

Philippines

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1. Introduction

The Philippine export of fish and fishery products is a 5 million dollars earner industry. The sustainability of the country's export performance is however being threatened by barriers to trade such as stricter product standards imposed by its trading partners. The European market has become more difficult to penetrate than the United States and Japanese markets due to stringent EU regulations covering issues like traceability, environmental contaminants, and antibiotic residues and histamine. Such issues caused considerable economic losses following product rejection from many Asian countries including the Philippines in the past few years.

The implementation of the project is an initial effort to address the problem in the fishery export industry and aims to develop a science-based data for effective food control system and to identify gaps with regards to food safety and quality issues.

2. Objectives And Goals

- To develop science-based data for food control system which focuses on consumer's health protection.
- To identify gaps in policies and regulations with regards to food safety and quality issues.
- To harmonize food standards with other ASEAN countries.

3. Survey Methodologies

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

Quarterly collections of samples were conducted on the following sources:

- Fresh samples from 2 fish landing sites namely General Santos and Zamboanga cities and 3

wet markets in Metro Manila i.e. Malabon, Navotas and Muñoz Markets.

- Canned samples packed in oil/brine/tomato sauce were collected from 3 establishments located at General Santos and Zamboanga Cities.
- Dried anchovies and fermented products from Metro Manila markets. The species of fishes collected were blue marlin, skipjack tuna, yellowfin tuna or long tail tuna, sardines, dried anchovies, dried mackerel and fermented products such as salted anchovies and anchovy sauce.

b. Method of Analysis

Seven samples (n=7) per product type were sampled and immediately kept chilled in ice until the laboratory was reached. Samples were wrapped in PE bags and stored at -30°C until analysis.

Nine samples (n=9) for canned, fermented and dried samples were taken and kept at ambient temperature for one week.

Prior to analysis, physical parameters such as total length, standard length and body weight were taken for fresh fish samples. All the skinned off-fillet, including dark meat but excluding meat from the belly flaps, were prepared and thoroughly minced using a homogenizer.

For canned tuna samples, the products were drained to remove water, brine or similar medium. The samples were then homogenized and blended for 1 minute until homogeneity was obtained.

The method of analysis used is the AOAC, Fluorometric method using a TD-700 fluorometer.

c. Limit of Detection and Limit of Quantification

The LOD and LOQ of the method were:

LOD = 2.67 ppm

LOQ = 8.9 ppm

d. National Regulatory Limits

Fresh/frozen products

USA = 50 ppm

Canada = 100 ppm

EU = 100 ppm

Philippine National Standard = 200 ppm

Dried/fermented products

EU = 200 ppm

Philippine National Standard = 200 ppm

4. Results And Discussion

a. Survey Results and Discussion

This study provided valuable information for evaluating the levels of histamine in fish and fish products available in local markets and fishery establishments.

Table 1. Physical parameters of samples

Common Name	Scientific Name	Code	Sample size (n)	Mean body weight (g)	Mean total length (cm)	Mean standard length (cm)
Yellowfin tuna	<i>Thunnus albacares</i>	YT	18	990 ± 55	45.44 ± 9.09	36.7 ± 7.34
Sardines	<i>Sardinella longiceps</i>	SA	5	64.25 ± 12.85	17.9 ± 3.58	14.88 ± 2.97
Mackerel (Dried)	<i>Scomberomorus</i> spp.	MA	12	461.0 ± 36.9	40.9 ± 1.3	37.0 ± 1.1
Anchovies (Dried)	<i>Stolephorus commersonii</i>	AN	5	1.25 ± 0.25	3.5 ± 0.7	2.8 ± 0.56

The mean total length of finfish ranged from 3.5 cm to 45.44 cm, the mean standard length ranged from 2.8 cm to 37.0 cm and the mean body weight ranged from 1.25 g to 990 g.

Table 2. List of species analysed and results.

