be presented for the TC cycle 2007-2008.

Participants in the IAEA/RCA Final Progress Meeting, Daejon, Korea

Activities and achievements of the project

As a result of the project, regulations governing the use of irradiation on food products are now in place in most RCA countries. The Philippines and Vietnam recently adopted harmonized regulations and approved advisory dose limits for seven food classes. Malaysia has put forward a draft harmonized regulation for public comment. Recently some countries also amended their regulations for generic approval for selected categories of food, including Australia and Korea.

Significantly, Australia and New Zealand approved irradiation processing of tropical fruit, including breadfruit, rambutan, carambola, custard apple, longan, litchi, mango, mangosteen and papaya.

China is developing a standard for irradiated seafood. Korea is also developing a draft standard for meat and meat products. India has amended its quarantine regulations to include irradiation. Sri Lanka is also planning to ratify regulations on food irradiation by April 2005.

A number of inter-county trade trials with irradiated food products were also undertaken. Examples include two trial shipments (16 tons total) of irradiated mangoes (var. Calypso) exported from Australia to New Zealand. The product was well accepted in the market and with export protocols in place trade is expected to expand next season. (See page 18 of this issue for additional details.)

Other inter-country trade trials were carried out by Pakistan to the United Arab Emirates (UAE) and the UK. In Indonesia, some food industries as well as exporters and traders conducted a series of trade trials with irradiated foods. The Philippines carried out a trade trial involving 4.65 tons of irradiated frozen fruits exported to the Middle East.

The number of commercial and semi-commercial irradiation facilities already functioning or proposed in the future also increased in all the RCA countries with the exception of Sri Lanka, which is expected to acquire a commercial facility in the near future. In India, a low dose irradiation facility for sprout control in onion and preservation of other agricultural commodities became operational in 2003. This facility will have a positive socio-economic benefit to farmers of the region.

In general, countries reported a significant increase in the volumes of foods processed by irradiation. Vietnam reported an increase of 180%, Malaysia 70%, India 50%, China and Indonesia 40% over the figures reported in 2002.

A number of countries conducted international workshops supported by IAEA under this project. China conducted a workshop on quality assurance of irradiation facilities in Beijing in 2004. As a result of the workshop, some countries of the region improved the safety systems in their pilot-scale food irradiation facilities. Thailand and the Philippines also held workshops in Bangkok and Manila respectively on phytosanitary and market trials of irradiated fruit with the participation of experts sent under the project. All workshops were well attended and a total of 216 participants received training. Many countries also organized national seminars and workshops on the application of irradiation for food security, safety and trade to raise consumer awareness. Activities included public awareness programs and meetings/workshops with exporters and wholesalers. A variety of promotional material such as documentary films, brochures and booklets on the subject were also produced.

Group of participants, IAEA/ RCA Final Progress Review Meeting, Daejon, Korea

Conclusions

1) Despite the many difficulties faced during the project period, excellent results were achieved.

2) Considerable progress was made with regard to acceptance/implementation of regulations. Most countries are working towards implementing harmonized regulations.

3) Quality assurance of the irradiation facilities was strengthened by participation in RCA workshops conducted in the region under this project.

4) There was a significant effort on the part of RCA member states to amend their respective rules and regulations.

5) A number of domestic trade trials were conducted successfully and the volume of food processed by irradiation as well as the number of facilities increased in the region.

6) Despite many difficulties, inter-country trade trials initiated during the course of this project are expected to lead to expanded international trade in irradiated commodities.

7) All countries have worked at creating awareness on the benefits of irradiation technology.

IAEA/FAO Workshop on Distance Learning for Capacity Building on Pesticide Management; San Jose, Costa Rica; 18-22 February 2005

Technical Officers: Ian Ferris and Kerstin Gross

Host: Professor Elizabeth Carazo (University of Costa Rica)

One of the recommendations of a meeting with project leaders of the International Union of Pure and Applied Chemistry (IUPAC) and FAO/IAEA staff in September 2004 was to hold a workshop on accelerated capacity building for pesticides in conjunction with the IUPAC-CICA-UCR MAG-CR International Workshop on Crop Protection Chemistry in Latin America (14-17 February 2005). IAEA's Technical Cooperation (TC), Latin American Section, agreed to fund the capacity building workshop, which was hosted by the Centro de Investigación en Contaminación Ambiental (CICA) of the University of Costa Rica. The overall objective of this workshop was to accelerate capacity building for pesticide management within the region of Latin America and the Caribbean.

The participants of the workshop agreed to become national trainers. As key persons in their countries they were asked to:

- utilize the eLearning course;
- raise awareness of eLearning courses in their countries;
- increase the number of participants of the eLearning courses in their countries by mentoring at least two of their colleagues;
- help build quality assurance of the courses by giving feedback on the course content and the eLearning system; and
- utilize the communication tools to strengthen networking amongst analysts and decision makers within the region.

