

SPECIAL REPORT

Research and Analysis of Chemical Residues and Contamination in Fish and Fish Products 2004-2008

From 2004 to 2008, MFRD organised, conducted and successfully completed the Japanese Trust Fund II Project on 'Research and Analysis of Chemical Residues and Contamination in Fish and Fish Products.'

Chemical contaminants and drug residues in fish and fish products causes serious implications to trade and human health. Thus this project was proposed because of a need to gain an understanding of current levels of chemical contaminants and drug residues in fish and fish products and to build the capacity for detection of these residues in the region. With science-based knowledge and capability, respective countries could take appropriate action to manage the safety of their fish and fish products.

The objectives of this project were:

- i) To obtain an understanding of levels of chemical contaminants in fish and fish products in Southeast Asia;
- ii) To transfer technology in chemical contaminant testing in the region through setting up of methodologies and human resource training.

The project was made up of four components as follows:

- a) Component 1: Survey of Heavy Metals (Arsenic, Cadmium, Lead and Total Mercury) in Fish and Fish Products in Southeast Asia
- b) Component 2: Survey of Pesticide Residues in Fish and Fish Products in Southeast Asia
- c) Component 3: Survey of Histamine Levels in Fish and Fish Products in Southeast Asia
- d) Component 4: Survey on Drug Residues (Chloramphenicol, Nitrofurantoin, Malachite green and Leuco-malachite green) in Fish and Fish Products in Southeast Asia

For each component, there were two activities, on-site training sessions at project sites where analytical equipment are available for conducting training, followed by a regional survey which was conducted in SEAFDEC member countries. A total of 8 countries, namely, Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam, participated in this project.

On-Site Training

The purpose of the on-site training was to upgrade the skills and capabilities of regional laboratory staff in using the Atomic Absorption Spectrometry (AAS) for heavy metals analysis, the Gas Chromatography Mass Spectrometry (GC-MS) for pesticide residues analysis, the High Performance Liquid Chromatography (HPLC) for histamine analysis and the Liquid Chromatography Tandem Mass Spectrometry (LC-MS-MS) for drug residue analysis. The execution of the respective surveys was facilitated

through the upgrading of skills and capabilities of regional laboratory staff.

Through this project, 9 training courses were conducted. A total of 106 fisheries officers from key laboratories of 9 ASEAN member countries were trained in histamine, pesticide residues, heavy metals and drug residues (chloramphenicol, nitrofurantoin, malachite green and leuco-malachite green) analytical methods. The participants expressed that the training sessions conducted were beneficial to their work. Through this regional training course, member countries shared their experience and their methods.

Regional Survey

Various participating regional laboratories conducted a survey each in their respective countries on fish and fish products that were of socio-economic importance.

Fish and fish product samples were sent to local/collaborating laboratories for analysis and the results of the survey were deposited in the database of the Fish and Fish Products Safety Information Network. In addition, to ensure the accuracy and comparability of the different analytical methods used by member countries, member countries participated in Inter-laboratory Proficiency Testing for test methods.

During the 'End-of-Activity' Seminar conducted from 22-24 October 2008 in Singapore, the key project leaders presented the survey results from 2004-2008 on heavy metals, pesticide residues, histamine and drug residues. A total of 186 species and/or products were studied with a total of 4,902 samples collected for analysis from 2004 to 2008.



Participants at the Regional Training Course in Seafood Safety for Laboratory Personnel in Thailand

Lists the training courses conducted under the project:

