Myanmar

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1. Introduction

Myanmar has a total area of 228,781 km^2 and an Exclusive Economic Zone (EEC) of 486,000 km^2 (CS0, 2004). It has a coastline of 2,800 km with swamplands along the coast totaling to about 0.5 million hectares. The country's fisheries operation is classified into marine and inland fisheries. Marine fisheries include both coastal and offshore fisheries while inland fisheries cover freshwater capture fishery and aquaculture. Aquaculture is categorized under inland fishery, which covers an area of about 70279.43 hectares. Coastal aquaculture, to date, is mostly devoted to Shrimp farming with relatively smaller production of Mud Crab and Grouper. The exported amount of fish and fish products was 0.34 million metric tons valued at US$ 466 million in 2006 to 2007. Myanmar has been exporting fish and fish products, including frozen, chilled, live and dried forms, to 33 different countries.

2. Objectives And Goals

- To ensure that aquaculture products of Myanmar are free from drug residues, such as chloramphenicol and nitrofuran.
- To set up the Monitoring Program on Drug Residues in Aquaculture Products.
- To supply aquaculture products that comply with the international market standard and food safety requirements for drug residues.
- To collect and deposit data in the database of the Fish and Fish Products Saftey Information Network.

3. Survey Methodologies

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

Sampling Method

random sampling

n=9

Sampling Locations

Yangon Division (Kyauktan, Khayaung &Twente Aquaculture Zone)

Ayeyarwaddy Division (Pantanaw Aquaculture Zone, Ghani Win & Myanmar Seafood processing Plant)

Tanintharyi Division (United Myeik & Pyi Phyo Tun Processing Plant)

Rakhine State (Thantwe Marine Processing Plant)

Species & Sampling Size in 1st Quarter (Oct 2006)

Giant Freshwater Prawn, aquacultured (26/30 size x1 kg)

Black Tiger Shrimp, aquacultured (41/45 size x 1 kg)

Giant Freshwater Prawn, captured (21/25size x 3 kg)

Black Tiger Shrimp, captured (36/40 size x 1 kg)

Species & Sampling Size in 2nd Quarter (Dec 2007-Apr 2008)

Tilapia (0.25-0.5 kg x 7)

River catfish (3-4 kg x 7)

Black Tiger Shrimp (40/45 size x 1 kg)

Rohu (2-3 kg x 7)

Giant Freshwater Prawn (16/20 size x 1 kg)

Pink (16/20 size 1 kg)

White (21 /25 size x 1 kg)

Number of Samples
1st Quarter = 40 (CAP Test only)

2nd Quarter = 133
Total number of samples = 173

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Sample Preparation
Only edible portions and fish muscle tissue were used for testing.

b. Method of Analysis

Method of Analysis
(i) ELISA method for Choramphenicol (CAP) Test

(ii) LC/MS/Ms Method for Nitrofuran Test

Method References
(i) 'EURO –DIAGNOST ICA' Method manual, Netherlands for CAP Test

(ii) Journal of Chromatography B, 691(1997) for Nitrofuran Test

Brand of Instrument
(i) ELISA method for CAP
QUALIGENS Strip Reader (ELISA), Italy
Chemical kit: EURO –DIAGNOSTICA Netherlands

(ii) LC/MS/MS method for Nitrofuran
API 4000 LC/MS /MS (Applied Biosystems), USA

c. Limit of Detection and Limit of Quantification

Limit of Detection (LOD):
CAP = 0.025 ppb
Nitrofuran = 0.01 ppb

Limit of Quantification (LOQ):
CAP = 0.3 ppb
Nitrofuran = 1.0 ppb

d. National Regulatory Limits

There were no national regulatory limits in Myanmar. DOF of Myanmar complies and adopts the EU Standards and that of the importing countries.

Maximum Permitted Level in Fish & Fish Products enforced by EU and Japan.

SN	Type of Chemical Hazardous	Product Types	EU	Japan
1.	CAP	All fish products	0.3 ppb	0.5 ppb

SN	Type of Chemical Hazardous	Product Types	EU	Japan
	Nitrofurans			
1.	AOZ	All fish & shell fish products	1.0 ppb	1.0 ppb
2.	AMOZ		1.0 ppb	
3.	AHD		1.0 ppb	
4.	SEM		1.0 ppb	

4. Results And Discussion

a. Participation in Inter-laboratory Proficiency Testing and Results

There was no participation in any inter-laboratory proficiency testing.

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b. Survey Results and Discussion

Table 1. Results of analysis for Chloramphenicol (CAP) in fish and fish products conducted in 1st quarter (Oct 2006).

