

Myanmar

U Than Winn

Assistant Director

Supervision of Quality Control Laboratories

Fish Inspection and Quality Control Division

Department of Fisheries

Ministry of Livestock and Fisheries

1. Introduction

In order to ensure that fish and fish products from Myanmar are free from pesticide residues, a survey on pesticide residues, such as DDT, Aldrin & Dieldrin, was conducted in Myanmar under the JTF II Project from Year 2006 to 2008. Most of the organochlorine compounds, such as endrin, dieldrin, aldrin, heptachlor and chlordane, are banned in Myanmar since 1993 by the Myanmar Agriculture Law. Compounds, such as DDT and DDE, are restricted for Malaria prevention. Japan International Corporation Agency (JICA), with the support of the Department of Fisheries (DOF), had laid down the rural development plan in Myanmar and initiated the project of Rice-Fish or Rice-Prawn in Paddy fields. The plan of action was to increase the individual income of a villager from consumption of fish. Through the survey, pesticide residues in fishes from paddy fields can be monitored.

2. Objectives And Goals

- To determine and obtain an understanding of the level of pesticide residues in fish and fish products in Myanmar.
- To collect data and deposit the results in the database of the Fish and Fish Products Safety Information Network.
- To set up the monitoring program on pesticide residues in fish and fish products in Myanmar.

3. Survey Methodologies

a. Sampling Method, Location, Species, Number of Samples and Sampling Size

Sampling Method

Random sampling

n=7

Location

- Yangon Division (Twente & Khayoung Aquaculture Zone, Central Fish Market)
- Tanintharyi Division (United Myeik Processing Plant)
- Ayeyarwaddy Division (Nyaung Done Aquaculture Zone and May Yu Processing Plant)
- Bago Division (Fish Market)

Species & Sampling Size for 1st quarter (Dec 2006-Feb 2007)

Rohu, 2-3kg x 7

Giant Freshwater Prawn, 20/25 size x 7

Tilapia, 0.25-0.5 kg x 7

Cat Fish, 0.25-0.5 kg x 7

Species & Sampling Size for 2nd quarter (Dec 2007-Apr 2008)

Marigal, 2-3 kg x 7

Snake Head, 0.25-0.50 kg x 7

Common Carp, 1.5-2.0 kg x 7

Tarpian, 0.5-1.0 kg x 7

Boal, 2-3 kg x 7

Indian Cat Fish, 0.2-0.3 kg x 7

Climbing Perch, 0.2-0.3 kg x 7

Number of Samples

1st Quarter = 84

2nd Quarter = 147

Samples = 231

Sample Preparation

Sample used edible portions and fish muscle tissue for testing

b. Method of Analysis

Method Reference

Training on Pesticide Residues Analysis (Trust Fund II Project), 2005, MFRD –SEAFDEC

Brand of Instrument

Shimadzu Gas Chromatograph, GC 17-A, Ver-3, Japan

ECD, TCD, FID & FTD Detectors

Capillary columns (DB-1-30N-STD 0.25mm x 30m)
 Different columns (DB-5 & DB-17)
 ECD-17cell unit with heater

c. Limit of Detection and Limit of Quantification

Limit of Detection (LOD):

- (i) DDT = 0.008 ppm
- (ii) Aldrin = 0.006 ppm
- (iii) Dieldrin = 0.009 ppm

Limit of Quantification (LOQ):

- (i) DDT = 0.05 ppm
- (ii) Aldrin = 0.04 ppm
- (iii) Dieldrin = 0.05 ppm

d. National Regulatory Limits

There is no national regulatory limits in Myanmar. The Department of Fisheries (DOF) is complying and adopting mainly the European Union (EU) Standards and to the importing countries' regulations.

Table 1. Maximum Permitted Level in Fish & Fish Products, Enforced by EU, USA, Canada and Japan.

Contaminants	Product type	Action Level
DDT / DDE / DDD	All Fish Products	5.0 ppm
Aldrin /Dieldrin	All Fish Products	0.3 ppm
Polychlorinated Biphenyl (PCB)	All Fish Products	2.0 ppm
BHC (HCH)	Dried Cod	0.3 ppm
Chlordane	All Fish Products	0.3 ppm
Heptachlor/ Heptachlor Epoxide	All Fish	0.3 ppm
Mirex	All Fish	0.1 ppm

4. Results And Discussion

a. Participation in Inter-laboratory Proficiency Testing and Results

Myanmar did not participate in inter-laboratory proficiency testing.

b. Survey Results and Discussion

Table 2. Results of DDT in Fish and Fish Products Surveyed in First Quarter.