The IAEA/FAO/IUPAC Workshop launched the FAO/IAEA Joint Division's new eLearning system (see link to eLearning site on FEP web pages) and was attended by counterparts from 12 countries of the Latin American and Caribbean region. They presented country situation reports, providing a snapshot on the status of pesticides and good agricultural practice in their countries. Further, the workshop included presentations and exercises on exchanging information with the IAEA's TC Department, project planning and reporting, best management practices in pesticide and irrigation management, relative risk assessment of pesticides, tools to identify capacity needs, important issues in technology transfer, and the importance of life-long learning. In addition, IUPAC projects leaders participated in a panel discussion, connecting leading international experts with national counterparts, thus building contacts and expand networking.

The IAEA/FAO/IUPAC Workshop lauched the FAO/IAEA Joint Division's new eLearning system and was attended by counterparts from 12 countries of the Latin American and Caribbean region. They presented country situation reports, providing a snapshot on the status of pesticides and good agricultural practice in their countries. Further, the workshop included presentations and exercises on exchanging information with the IAEA's Technical Cooporation Department, project planning and reporting, best management practices in pesiticide and irrigation management, relative risk assessment of pesticides, tools to identify capacity needs,

important issues in technology transfer, and the importance of life-long learning.

Group exercise during the launch of the eLearning system and courses at the workshop on Distance learning for capacity building on pesticide management

In addition, IUPAC project leaders participated in a panel discussion, connecting leading international experts with national counterparts, thus building contacts and expand networking.

Field trip & group exercises demonstrating the close relationship between water management/ irrigation & pesticide/ fertilizer management

An important output of the workshop was the identification of the main problems and stakeholders for the application of Good Agricultural Practice (GAP). These included the lack of information on use, dose, toxicity, storage, protection measures and waste management by the end user; lack of procedures for final disposal of obsolete pesticides; cheaper generic products of low quality; lack of local pesticides field information; lack of pesticide residues monitoring programmes; lack of methods and capacity for risk analysis. The participants focused particularly on what analysts and agencies can do to help GAP implementation.

The presentations and results of the workshop are available online.[10]

The success of the IAEA/FAO/IUPAC Workshop and eLearning is evident by the rapid increase in site visits[11].

Plans are now being made to extend the concept of accellerated capacity building to the Asian and African regions.

Third Research Coordination Meeting of the Coordinated Research Project "Development of Strategies for the Effective Monitoring of Veterinary Drug Residues in Livestock and Livestock Products in Developing Countries" (D3.20.22); Natal, Brazil; 11–15 April 2005

Technical Officer: Andrew Cannavan

Summary

The third RCM for the CRP on the development of strategies for the effective monitoring of veterinary drug residues in livestock and livestock products in developing countries was held in Natal, Brazil, from 11-15 April 2005. The meeting was attended by ten Research Contract Holders, a second representative of the research group of the host country, two Research Agreement Holders, two Technical Contract Holders and the Scientific Secretary.

The meeting was opened by Dr. Alfredo Montes Niño on behalf of the host country. Dr. Montes Niño has been with the Food and Environmental Protection Section since January 2005 working as a consultant in the area of veterinary drug residue testing and monitoring in developing countries with the general context of improving food quality and safety and enhancing international trade in meat and meat products.

An overview of the objectives and progress of the project was presented by the Scientific Secretary, Dr. Andrew Cannavan. Background and review papers were presented on modified gene expression profiles in bovine liver after animal treatment with anabolic steroids (Prof. Heinrich Meyer, Germany), future issues in veterinary drug residue analysis (Dr. Chris Elliott, UK), studies on the antibody response of *Lama glama* – evaluation of the binding capacity of different IgG subtypes in ELISAs for clenbuterol and BSA (Dr. Iris Lange, Germany) and the preparation of reagents for use in monitoring of veterinary drug residues in livestock (Mr. Terry Fodey, UK). The Scientific Secretary also presented an overview of

[10] http://elearning.iaea.org/ATutor/bounce.php?course=33

[11] (http://elearning.iaea.org/ATutor/statistics/index.htm).

the INFOCRIS database and the eLearning modules and courses available and under development by the Joint FAO/IAEA Division.

The progress of each research group was presented and the results were discussed and used to formulate individual work plans for the final phase of the CRP. The main focus of the project to date has been on method development or adaptation and evaluation. Progress has again been made in this phase of the project on the development of immunoassay methods for chloramphenicol. Many of the problems encountered in the first phase of the CRP with reagent production have been overcome and good quality antibodies and conjugates are now being produced in several laboratories. Some stability problems have been addressed, for example by a change of format from direct to indirect ELISA. Antibody production and maturation has been studied in various species. The overall objectives for the final phase of the project for those groups working on ELISA (Indonesia, Kenya, Korea, Sri Lanka, Barbados, Malta, Cyprus) are to develop test protocols using the reagents produced, validate the methods and compare results with test kits and confirmatory methods. This will require further investigation into methods to stabilize reagents, including lyophilisation and the use of ammonium sulphate or glycerol, further antibody purification and characterization, optimization and validation of test protocols, and transfer of methods for comparison in partner laboratories and against commercially available kits.

