Consultants Meeting for the Coordinated Research Project on the Development of Multiresidue Methods for Antibiotic and Anthelmentic Veterinary Drug Residues
16 to 19 September 2008, Vienna, Austria

Meeting Report

1. Purpose of the meeting
The purpose of the meeting was to advise the Food and Environmental Protection Subprogramme (FEP) of the Joint FAO/IAEA Programme for Nuclear Techniques in Food and Agriculture (NAFA) on the proposed Coordinated Research Project (CRP), Development of multiresidue methods for antibiotic and anthelmentic veterinary drug residues to combat drug resistance and promote food safety in developing countries.

2. Background
In many developing countries, rapid demographic changes and rising incomes have increased the demand for high value food commodities. Increasing international trade in these products has therefore led to dramatic growth in the livestock and aquaculture sectors. Changes in production practices and exacerbating factors such as climate change have resulted in a rise in disease outbreaks and increased use of agrochemicals including veterinary medicines, with the concurrent development of microbial and parasitic resistance to these compounds. At the same time, awareness of food safety is rising and many importing countries have implemented food control regulations to guarantee the quality and safety of imported foods for their consumers. Many developing countries have also taken steps to put in place control systems that encourage responsible use of veterinary medicines to combat drug resistance and comply with international standards. However, they find it difficult to access the required know-how and skills, thus hindering their ability to access international markets for food products of animal origin. One significant constraint is the capacity of laboratory services to generate surveillance data using analytical methods validated to nationally and internationally agreed standards.

Approaches for the detection of veterinary drug residues include microbiological, immunochemical, chromatographic and spectrometric techniques. While these may fulfil suitability criteria, such as method sensitivity, they require multiple time-consuming steps for extraction, sample clean-up or pre-concentration prior to measurement. These measurement techniques also often lack the robustness necessary for their successful application in developing countries. These issues can be addressed by developing methods utilising nuclear and related technologies for the detection of veterinary drug residues. These methods could also meet the need for robust analytical methods required by other international bodies such as the Joint FAO/WHO Codex Alimentarius Commission during the standards setting process.

3. Objectives
The objectives of the meeting were to:
   i. critically review the draft Contract Research Project Proposal.
ii. identify robust nuclear and related technologies suitable for the screening and confirmatory analysis of residues of veterinary medicines.

iii. address issues relating to drug resistance by identifying anti-parasitic drugs of importance in developing countries and to select suitable antimicrobials for methods development from the list provided by the Joint FAO/WHO/OIE Expert Meeting on Critically Important Antimicrobials.

iv. address the systems needed to assure the quality of research processes used in this CRP and provide guidelines to implement them.

v. assist with identifying suitable agreement and contract holders with suitable laboratories and resources.

4. Presentations and Discussions

The Provisional Agenda for the meeting was adopted as proposed (Annex 1). The meeting was opened by Mr. David Byron, Head, Food and Environmental Protection Section. He provided background information on the Joint FAO/IAEA Division and the IAEA Contract Research Programme, including the role of agreement and contract holders in the process.

Mr Andrew Cannavan presented the work done during a previous CRP (D.3.20.22) on The Development of Strategies for the Effective Monitoring of Veterinary Drug Residues in Livestock and Livestock Products in Developing Countries (2002-2006). The main outcome of that project was the development of methods that have been applied in member states (e.g. Thailand, Sri Lanka, and Brazil). The main recommendation from the final meeting of the CRP was that further work is needed to meet the increasing demand for robust, rapid and affordable analytical methods, especially in developing countries.

The current situation in different regions (Southern Africa, Thailand and India) was discussed following presentations from the consultant experts, Prof Mathew Nindi, Dr Sasitorn Kanarat and Dr Vishweshwaraiah Prakash. Key points were:

i. Recognition that veterinary drug residues are a problem in commodities produced in many developing countries.

ii. The development of drug resistance is a problem in terms of reduced effectiveness of the drugs both in animal husbandry and for human health.

iii. There are problems with availability of analytical standards and reagents and often difficulty in obtaining those that are commercially available.

iv. Most control programmes are focussed on export markets and the need for affordable technologies to ensure domestic consumer food safety was highlighted.