Year of analysis & Sampling location	Analyte	Fish sample analysed		No. of samples analysed	Min. value of results (ppm)	Max. value of results (ppm)	Average value of results (ppm)	Remarks
		Common name	Scientific name					
2006 (Dec) Twente Aquaculture Zone, Yangon Division	DDT	Rohu	<i>Labeo rohita</i>	7	Not Detected	Not Detected	Not Detected	Aquacultured (Fresh/Chilled)
2006 (Dec) United Myeik Processing Plant in Myeik, Tanintharyi Division		Giant Fresh Water Prawn	<i>Macrobrachium rosenbergii</i>	7	Not Detected	Not Detected	Not Detected	Captured (Frozen)
2006 (Dec) Khayoung Aquaculture Zone, Yangon Division		Tilapia	<i>Oreochromis niloticus</i>	7	Not Detected	Not Detected	Not Detected	Aquacultured (Fresh/Chilled)
2006 (Dec) May Yu Processing Plant in Yangon, Ayeyarwaddy Division		Cat Fish	<i>Clarias batrachus</i>	7	Not Detected	Not Detected	Not Detected	Captured (Frozen)

Table 3. Results of Aldrin in Fish and Fish Products Surveyed in First Quarter.

Year of analysis & Sampling location	Analyte	Fish sample analysed		No. of samples analysed	Min. value of results (ppm)	Max. value of results (ppm)	Average value of results (ppm)	Remarks
		Common name	Scientific name					
2007 (Jan) Twente Aquaculture Zone, Yangon Division	Aldrin	Rohu	<i>Labeo rohita</i>	7	Not Detected	Not Detected	Not Detected	Aquacultured (Fresh/Chilled)
2007 (Jan) United Myeik Processing Plant in Myeik, Tanintharyi Division		Giant Fresh Water Prawn	<i>Macrobrachium rosenbergii</i>	7	Not Detected	Not Detected	Not Detected	Captured (Fresh/Chilled)
2007 (Jan) Khayoung Aquaculture Zone, Yangon Division		Tilapia	<i>Oreochromis niloticus</i>	7	Not Detected	Not Detected	Not Detected	Aquacultured (Fresh/Chilled)
2007 (Jan) May Yu Processing Plant in Yangon, Ayeyarwaddy Division		Cat Fish	<i>Clarias batrachus</i>	7	Not Detected	Not Detected	Not Detected	Captured (Frozen)

Table 4. Results of Dieldrin in Fish and Fish Products Surveyed in First Quarter.

Year of Analysis & Sampling location	Analyte	Fish sample analysed		No. of samples analysed	Min. value of results (ppm)	Max. value of results (ppm)	Average value of results (ppm)	Remarks
		Common name	Scientific name					
2007 (Feb) Twente Aquaculture zone, Yangon Division	Dieldrin	Rohu	<i>Labeo rohita</i>	7	Not Detected	Not Detected	Not Detected	Aquacultured (Fresh/ Chilled)
2007 (Feb) United Myeik Processing Plant in Myeik , Tanintharyi Division		Giant Fresh Water Prawn	<i>Macrobrachium rosenbergii</i>	7	Not Detected	Not Detected	Not Detected	Captured (Frozen)
2007 (Feb) Khayoung Aquaculture zone, Yangon Division		Tilapia	<i>Oreochromis niloticus</i>	7	Not Detected	Not Detected	Not Detected	Aquacultured (Fresh/ Chilled)
2007 (Feb) May Yu Processing Plant in Yangon , Ayeyarwaddy Division		Cat Fish	<i>Clarias batrachus</i>	7	Not Detected	Not Detected	Not Detected	Captured (Frozen)

Table 5. Results of DDT in Fish and Fish Products Surveyed in 2nd Quarter.

