

Myanmar

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1. Introduction

The Department of Fisheries (DOF) under the Ministry of Livestock and Fisheries is the government agency responsible for the management of quality and safety of fish and fish products. The department also ensures that requirements of importing countries' rules and regulations are met. A low level of histamine in seafood is a pre-requisite for quality and safety of export products. The recent rejection cases notified to the DOF from the Rapid Alert System for Food and Feed (RASFF) were in March and May 2008 due to high levels of histamine found in dried anchovies exported to UK. The level of histamine detected was more than EU's criteria of 200 ppm. Presently, our laboratory thoroughly check and re-check samples of scombroid and non-scombroid species, especially fish sauce that is produced from anchovies and exported to Thailand.

2. Objectives And Goals

- To determine the level of histamine in fish and fish products made from scombroid species in Myanmar.
- To collect data for the database of the Fish and Fish Products Safety Information Network.
- To use the data for management planning of measures to improve post-harvest handling practices.

3. Survey Methodologies

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

The method of sampling was conducted according to the sampling plan and the monitoring program of each divisional Fishery Office and the Regional Laboratory for Fish Inspection & Quality Control Section (key laboratory). Between 2006-2008,

sampling of raw materials was carried out at 5 states and divisions, which are representatives for producing fish and fish products. They are:

- (1) Tanintharyi Division
- (2) Yangon Division
- (3) Rakhine State
- (4) Ayeyarwady Division
- (5) Mon State

All the samples collected were marine fish products, especially scombroidae such as Spanish Mackerel, Sardine, dried Anchovy, Hilsa, dried Lotia, fish paste, shrimp paste etc. In most cases, raw materials were taken from wholesale fish markets, fish processing plants and canning factories. After the sample collection, the fish and fish products, except canned and dried products, were frozen at -18°C prior laboratory analysis. Some frozen fish from processing plants were usually analyzed directly for histamine.

Sampling locations

Yangon Division (Kyauk Tan Aquaculture Zone)

Tanintharyi Division (Myanmar Garming Processing Plant, Twin Brother Processing Plant)

Yangon Division (Myanmar Makro Canning Factory)

Rakhine State (Lin Aung Processing Plant, Bayintnaung Wholesale Market)

Ayeyarwaddy Division (May Yu Processing Plant, Hypar Pon Fish Market)

Mon state (Bayintnaung Wholesale Market)

Species & Sampling Size for 1st Quarter (Nov 2006-Jan 2007)

Spanish Mackerel (2-3 kg x 1)

Canned Sardine (1 can x 7)

Fresh Sardine (0.10 - 0.25 kg x 7)

Dried Anchovy (Total 1 kg)

Species & Sampling Size for 2nd Quarter (Dec 2007-April 2008)

Spanish Mackerel (2-3 kg x 7)
Fresh Hilsa (0.25 – 0.50 kg x 7)
Dried Anchovy (Total 1 kg)
Dried Lotia (Total 1kg)
Canned Hilsa (1 can x7)
Fish paste (Total 1 kg)
Shrimp paste (Total 1 kg)

Number of Samples

1st Quarter = 36 Samples
2nd Quarter = 63 Samples
Total = 99 Samples

Random sampling with n=9

Sample Preparation

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

b. Method of Analysis

Method of Analysis

Modified Kawabata's Method / Colorimetric 301-D

Method Reference

Training Course in Seafood Safety Management (JSPP 21) 2003 Singapore, MFRD-SEAFDEC

Brand of Instrument

Optima Spectrophotometer (Japan)
Wavelength: 330-1000 nm

c. Limit of Detection and Limit of Quantification

Limit of Detection (LOD) of histamine (Hm) = 5 ppm

Limit of Quantification (LOQ) of histamine (Hm) = 10 ppm

d. National Regulatory Limits

There are 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, USA, Canada and Japan

SN	Type of Chemical Hazardous	Product Types	EU	USA	Canada	Japan
1.	Histamine (Hm)	Fish paste and fish sauce			200 ppm	200 ppm
2.	Histamine (Hm)	Scombroid fish Products (eg. Tuna, Spanish Mackerel)	200 ppm	50 ppm		100 ppm

4. Results And Discussion

a. Participation in Inter-laboratory Proficiency Testing and Results

Myanmar did not participate in any inter-laboratory proficiency testing.

b. Survey Results and Discussion

Table 1. Results of analysis for histamine in fish and fish products conducted in 1st quarter (Nov 2006-Jan 2007).

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					
Nov 2006, Myanmar Garming Processing Plant in Myeik, Tanintharyi Division	Histamine (Hm)	Spanish Mackerel	<i>Somberomorus commerson</i>	9	32.37	44.87	39.26	Captured (Frozen)
Nov 2006, Myanmar Makro Canning Factory, Thaketa, Yangon Division		Sardine (Canned)	<i>Sardinella gibbosa</i>	9	20.63	24.54	22.61	Captured (Canned)
Dec 2006, Lin Aung Processing Plant in Rakhine State		Sardine	<i>Sardinella gibbosa</i>	9	22.22	30.97	27.63	Captured (Frozen)
Jan 2007, Bayint Naung Wholesale Market for Domestic, Rakhine State		Anchovy (Dried)	<i>Stolephorus indicus</i>	9	75.48	142.93	111.36	Captured (Dried)

Table 2. Results of analysis for histamine in fish and fish products conducted in 2nd Quarter (Dec 2007-April 2008).

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					
Dec 2007, Tanintharyi Division (Twin Brother Processing Plant)	Histamine (Hm)	Spanish Mackerel	<i>Somberomorus commerson</i>	9	9.82	39.10	22.28	Captured (Frozen)
Dec 2007, Ayeyarwaddy Division (May Yu Processing Plant)		Hilsa	<i>Tenualosa ilisha</i>	9	12.12	45.18	30.74	Captured (Frozen)
Jan 2008, Rakhine State (Bayintnaung Wholesale Market)		Anchovy (Dried)	<i>Stolephorus indicus</i>	9	12.54	55.31	33.07	Captured (Dried)
Feb 2008, Mon State (Bayintnaung Wholesale Market)		Lotia (Dried)	<i>Harpodon nehereus</i>	9	10.97	37.13	19.17	Captured (Dried)
Mar 2008, Yangon Division (Myanmar – Makro Canning Factory Thaketa)		Canned Hilsa	<i>Tenualosa ilisha</i>	9	20.20	24.16	22.03	Captured (Canned)
April 2008, Hypar Pon Fish Market, Ayeyarwaddy Division		Fish paste	–	9	34.52	66.72	51.07	Traditional Product (Fermented)
April 2008, Hypar Pon Fish Market, Ayeyarwaddy Division		Shrimp paste	–	9	24.37	52.72	37.05	Traditional Product (Fermented)

a. Corrective Actions

- Verification of sampling and analytical methods.
- Carry out investigation studies such as traceability measures at the landing site, fishing ground areas and use of product flow diagram from processing plant.
- Intensive monitoring of fish handling.

5. Problems and Challenges Encountered

- The budget is limited
- Problems and constraints faced during project implementation, especially when purchasing chemicals and samples.

6. Recommendations and Suggestions for Future Follow up Action

- There is a need for on-site training in Myanmar.
- This activity gave fruitful outcomes, which are able to support the Myanmar Fisheries Monitoring Programme and reduce the number of RASFF notifications from EU due to high content of Histamine.
- Participation in inter-laboratory proficiency testing will be beneficial.