The scope of the RIA method employed in Brazil has been successfully broadened to include a second beta-agonist, mabuterol. A full validation, including parameters specified in European Community Decision 2002/657/EC, was presented at the RCM. Future work aims to extend the scope further to include a range of beta-agonistic compounds, through further cross-reactivity tests and development of suitable multi-residue sample preparation protocols.

A full set of reagents and protocols for their optimisation in a novel ^{125}I-radioimmunoassay (RIA) for chloramphenicol was developed in the first phase of the project by the technical contract holders. No progress has been made on the further elaboration of this promising method and it has been decided to transfer this work to the research group in Brazil.

Confirmatory LC-MSMS methods, including extraction procedures, for both the nitrofuran metabolites and chloramphenicol in meat have been developed by the research group in Argentina. Confirmatory methods are, therefore, now available in laboratories in South America and in Asia (Thailand). The work plan for the final phase includes optimization of extraction procedures for different matrices and full validation of the methods according to criteria specified in Decision 2002/657/EC.

Progress was also reported on the development of HPLC methods for nitrofuran metabolites. Nitro-phenyl derivatives of the metabolites of the four main nitrofuran drugs have been produced in Namibia and applied in an HPLC-UV method. Various fluorescence reagents have been evaluated and a suitable fluorescent derivative of AOZ (furazolidone metabolite) has been selected by the researchers in South Africa. Further work for both groups will include elaboration of sample extraction and clean up protocols and validation of the methods.

A number of investigations into the possible natural occurrence of chloramphenicol in poultry litter have been carried out by the researchers in Thailand. The results presented were interesting and further experiments are planned to complete this work.

The objectives of the CRP also include the elaboration of Quality Assurance and Quality Control procedures and the sharing of practical advice on the implementation of sampling plans. To help address these objectives, a detailed presentation on the preparation of a “QA Handbook for the Implementation of the German National Residue Control Plan in Bavaria” was presented by Dr. Lange. The practical steps outlined in this presentation can be adapted and used by the CRP participants in their respective countries. Dr. Elliott also presented a lecture on method validation for immunoassays and it was agreed to use the protocol provided by Dr. Elliott, with necessary adaptations to suit local conditions, as the standard for all research groups. The applicability of the immunoassay validation protocol will be discussed at the final RCM in 2006. Dr. Montes Niño presented a lecture on Conformity Assessment, which outlined the history and development of various standards and explained the role of certification and accreditation bodies.

The Scientific Secretary wishes to express his gratitude to Dr. Alfredo Montes Niño, Dr. Rodrigo Granja and the local organizing team from Microbioticos for their assistance in organizing the meeting.

Conclusions and Recommendations

The work in the second phase of this CRP has built upon the progress reported from the first phase, resulting in good quality immunoassay reagents, confirmatory methods and a number of validated methods. It is recommended that all contracts (with one exception), including technical contracts, be renewed to facilitate the completion of the work plans agreed at the meeting.

Group photo of participants at RCM, Natal, Brazil, April 2005

A protocol for the validation of immunoassays will be provided by a Research Agreement Holder. The protocol has already been successfully applied for validation of an RIA method in Brazil. It is recommended that this protocol be adopted by all participants in the project to harmonize the validation of immunoassay methods developed.

Work on the development of the ^{125}I-radioimmunoassay for chloramphenicol has not been satisfactory. It is recommended that this work is transferred to the research group in Brazil.

The meeting agreed that the FAO/IAEA Joint Division's INFOCRIS database and associated eLearning modules are a very useful resource for developing country scientists. It is recommended to proceed with the expansion of the database as planned. In addition, it was suggested that a database and bibliography of original literature on, for example, pharmacokinetic and metabolism studies on veterinary drugs and hormonal growth promoters should be included. Much of this data was published many years ago and is very difficult to access, but is of importance in the design and development of methods.

Some of the results generated by CRP participants should be presented at the 2nd International Symposium on Recent Advances in Food Analysis, Prague, Czech Republic, 2-4 November 2005.

The final RCM will be held in approximately 18 months. The venue has yet to be selected.

Activities of the Joint FAO/IAEA Division Related to Subsidiary Bodies of the Codex Alimentarius Commission

Technical Officer: David H. Byron

Introduction

The IAEA and the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture and the FAO/IAEA Agriculture and Biotechnology Laboratory of the Agency's Laboratories at Seibersdorf provide direct support to the Codex Alimentarius Commission in its efforts to enhance food quality and safety, the protection of consumers and the promotion of trade in food and agricultural products. This assistance is primarily directed to the Codex Committee on Food Additives and Contaminants, the Codex Committee on Pesticide Residues and the Codex Committee on Methods of Analysis and Sampling.