S/No	Title of Training Course	Date of Training Course	Location of the Training Course	Number of Participants
1.	On-site Training in Heavy Metals Analysis	1-8 July 2005	Indonesia	12 (from Indonesia)
2.	On-site Training in Heavy Metals Analysis	7-11 November 05	Myanmar	13 (from Myanmar)
3.	On-site Training in Heavy Metals Analysis	28 August to 1 September 06	Vietnam	11 (from Vietnam)
4.	On-site Training in Pesticide Residues Analysis ¹	6-15 June 05	Singapore	8 (from Indonesia, Malaysia, Myanmar, Philippines, Thailand and Vietnam)
5.	On-site Training in Pesticide Residues Analysis	27 November to 1 December 06	Malaysia	12 (from Malaysia)
6.	On-site Training in Histamine Analysis ²	16 to 20 May 05	Indonesia	14 (from Indonesia)
7.	On-site Training in Histamine Analysis ³	25 to 29 September 06	Philippines	12 (from the Philippines)
8.	Regional training course in seafood safety for laboratory personnel ⁴	15 to 19 August 05	Thailand	16 (from Indonesia, Malaysia, Myanmar, Philippines, Thailand and Vietnam)
9.	Regional training course in seafood safety for laboratory personnel ⁵	2 to 5 October 07	Singapore	8 (from Brunei, Cambodia, Laos, Indonesia, Malaysia, Philippines, Thailand and Vietnam)

From the results of the surveys conducted on heavy metals, pesticide residues, histamine and drug residues, the majority of the results were within regulatory limits.

End-of-Activity Seminar

The project ended with the 'End-of-Activity' Seminar which was conducted from 22-24 October 2008 in Singapore where key project leaders reported on the project since its implementation in 2004 and identified the challenges faced in the implementation of the project and the deliberated on future plans.

The meeting also identified that it is imperative to build capacity in biotoxin testing in SEAFDEC member countries. The Biotoxins project (2009 – 2012) was proposed. The specific aspects of biotoxin testing and the existing capabilities of member countries with regards to the proposed new project were identified.

Technical Publication

A publication, entitled, 'Technical Compilation of Heavy Metals, Pesticide Residues, Histamine and Drug Residues in Fish and Fish Products in Southeast Asia: 2004-2008' summarising the results of the regional surveys conducted by participating

¹ MFRD, together with a Japanese expert, Mr. Kazuki Maruyama, conducted the on-site training.

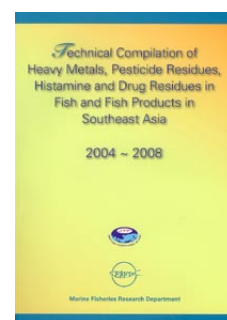
² MFRD, together with a trainer from Thailand's Department of Fisheries (DOF), conducted the on-site training.

³ MFRD, together with a trainer from Thailand's Department of Fisheries (DOF), conducted the on-site training.

⁴ A Japanese expert from the Japan Food Research Laboratory, Ms Sasakura Naoko, was the advisor for the training course. The main trainers for this training were MFRD and FIQD staff.

⁵ MFRD, together with a trainer from the National Agriculture, Forestry and Fisheries Quality Assurance Department of Vietnam (NAFIQAD), Mr Nguyen Anh Dung, conducted the on-site training.

member countries as well as the reports of all SEAFDEC member countries, was published and distributed in 2008 as the final output of the 5-year programme. The publication is a definitive work highlighting the region's commitment to ensure seafood safety of fish and fish products from the region to importing countries.



Review of the Project

For the purpose of the project, member countries were strongly encouraged to participate in inter-laboratory proficiency testing as it is a measure of the laboratory's proficiency and staff competency when conducting analytical tests. It gives confidence to the results produced by the laboratory. In addition, there is a need for member countries to continuously train and upgrade the skills of laboratory personnel to ensure their competency and efficiency.

In conclusion, this project benefited participating countries by providing baseline information on the level of contamination for heavy metals, pesticide residues, histamine and drug residues. This information is useful for the planning of monitoring programmes within the country and for policy makers, technologists, scientists as well as extension and regulatory personnel in the fisheries sector. These results also provide assurance and confidence in the safety of fish and fish products in participating countries. The project also saw the collaboration amongst laboratories and the sharing of expertise from the region. Experts from laboratories in Thailand and Vietnam served as trainers in several of the courses. This is an indication of the growing pool of expertise and capabilities residing in the region and the establishment of strong collaborative ties amongst member countries.