Year of analysis & Sampling location	Fish sample analyzed		No. of samples analyzed	Min. value of results (ppm)	Max. value of results (ppm)	Average value of results (ppm)	Average Recovery (%)	Remarks
	Common Name	Scientific Name						
Zamboanga (2005)	Blue marlin	<i>Makaira nigricans</i>	Fresh/ Frozen 2	ND	ND	ND	81 - 90	Passed
Zamboanga (2005)	Yellowfin tuna	<i>Thunnus albacares</i>	Fresh/ Frozen 4	ND	ND	ND	81 - 90	Passed
General Santos City (2006)	Skipjack tuna	<i>Katsuwonus pelamis</i>	Canned 5	ND	ND	ND	81 - 112	Passed
General Santos City (2006)	Yellowfin tuna	<i>Thunnus albacares</i>	Fresh/ Frozen 5	ND	ND	ND	87 - 100	Passed
Metro Manila (2006)	Anchovies	<i>Stolephorus commersonii</i>	Dried 5	ND	ND	ND	73.5 - 84	Passed
Zamboanga (2006)	Sardines	<i>Sardinella longiceps</i>	Fresh/ Frozen 5	4.82	Detected but not quantifiable	Detected but not quantifiable	78 - 103	Passed
General Santos City (2007)	Skipjack tuna	<i>Katsuwonus pelamis</i>	Canned 36	3.20	14.5	11.68	81-90	Passed
General Santos City (2007)	Yellowfin tuna	<i>Thunnus albacares</i>	Canned 82	ND	Detected but not quantifiable	Detected but not quantifiable	78-101	Passed
Zamboanga (2007)	Sardines	<i>Sardinella longiceps</i>	Canned 282	ND	Detected but not quantifiable	Detected but not quantifiable	85-94	Passed
Metro Manila (2008)	Anchovies	<i>Stolephorus ronquilloi</i>	Salted 9	25.71	62.71	44.69	94.25	Passed
Metro Manila (2008)	Anchovies	<i>Stolephorus commersonii</i>	Sauce 9	27.27	49.77	42.20	105	Passed
Metro Manila (2008)	Mackerel	<i>Scomberomorus</i> spp.	Dried 12	95	153.5	120.5	110.22	Passed
Metro Manila (2008)	Yellowfin tuna	<i>Thunnus albacares</i>	Fresh/ Chilled 9	ND	112.69	61.15	126.75	Min. Value Passed Max. Value Failed
Pangasinan (2008)	Milkfish	<i>Chanos chanos</i>	Marinated 3	ND	ND	ND	95	Passed

Note:

ND = Not Detected

LOD = 2.67ppm

LOQ = 8.9 ppm

In general, samples analyzed had histamine levels below 100 ppm for fresh frozen products and below 200 ppm for dried and fermented products and were therefore safe for human consumption. All canned

products for export met the regulatory limits for histamine, indicating good quality products.

Three samples of fresh chilled tuna loins were however found to exceed the level for histamine. The exporter concerned was advised to take some corrective measures in order to avoid the formation of histamine in their products.

b. Corrective Actions

The exporter of the samples of fresh chilled tuna loins that did not meet the standard requirement for histamine was advised by the inspector to take precautionary measures to preclude the same findings in the future. The measures were to closely maintain the temperature of the raw material during processing. This could be done by applying ice on the product throughout the supply chain, from the time it was caught until it reaches the fish processing plant.

5. Problems and Challenges Encountered

- There was a delay in remittance of funds for Year 2005.
- There was a delay in the processing of procurement request.
- There was a need to replace the existing fluorometer as it had broken down.

6. Recommendations and Suggestions for Future Follow up Action

- There is a need to purchase Certified Reference Material (CRM) for comparison of test results.
- Inter-laboratory proficiency testing should be carried out and supported to ensure reliability of data.
- There is a need to strengthen manpower skills on histamine analysis using high performance liquid chromatography (HPLC).