Codex Committee on Food Additives and Contaminants

The Joint Division, in collaboration with the IAEA Division of Radiation and Waste Safety, continues to take the lead in the revision and expansion of the Codex Guideline Levels for Radionuclides in Foods Following Accidental Nuclear Contamination for Use in International Trade (CAC/GL 5-1989) to additional radioisotopes and to guideline levels for long-term use.

Most recently, the draft revised Codex Guideline Levels for Radionuclides in Foods for Use in International Trade (ALINORM 04/27/12, Appendix XXII) were considered by the 37th Session (April 2005) of the Codex Committee on Food Additives and Contaminants (CCFAC) along with written comments submitted by the European Community, the IAEA and Venezuela (CX/FAC 05/37/36).

As a result of these discussions (ALINORM 05/28/12 paras. 208-217), the CCFAC returned the draft Revised Guideline Levels for Radionuclides in Foods for Use in International Trade for revision by a drafting group led by the EC and the IAEA, with the assistance of Belgium, Egypt, France, Germany, Switzerland, the United Kingdom and the United States.

It was agreed that the drafting group would consider the current draft text in its entirety, with particular emphasis on revisions to the scope of the guidelines to clarify that they only apply in situations related to nuclear accidents or radiological events (i.e., not to routine monitoring) and to the separation of guideline levels specific to general and infant food categories.

It was understood that the resolution of these issues would allow consideration for advancement of the text to Step 5/8 (i.e., final adoption) at the next meeting.

Codex Committee on Pesticide Residues

The Joint Division, and specifically the FAO/IAEA Agriculture and Biotechnology Laboratory and the FAO/IAEA Training and Reference Center for Food and Pesticide Control (TRC), provide expert advice to the Codex Committee on Pesticide Residues (CCPR). In particular, the most recent 37th Session (April 2005) of the CCPR forwarded (ALINORM 05/28/24, paras. 224-228) proposed draft Guidelines on the Use of Mass Spectrometry for the Identification, Confirmation and Quantitative Determination of Residues to the forthcoming 28th Session (July 2005) of the Joint FAO/WHO Codex Alimentarius Commission for final adoption and inclusion in

the Codex Guidelines on Good Practice in Pesticide Residue Analysis.

The 37th Session of the CCPR also forwarded proposed draft Guidelines on the Estimation of Measurement Uncertainty to the 28th Session of the Commission for preliminary adoption and further consideration at the next meeting of the CCPR.

The CCPR also accepted the offer made by the delegation of the Netherlands to review the list of methods of analysis for pesticides and to prepare an inventory of submitted methods for submission to the IAEA for publication on the Training and Research Center website.

Codex Committee on Methods of Analysis and Sampling

As highlighted in an information document presented at the most recent 26th Session (April 2005) of the Codex Committee on Methods of Analysis and Sampling (ALINORM 05/28/23, paras. 134-136), analytical methods and sampling procedures are crucial aspects of the activities undertaken by the Food and Environmental Protection Section and the Agrochemicals Unit. Laboratories and trained staff capable of establishing reliable sampling and analytical regimes for quantifying potential hazards within specific production practices or in products are indispensable for informed decision-making and improved food safety and environmental protection in Member States.

In this regard, and in addition to our current initiative to incorporate Codex methods of analysis for pesticide residues (ALINORM 05/28/24, paras. 236-237) into our Food Contaminant and Residue Information System (INFOCRIS), we are also updating our database to include data provided by the Netherlands on methods of analysis for veterinary drug residues. The Joint Division also looks forward to collaborating with other Codex committees in the expansion of the INFOCRIS database to include Codex methods of analysis for veterinary drug residues and other contaminants in the future.

Status of Coordinated Research Projects

Quality Control of Pesticide Products, D5.40.03

Technical Officer: Josef Brodesser

The third and last RCM is planned for November 2005, in cooperation with the Ministry of Agriculture and Irrigation of Myanmar. Ten active CRP participants will be involved.

Validation of Thin-layer Chromatographic Methods for Pesticide Residue Analysis, D5.20.33 and D5.20.34

Technical Officer: Josef Brodesser

Reports of the participants and results of the work performed within the coordinated research projects D5.20.33 and D5.20.34 are being compiled and revised for publication as a single TecDoc. Its publication is foreseen in the third quarter 2005.

Irradiation to Ensure the Safety and Quality of Prepared Meals, D6.20.07

Technical Officer: Tatiana Rubio Cabello

Microbiological, sensorial and nutritional analyses have been carried out in approximately 30 different prepared meals. Most of them have been ethnic dishes.

Most of the investigators have been working closely with the end users (food companies, catering services) in order to promote the transfer of the technology.