Year of analysis & Sampling location	Analyte	Fish sample analysed		No. of samples analysed	Min. value of results (ppb) -wet weight basis	Max. value of results (ppb) -wet weight basis	Average value of results (ppb) -wet weight basis	Remarks
		Common name	Scientific name					
Oct 2006, Pantanaw Aquaculture Zone, Ayeyarwaddy Division	CAP	Giant Fresh water Prawn	*Macrobrachium rosenbergii*	10	0.0148	0.0226	0.01342	Aquacultured (Fresh/ Chilled)
Oct 2006, Kyauk Tan Aquaculture Zone, Yangon Division		Black Tiger Shrimp	*Penaeus monodon*	10	Not Detected	Not Detected	Not Detected	Aquacultured (Fresh/ Chilled)
Nov 2006, United Myeik Processing Plant in Myeik, Tanintharyi Division		Giant Fresh water Prawn	*Macrobrachium rosenbergii*	10	Not Detected	0.0663	0.0172	Captured (Frozen)
Oct 2006, Thantwe Marine Processing Plant in Thantwe, Rakhine State		Black Tiger Shrimp	*Penaeus monodon*	10	Not Detected	0.1682	0.0194	Captured (Frozen)

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Table 2. Results of analysis for Chloramphenicol (CAP) in fish and fish products conducted in 2nd quarter (Dec 2007 – Apr 2008).

Year of analysis & Sampling location	Analyte	Fish sample analysed		No. of samples analysed	Min. value of results (ppb) -wet weight basis	Max. value of results (ppb) -wet weight basis	Average value of results (ppb) -wet weight basis	Remarks
		Common name	Scientific name					
Dec 2007, Khayoung Aquaculture Zone, Yangon Division	CAP	Tilapia	*Oreochromis niloticus*	10	Not Detected	0.062	0.0216	Aquacultured (Fresh/ Chilled)
Jan 2008, Ayeyarwaddy Division, Ghani Win Processing Plant		River cat Fish	*Sperata seenghala*	10	Not Detected	Not Detected	Not Detected	Captured (Frozen)
Feb 2008, Rakhine State, Thantwe Marine Processing Plant		Black Tiger Shrimp	*Penaeus monodon*	10	Not Detected	0.061	0.0193	Aquacultured (Frozen)
Mar 2008, Twente Aquaculture Zone, Yangon Division, Annawar Hlwam Processing Plant		Rohu	*Labeo rohita*	10	Not Detected	0.028	0.0045	Aquacultured (Frozen)
Apr 2008, Ayeyarwaddy Division, Myanmar Sea Food Processing Plant		Giant Fresh water Prawn	*Macrobrachium rosenbergii*	10	Not Detected	0.043	0.0064	Captured (Frozen)
Apr 2008 Tanintharyi Division, Phyi Phyo Tun Processing Plant		Pink Shrimp	*Metapenaeus affinis*	10	Not Detected	0.034	0.0074	Captured (Frozen)
Apr 2008, Tanintharyi Division, Phyi Phyo Tun Processing Plant		Indian White Prawn	*Penaeus indicus*	10	Not Detected	0.021	0.0039	Captured (Frozen)

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Table 3. Results of analysis for Nitrofurans (NF) in fish and fish products conducted in 2nd quarter (Dec 2007 – Apr 2008).

Year of analysis & Sampling location	Analyte	Fish sample analysed		No. of samples analysed	Min. value of results (ppb) - wet weight basis	Max. value of results (ppb) - wet weight basis	Average value of results (ppb) - wet weight basis	Average Recovery (%)	Remarks
		Common name	Scientific Name						
Dec 2007, Khayoung Aquaculture Zone, Yangon Division	NF	Tilapia	*Oreochromis Niloticus*	9	Not Detected	Not Detected	Not Detected	89.3	Aquacultured (Fresh/ Chilled)
Jan 2008, Ayeyarwaddy Division, Ghani Win Processing Plant		River catfish	*Sperata seenghala*	9	Not Detected	Not Detected	Not Detected	90.2	Captured (Frozen)
Feb 2008, Rakhine State, Thantwe Marine Processing Plant		Black Tiger Shrimp	*Penaeus monodon*	9	Not Detected	Not Detected	Not Detected	91.0	Aquacultured (Frozen)
Mar 2008, Twente Aquaculture Zone, Yangon Division, Annawar Hlwam Processing Plant		Rohu	*Labeo rohita*	9	Not Detected	Not Detected	Not Detected	90.3	Aquacultured (Frozen)
Apr 2008, Ayeyarwaddy Division, Myanmar Sea Food Processing Plant		Giant Fresh water Prawn	*Macrobrachium rosenbergii*	9	Not Detected	Not Detected	Not Detected	92.2	Captured (Frozen)
Apr 2008, Tanintharyi Division, Phyi Phyo Tun Processing Plant		Pink Shrimp	*Metapenaeus affinis*	9	Not Detected	Not Detected	Not Detected	87.7	Captured (Frozen)
Apr 2008, Tanintharyi Division, Phyi Phyo Tun Processing Plant		Indian White Prawn	*Penaeus indicus*	9	Not Detected	Not Detected	Not Detected	87.9	Captured (Frozen)

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c. Corrective Actions

- Carry out investigation studies such as traceability, from farmers to suppliers and establishments.
- Verification of Sampling and Analytical Methods.

5. Problems and Challenges Encountered

- The budget is limited.
- There was a lack of skilled laboratory personnel.

6. Recommendations and Suggestions for Future Follow up Action

- There is a need for on-site training courses.
- Skills of laboratory personnel on sampling and analysis can be strengthened.
- There is a need to train farmers and aquaculture inspectors on Good Aquaculture Practices (GAP).
- Proficiency testing should be conducted.
- DOF of Myanmar have drawn the Drug Residues Monitoring Plan and results from the project activities are deposited in the database of this plan.

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