Year of analysis & Sampling location	Analyte	Fish sample analysed		No. of samples analysed	Min. value of results (ppm)	Max. value of results (ppm)	Average value of results (ppm)	Remarks
		Common name	Scientific name					
2007 (Dec) Nyaung Done Aquaculture Zone, Ayeyarwaddy Division (Mya Yu Processing Plant)	DDT	Mrigal	<i>Cirrhinus mrigala</i>	7	Not Detected	Not Detected	Not Detected	Aquacultured (Frozen)
2007 (Dec) Bago Fish Market, Bago Division		Snake Head	<i>Channa striata</i>	7	Not Detected	Not Detected	Not Detected	Captured (Fresh/ Chilled)
2008 (Jan) Nyaung Done Aquaculture Zone, Ayeyarwaddy Division (Mya Yu Processing Plant)		Common Carp	<i>Cyprinus carpio</i>	7	Not Detected	Not Detected	Not Detected	Aquacultured (Frozen)
2008 (Jan) Central Fishmarket – Kyimyindaing (Wholesale Market) Yangon, Division		Tarpon	<i>Puntius chola</i>	7	Not Detected	Not Detected	Not Detected	Aquacultured (Fresh/ Chilled)
2008 (March) Ayeyarwaddy Division (Mya Yu Processing Plant)		Boal	<i>Wallago attu</i>	7	Not Detected	Not Detected	Not Detected	Captured (Frozen)
2008 (March) Yangon Division (Mya Yu Processing Plant)		Indian Cat Fish	<i>Clarias batrachus</i>	7	Not Detected	Not Detected	Not Detected	Captured (Frozen)
2008 (March) Yangon Division (Mya Yu Processing Plant)		Climbing Perch	<i>Anabas testudineus</i>	7	Not Detected	Not Detected	Not Detected	Captured (Frozen)

Table 6. Results of Aldrin in Fish and Fish Products Surveyed in 2nd Quarter.

Year of Analysis & Sampling location	Analyte	Fish sample analysed		No. of samples analysed	Min. value of results (ppm)	Max. value of results (ppm)	Average value of results (ppm)	Remarks
		Common name	Scientific name					
2008 (April) Ayeyarwaddy Division (Mya Yu Processing Plant)	Aldrin	Boal	<i>Wallago attu</i>	7	Not Detected	Not Detected	Not Detected	Captured (Frozen)
2008 (April) Yangon Division (Mya Yu Processing Plant)		Indian Cat Fish	<i>Clarias batrachus</i>	7	Not Detected	Not Detected	Not Detected	Captured (Frozen)
2008 (April) Yangon Division (Mya Yu Processing Plant)		Climbing Perch	<i>Anabas testudineus</i>	7	Not Detected	Not Detected	Not Detected	Captured (Frozen)

Table 7. Results of Dieldrin in Fish and Fish Products Surveyed in 2nd Quarter.

Year of Analysis & Sampling location	Analyte	Fish sample analysed		No. of samples analysed	Min. value of results (ppm)	Max. value of results (ppm)	Average value of results (ppm)	Remarks
		Common name	Scientific name					
2008 (Feb) Nyaung Done Aquaculture Zone, Ayeyarwaddy Division (Mya Yu Processing Plant)	Dieldrin	Mrigal	<i>Cirrhinus mrigala</i>	7	Not Detected	Not Detected	Not Detected	Aquacultured (Frozen)
2008(Feb) Bago Fish Market, Bago Division		Snake Head	<i>Channa striata</i>	7	Not Detected	Not Detected	Not Detected	Captured (Fresh/ Chilled)
2008 (Feb) Nyaung Done Aquaculture Zone, Ayeyarwaddy Division (Mya Yu Processing Plant)		Common Carp	<i>Cyprinus carpio</i>	7	Not Detected	Not Detected	Not Detected	Aquacultured (Frozen)
2008 (Feb) Central Fishmarket – Kyimyindaing (Wholesale Market) Yangon , Division		Tarpon	<i>Puntius chola</i>	7	Not Detected	Not Detected	Not Detected	Aquacultured (Fresh/ Chilled)
2008 (April) Ayeyarwaddy Division (Mya Yu Processing Plant)		Boal	<i>Wallago attu</i>	7	Not Detected	Not Detected	Not Detected	Captured (Frozen)
2008 (April) Yangon Division (Mya Yu Processing Plant)		Indian Cat Fish	<i>Clarias batrachus</i>	7	Not Detected	Not Detected	Not Detected	Captured (Frozen)
2008 (April) Yangon Division (Mya Yu Processing Plant)		Climbing Perch	<i>Anabas testudineus</i>	7	Not Detected	Not Detected	Not Detected	Captured (Frozen)

c. Corrective Actions

- Verification of sampling and analytical methods.
- Carry out investigation studies such as traceability to the fishing grounds.
- Intensive monitoring of contaminants such as heavy metals in fish and fish products.

5. Problems and Challenges Encountered

- The budget is limited.
- Standard reference materials were unavailable for method validation.

6. Recommendations and Suggestions for Future Follow up Action

- Need on-site training courses.
- Survey of chemical contaminant such as pesticide residues under the Japanese Trust Fund (JTF) project is beneficial in supporting Myanmar Fisheries Monitoring Programme and reducing the number of RASFF notifications from EU due to high contents of pesticide residues.
- Participate in proficiency testing.