The USA investigator evaluated consumer's perceptions, acceptance and willingness to pay for irradiated ready-to-cook and fully-cooked prepared beef products. The studies carried out to date, using both survey and experimental economics methodologies, generally suggest that information about the nature of food irradiation technology increases consumer acceptance of irradiated prepared meals and processed ground beef and fully cooked beef brisket. The research findings also indicated that consumers are willing to a pay a premium for irradiated ground beef.

The investigator of Argentina presented findings on the production of safer meals prepared specifically for 44 immunocompromised patients of the José de San Martin Hospital in Buenos Aires. It is important to note that this study was done under the approval of the Ethics Committee of the hospital mentioned.

Use of Irradiation to Ensure Hygienic Quality of Fresh, Pre-cut Fruits and Vegetables and other Minimally Processed Food of Plant Origin, D6.10.22

Technical Officer: Tatiana Rubio Cabello

See *Forthcoming Events* in this issue.

FAO/IAEA Agriculture & Biotechnology Laboratory, Seibersdorf

Training Course on QA/QC Measures in Pesticide Residue Analytical Laboratories; Siebersdorf, Austria; 12 September-6 October 2005

A training course on QA/QC measures in pesticide residue laboratories will be held at the FAO/IAEA Training and Reference Centre for Food and Pesticide Control at Seiberdorf, Austria, 12 September-7 October 2005.

Further information is available in the *Forthcoming Events* section of this issue.

Fellowships and training

The Agrochemicals Unit is currently hosting a Fellow, Mr. Lawal Shitta-Bey from Nigeria. Lawal will be with the Unit for approximately 5 months, during which time he will gain experience in the operation, maintenance and troubleshooting of laboratory instrumentation, mainly GC and HPLC equipment. Lawal will apply the knowledge gained during this fellowship in his home laboratory, where his duties include the preventative maintenance and repair of similar instrumentation. He is also using the opportunity to absorb knowledge on analytical methodologies and the use of laboratory instrumentation from the analyst's point of view, which will prove helpful in the diagnosis of problems encountered in the overall analytical process in his home institute.

Fumonisin Study

Moulds and fungi are able to grow on all kind of foods: cereals, meat, milk, fruit, vegetables, nuts, fats and others. The mould growth may result in several kinds of food-spoilage: off-flavours, odours, enzymes, discoloration, rotting, and most important with regard to food safety, the formation of toxins, the so-called mycotoxins. Mycotoxins are the natural products of the secondary metabolism of certain moulds.

Commodities can become contaminated at any time from growth in the field through harvesting, processing, storage, and shipment.

As the fungal flora at each stage is likely to vary significantly, there is the potential for a number of mycotoxins to develop through the life of an agricultural commodity if proper care is not taken in its production, handling, and storage.

In 1988, Gelderblom and colleagues discovered a class of mycotoxins called Fumonisins. Fumonisin B_1 is the most common and is the most thoroughly studied. Corn is the major commodity affected by this group of toxins.

Contaminated maize samples

Fumonisin FB_1 has recognised adverse health effects on animals and suspected carcinogenic potential in humans.

Due to the technical difficulty and expense of fumonisin analysis, the distribution of fumonisin in corn infected with Fusarium genera has received little study. Mycotoxins are distributed heterogeneously in foodstuffs, with a patchy distribution. Consequently, to ensure that the tested sample is representative, proper sampling techniques must be used.

The aim of our study was to investigate the distribution of fumonisin FB_1 in primary maize samples, and to determine the FB_1 levels across agro-ecological zones in Nigeria.

In our study a lot of effort was put into the design of a proper sampling scheme, and accordingly we collected 20 primary samples of 100g each from 100 lots collected from five different agro-ecological regions in Nigeria. In total we analysed 2000 primary samples. The analysis of the results is ongoing and will be presented in the next edition of this newsletter.

The principle of sample analysis is briefly described hereunder.

1) Primary samples of maize are ground.

2) The Fumonisin B1 (FB1) is extracted from maize samples with a methanol-water solution (3:1).

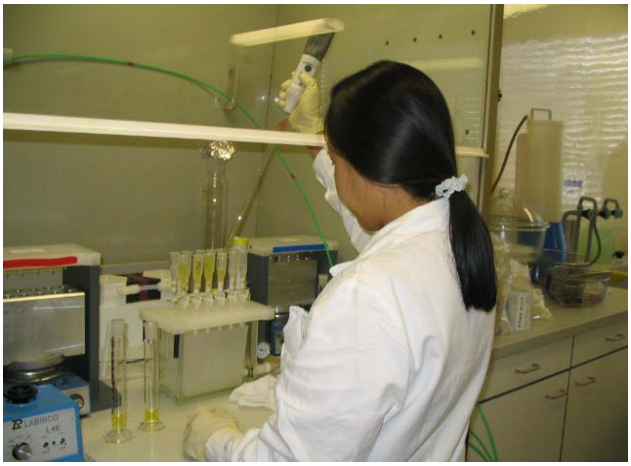
3) The filtered extract is purified by strong anion exchange (SAX) solid phase extraction (SPE).