Presentations on the technologies available for residues detection were made by Prof. Chris Elliott and Prof. Hubert De Brabander. Dr. Thomas Kuhn presented the regulatory framework in the EU for methods validation and performance criteria. Prof. De Brabander also presented the IT solutions used to teach and disseminate information at the Faculty of Veterinary Medicine, Ghent University. Detailed discussions concluded that:

i. For the benefit of the countries with limited resources, the CRP should include development of screening methods that do not require purchase of sophisticated equipment. Transfer of these methods to these countries
would empower them to start establishing the national preliminary monitoring programs for veterinary drug residues.

ii. The concept utilized in a previous CRP to develop a screening method using radioactive labelled streptavidin in a radio-immunoassay format should be further developed to provide screening assays for antibiotics and anti-parasitic drugs.

iii. Issues relating to extraction of residues from complex food matrices, sample clean-up and pre-concentration should be addressed by the CRP.

iv. Taking into account new developments in the field of high performance thin layer chromatography (HPTLC), the use of this technique for rapid detection of drug residues should be investigated as part of the CRP.

v. The use of stable isotope labelled internal standards is vital for successful development of robust analytical methods.

vi. The methods developed during the CRP should be validated using the relevant guidelines and detailed SOPs written using guidelines to be agreed upon at the first RCM.

vii. A protected website for interaction between IAEA, contract and agreement holders should be established.

viii. Appropriate experts should be invited to the RCMs to present up to date developments in the residues field to all participants. A component of training was felt to be important to the success of the project and this could best be achieved in tandem with RCMs.

ix. Up to 10 research contracts should be awarded to Member States submitting appropriate research proposals. Each Principal Scientific Investigator will have to submit his/her project highlighting current equipment and experience levels in their laboratory together with an indication of availability of adequate funds for relevant research activities. Research Agreement holders (3-4) will be invited to support the CRP with their expertise.

x. Technical contacts will be awarded to selected institutions to provide radioactive and stable isotope labelled reagents and internal standards for the CRP.

xi. The Agrochemicals Unit of the FAO/IAEA Agriculture and Biotechnology Laboratory at Seibersdorf will provide scientific and technical support to the CRP.

5. Conclusions and recommendations

Based on the FEP proposal and the activities needed to meet the objectives of the CRP, the consultants concluded that

i. In the context of rapid demographic and climate changes, international trade, human health, the development of drug resistance, food security and food safety, veterinary drug residues in food is a growing concern for developing countries. The meeting strongly supports the CRP submission (Annex 2) for approval and implementation, which should lead to an establishment of a harmonised network of expertise able to share knowledge and transfer technology to strengthen the national residue control programs of Member States so as to comply with harmonized international standards.
ii. In order to promote effective control policies to prevent/minimize drug resistance, the CRP should focus on anti-parasitic drugs widely used in developing countries and significant antibiotics highlighted by the Joint FAO/WHO/OIE Expert Meeting on Critically Important Antimicrobials.

iii. The CRP should aim to develop for operational use assays using nuclear and related techniques that are rapid, robust, affordable and sustainable. The approach developed in the previous CRP using radioactive labelled streptavidin in an assay to detect prohibited veterinary medicines should be further extended to cover veterinary antibiotic and anti-parasitic compounds. The use of radioactive and stable isotope labelled compounds and internal standards for method optimisation and validation studies to establish quality control and method performance criteria should be facilitated by the Agrochemicals Unit of the IAEA Laboratories at Seibersdorf.

iv. The CRP should aim to generate detailed laboratory protocols, including validation data. These should be widely disseminated for use by Member states and standards setting bodies. Additionally, the meeting noted that these protocols would play an important role in training programmes, including those initiated by the IAEA Technical Cooperation Programme.

v. In order to ensure that the protocols are robust, repeatable,transferable and suitable for publication, the CRP agreement and research contract holders should adhere to a defined quality system. To facilitate this, a guideline based on the Joint Code of Research developed by the UK Biotechnology and Biological Sciences Research Council, the Department for Environment, Food and Rural Affairs, the Food Standards Agency and the Natural Environment Research Council will be prepared by the FEP section prior to the first RCM.

vi. The Consultants agreed on the need to focus on analytes of significance in international trade of high value commodities and to accept appropriate proposals from contract and agreement holders based on these criteria.

6. Potential CRP contract and agreement holders.
The importance of selecting technically competent laboratories and contract holders from developing countries was stressed and in this regard, the consultants proposed potential CRP participants and laboratories (Annex 3).

7. List of Participants.
Prof. Dr. Hubert De Brabander, Faculty of Veterinary Medicine, Ghent University, Belgium
Prof Chris Elliott, Queens University, Belfast, UK
Prof Mathew Muzi Nindi, University of South Africa
Dr Sasitorn Kanarat, Thailand
Dr Vishweshwaraiah Prakash, CFTRI, Mysore, India
Dr Thomas Kuhn, Austrian Agency for Health and Food Safety, Vienna, Austria
Mr David Byron (NAFA)
Mr Rajendra Patel (NAFA) (Scientific Secretary)
Mr Gary Luckman (NAFA)
Mr Josef Brodesser (NAFA)
Mr Andrew Cannavan (NAAL)
Ms Marivil Islam (NAAL)
Mr James Sasanya (NAAL)
Ms. Britt Maestroni (NAAL)
Mr. Nasir Rathor (NAAL)