4) The residue is dissolved in acetonitrile:water (1:1) and o-phthaldialdehyde (OPA)-2-mercapto ethanol is added to form the fluorescent fumonisin derivative.

5) The detection is carried out by reverse-phase liquid chromatography with fluorescent detection.

1) Grinding of the maize samples.

2) The Fumonisin B1 (FB1) is extracted from maize samples with a methanol-water solution (3:1).



3) The filtered extract is purified by strong anion exchange (SAX) solid phase extraction (SPE).

4) The residue is dissolved in acetonitrile:water (1:1) and o-phthaldialdehyde (OPA)-2-mercapto ethanol is added to form the fluorescent fumonisin derivative.

5) The detection is carried out by reverse-phase liquid chromatography with fluorescent detection.

Current Technical Cooperation Projects

Project Number	Title	Technical Officer
ANG50003	Veterinary Drug Residue Monitoring Programme	D. H. Byron
BEN5003	Veterinary Drug Residue Monitoring Programme	D. H. Byron
BGD5024	Phytosanitary Treatment for Insect Pests Infesting Fresh Fruits and Vegetables	T.Rubio-Cabello
BOL5015	Developing Pesticide Residue Monitoring Capabilities in Support of Cash Crops	I.G. Ferris
BKF5005	Regulatory Control and Monitoring of Contaminants and Residues	J. Brodesser
CHI5022	Detection of Pesticide Levels in Water and Agricultural Soil Using Nuclear Techniques	I.G. Ferris and K. Gross
CHI5046	Certification of Exported Animal Products Using Nuclear and Other Analytical Techniques	D. H. Byron
COS5024	Toxic Residues of Pesticides in Soils and Water	I.G. Ferris and K. Gross
COS5026	Management and Appropriate Use of Insecticide-nematicides	I.G. Ferris
CPR5016	Strengthening the Quality Assurance System for Food Irradiation	T.Rubio-Cabello
GUA5015	Establishing a Food Irradiation Plant	T.Rubio-Cabello
HAI5003	Enhancing Crop Productivity through the Applicatoin of Isotope Nuclear Techniques	R. Serraj and I.G. Ferris
IVC5003	Monitoring of Pesticide Residues in Food Products	J. Brodesser
JAM5009	Developing Soil Fertility Management	R. Serraj and I.G. Ferris
MAK5005	Upgrading of Food Safety System	J. Brodesser
MLI5018	Regulatory Control and Monitoring of Pesticides and Residues in Fresh Produce	J. Brodesser
MOR5024	Industrial Application of Irradiation	T.Rubio-Cabello
NIC5007	Determining Drug Residues in Bovine Meat Exports	D.H. Byron
NIR5030	Regulatory Control and Monitoring of Contaminants and Residues in Fresh Produce	D.H. Byron and J. Brodesser
NIR5033	Improvement of Quality Management and Food Safety Monitoring Using Isotope Techniques	J. Brodesser
PAN5015	Quality Assurance in Pesticide Residue Analysis for Agriculture Production	J. Brodesser
PER5026	Radiosterilization of Pre-Cooked Meals for Hospital Diets	T.Rubio-Cabello
RAS5042	Application of Food Irradiation for Food Security, Safety, and Trade (RCA)	T.Rubio-Cabello
RER9074	Long-term Countermeasure Strategies and Monitoring of Human Exposure in Rural Areas Affected by the Chernobly Accident	M.Balanov and D.H.Byron
ROK/5/034	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 and J. Brodesser
SLO5002	Protecting Groundwater and Soil Against Pollutants Using Nuclear Tech-	I.G. Ferris

Project Number	Title	Technical Officer
	niques	
SRL5037	Assessing Impact of Pesticides on Water Catchments and Groundwater	J. Brodesser
SYR5018	Pesticide Degradation in Food and Environment	I.G. Ferris and J. Brodesser
SYR5020	Implementation of Quality Assurance and Quality Control Procedures in Pesticide Residue Analysis Laboratories	J. Brodesser
THA5047	Application of Food Irradiation for Sanitary and Phytosanitary Certification	T.Rubio-Cabello
TUR5022	Food Irradiation Technology	T.Rubio-Cabello

Other Activities on Food Irradiation with the Participation of IAEA

Use of irradiation as a quarantine treatment

Technical Officer: Tatiana Rubio

In the issue Vol. 6, No 2 of our Newsletter, published in July 2004, we informed readers about the objectives, conclusions and recommendations of a consultants meeting held in Vienna, IAEA Headquarter, 10-14 May 2004. One of the recommendations of the consultants was "to carry out research towards determining a default dose for all mites and insects and default doses for specific subgroups within the Arhropoda as well as doses to surmount specific phytosanitary trade barriers". In spite of very limited funds available, a big effort was made in trying to implement this recommendation through four contracts. The subject of the research contracts were the following:

i) To determine a default dose sufficient to disinfect avocado fruit of *Stenoma catenifer;*

ii) Effect of irradiation on mites in order to contribute in determining a default dose for this specific group of Arthropods;

iii) Irradiation sterilization of two pyralid pupae toward a default dose for all Arthropods; and

iv) Effect of irradiation on scale insects in order to contribute in determining a default dose for this specific group of Arthropods.

The results of these studies are expected at the end of 2005.

Short course on Food Pasteurization with Electronic Irradiation; Texas, USA; 8-11 February 2005

The National Center for Electron Beam Food Research invited food processors, produce packers, inspectors, consultants, university and extension educators and regulatory colleagues around the world to participate in our February 2005 short course featuring electron beam, x-ray, and gamma irradiation techniques for food safety, shelf-life extension and quarantine applications. It has become apparent that consumers, with the support of the scientific community, an enhanced regulatory environment, and the participation of more than 2000 US retail outlets, are increasingly requesting irradiation as a food safety and quarantine treatment for fresh and frozen meats, nuts and fresh produce. Four US-based irradiation processors were treated approximately 25 million pounds of meat, poultry and produce in 2004. Demand is also evidenced by university and food industry market research, which has proven that when properly informed about the benefits of food irradiation, 80-92% of consumers will purchase irradiated foods.

This short course engaged in face-to-face discussions with physical and biological scientists, hands-on training related to irradiation, dosimetry techniques and sensory and quality assurance experiences. The curriculum was designed to increase one's knowledge and skills through a diversity of experiences, aimed at food industry practitioners and technology decision makers who can take advantage of irradiation technology to combat sanitary and phytosanitary challenges and become innovators in respect to the adoption and implementation of e -Beam technology.

First consignment of irradiated mangoes from Australia to New Zealand

A bilateral quarantine agreement between Australia and New Zealand was modified in order to include irradiation as an approved phytosanitary treatment option for tropical fruit. Currently restricted to mangoes (*Mangifera indica*) its use is subject to certain conditions such as labelling, establishment of a technological need and the availability of pest risk data to quarantine authorities.

This agreement allows the use of irradiation as a quarantine treatment in mangoes exported to New Zealand. Every piece of fruit of almost 16 tonnes was individually labelled, and there were clear signs displayed at the point of sale. In spite of the efforts spent by opposition groups trying to organize consumers against the use of irradiation the fruit was successfully sold in supermarkets in New Zealand.

Irradiated Mangoes

This market trial was included as part of the activities carried out under the regional project Application of Food Irradiation for Food, Security, Safety and Trade (RAS/5/042).

First Symposium on Phytosanitary Irradiation in Guadalajara, Jalisco, Mexico; 25th February 2005

The Mexican Secretary of Agriculture, SAGARPA, organized the First Symposium on Phytosanitary Irradiation in Guadalajara, Jalisco, Mexico on the 25th February 2005. This Symposium was attended by 150 participants from Mexico and abroad. At the Symposium it was announced that Mexico and the USA have started negotiations on an equivalence agreement. Two Co-60 commercial irradiation facilities will be in operation soon in Guadalajara and Matehuala for treatment of fresh fruits for exportation.

Use of ionizing radiation for food preservation: A direct benefit to farmers in India

The Government of India, mainly through the Bhabha Atomic Research Centre (BARC), has made great efforts and taken important steps during the last few years for introducing irradiation technology for food safety and security in the country. As an example of these efforts, two technology demonstration facilities have been built in order to show the benefits of irradiation technology to farmers, traders and exporters. In 2001 a radiation processing plant at Vashi, Navi Mumbai, was built in order to process spices. At present this facility has 430 kCi of cobalt-60 activity and is irradiating more than 2000 tons of spices and other materials. The construction of another irradiator was started in 1998 and it became fully operational in 2003. The facility, named KRUSHAK, is located at Lasalgaon, in Nashik District, 250 km east of Mumbai. KRUSHAK is an acronym for 'Krushi Utpadan Sanrakshan Kendra', literally translated in English as 'agricultural produce conservation centre'. The KRUSHAK irradiator is a specially designed technology demonstration unit for low dose applications of irradiation, primarily for controlling sprouting in stored onions and insect disinfestation of agricultural commodities for storage and quarantine. In 2003 only two farmers and an onion processing company irradiated about 30 tons of onion in this facility; however, due to the dissemination of technical information in the surrounding villages, the quantity of irradiated onions, as well as the number of end users (farmers), increased more than 10 times in 2004. This is a successful example of transfer of irradiation technology in this country.

At present, a dozen Memoranda of Understanding have been signed between the entrepreneurs and the BARC/Board of Radiation and Isotope Technology (BRIT) for setting up multi-product radiation processing facilities. About four of them have already finalized the financing arrangements and construction has begun.

Irradiation of potatoes, KRUSHAK facility, India

Distance Learning

Launch of FAO/IAEA Joint Division's new eLearning system

Technical Officer: Kerstin Gross

During the IAEA/FAO/IUPAC WORKSHOP on Distance learning for capacity building on pesticide management in Costa Rica (see *Past Events* for more information on the workshop) the first eLearning courses were made available. These are: Pesticide management, Pesticide residue analysis, Statistics Manual, Project management, and Time management. The eLearning courses are free and anyone can join, at any time, under http://elearning.iaea.org/ATutor/.

The launch of the eLearning system has been a great success, as shown by the feedback of the workshop participants and the new eLearning students as well as by the rapid increase in the number of registered students and site visits (http://elearning.iaea.org/ATutor/statistics/index.htm.

Nuclear Preparedness

See our Feature Article of this issue. For further information visit and bookmark the site. (http://www.iaea.org/programmes/.nafa/dx/emergency/index.html)

Websites

INFOCRIS received an upgrade to provide more relevant information to analysts and decision makers in their date-to-day work. If you have not visited INFOCRIS recently, have a look at the atrazine property links[12]. A presentation of the system is planned for the 11th International Congress of Pesticide Chemistry[13]). Before then, 60 key pesticides records should implement the new chemical properties format. If you would like to participate, please contact John Unsworth[14]. John is the leader of the IUPAC project on "Global availability of information on agrochemical" http://www.iupac.org/projects/2001/2001-022-1-600.html). He is also INFOCRIS' pesticide domain Caretaker or Gatekeeper. As such, he provides editorial and tutorial guidance to pesticide editors and promotes INFOCRIS among potential editors by helping them adopt pesticide records. In consultation with editors, he reviews the INFOCRIS record structure and functions, and proposes changes to the system supervisor.

Food and Environmental Protection Section http://www.iaea.org/programmes/nafa/d5/index.html

FAO/IAEA Training and Reference Centre for Food and Pesticide Control: Controlhttp://www.iaea.org/trc

elearning: http://elearning.iaea.org/ATutor/login.php

International Database on Insect Disinfestation and Sterilization – IDIDAS: http://www-ididas.iaea.org/

International Food Contaminant and Residue Information System – INFOCRIS: http://www-infocris.iaea.org

[12] http://www-infocris.iaea.org/en/w3.exe$ShowEnt?ID=23

[13] http://www.iupac2006.jtbcom.co.jp/

[14] JohnLydiaUnsworth@compuserve.com

Publications

"Irradiation as a Phytosanitary Treatment of Food and Agricultural Commodities", IAEA–TECDOC–1427, ISBN 92-0-113804-0, English, 15 Euro, (2004)

Results of a Coordinated Research Project which began in 1998 and was completed in 2002.

This publication includes the results of a Coordinated Research Project (CRP) on "Irradiation as a Phytosanitary Treatment of Food and Agricultural Commodities". The results contain data on the effect of low doses of irradiation at different stages of development of almost 30 different species of insects and mite which represent major trade problems. It is important to note that some of the projects resulted in the first approvals against a non-fruit fly pest (sweetpotato weevil and mango seed weevil). The document also includes information about tolerance to irradiation of some commodities, packaging materials, methodologies used and the effect of a few combined treatments. This CRP includes also a number of "firsts" such as the first large-scale confirmatory tests for several non-fruit fly pests, the first commercial shipment of cut flowers using irradiation as part of a quarantine treatment, and extensive studies on the response of mites to irradiation.

More details can be seen on our web page: http://www.iaea.org/programmes/nafa/d5/index.html.

"Determination of Human Pathogen Profiles in Food by Quality Assured Microbial Assays", IAEA-TECDOC-1431, ISBN 92-0-115704-5

Results of a Coordinated Research Project which began in 1998 and was completed in 2002.

This publication includes the results of a Coordinated Research Project (CRP) on "Determination of Human Pathogen Profiles in Food by Quality Assured Microbial Assays". Major food microbial contaminants were identified in some of the main foods exported in the international food market. Thousands of samples in a wide variety of foods were selected to be studied during different points of the food chain: meat (chicken, beef and pork), seafood (shellfish such as shrimp, prawns, scampi, squid, and lobsters, and different types of fish such as salmon, cuttle fish, rohu, fin herring, catfish, milkfish, and tilapia), spices (pepper, paprika), frozen vegetables (asparagus, peas and corn) and other products (coconut and dairy products). The analysis included pathogenic bacteria such as Salmonella spp. (several serotypes), Escherichia coli, E. coli 0157:H7, Staphylococcus aureus, Clostridium perfringens, Bacillus cereus, Vibrio choleare, Vibrio parahaemolitycus and Yersinia enterolítica. This CRP produced data to conduct better risk assessments on food in importing as well as exporting countries.

More details can be seen on our web page: http://www.iaea.org/programmes/nafa/d5/index.html.

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