

Cambodia

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1. Introduction

Cambodia has rich resources of fresh water fish. The Mekong, Tonle Sap, and Basac Rivers and their many tributaries, a number of lakes, and a vast area of floodplain are a rich source of fish for the population. Among the water resources, the Great Lake, which is the largest lake in Southeast Asia, plays an important role in the country's fish wealth. The lake ranges in surface area from 3,000 to 10,000 sq. km. It is estimated that almost 60% of the country's freshwater fish is produced in the Great Lake region.

Cambodia has small-scale aquaculture. Some species of fresh water fish with economic value such as *Pangasianodon hypophthalmus*, *Micronema micronema*, *Pangasius bocourti* have been selected to be cultured in the ponds and cages along Mekong River and Tonle Sap River.

Cambodian Fisheries Administration, especially in the Laboratory of Inland Fisheries Research and Development Institute (IFReDI), did not have equipment for chemical testing under Japanese Trust Fund II Project. For all projects involving chemical analysis, laboratories in neighbour countries were rented for testing. Cambodia started participating in the regional survey of Histamine in Fish and Fish Products under Japanese Trust Fund II only from 2006 to 2008. Fortunately, from 2007, Cambodia has the National Laboratory for Drug Qualities Control, which can test for Histamine. The cost of analysis is however very expensive.

2. Objectives And Goals

- To examine the histamine levels in fish and fish products from Kendal province around Phnom Penh and in frozen marine fish from Kompong Som Province, Cambodia.
- To provide the results of these 3 years survey to the fisheries industry such as exporting fish factories,

processing factories and others sectors related to food safety control.

3. Survey Methodologies

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

In 2006, a total of 12 samples of *Pangasius bocourti* (Basa-catfish), each with a weight of 500 to 700 g, were collected from a pond culture 12 km from Phnom Penh in the Kandal Province.

In 2007, a total of 14 samples of *Epinephelus coioides* and Indo-Pacific mackerel were taken. Each sample had a weight of 150 to 200 g. Samples were collected from marine fish and marine fish processing plants in the coastal areas of Kompong Som Province.

Year 2008, a total of 4 Indo-Pacific mackerel sized between 500 to 700 g were collected from Cambodian capital Phnom Penh market and a frozen factory in Kompong Som Province.

All samples were packed in plastic bags and kept at 18°C for 1 to 2 days before transportation to the analytical laboratories.

b. Method of Analysis

In 2006, 12 samples were analyzed in laboratories of the National Agriculture, Forestry and Fisheries Quality Assurance Department (NAFIQAD) -Branch 4 in Ho Chi Minh City have certificate number: 105, using the method 05.2CL4/ST3.52 (HPLC-FLD). The equipment for analysis used was Hitachi Z 8200.

In 2007 and 2008, a total of 18 samples were analyzed at Cambodian National Laboratory for Drug Quality Control in Phnom Penh.

According to the certificate number 1685 and 1686-07 of the National Laboratory For Drug Quality Control, the method used was 05.2CL4/ST3.52 (HPLC-FLD).

c. Limit of Detection and Limit of Quantification

- For analysis of fresh water fish (12 samples of *Pangasius borcouti*)

Limit of detection (LOD) = 1.0 mg/kg

- For analysis of Marine fish (18 samples of *Epinephelus coioides* and Indo-Pacific mackerel)

Limit of quantification (LOQ) = 1.2 mg/kg

d. National Regulatory Limits

Standard specification of Histamine, maximum permitted level in fish and fish products enforced by Cambodia, EU, USA, Canada and Japan

Type of products	Cambodia	EU	USA	Canada	Japan
Fish paste and fish sauce	<100 ppm	200 ppm	50 ppm	200 ppm	200 ppm
Fish products					100 ppm

4. Results And Discussion

a. Participation in Inter-laboratory Proficiency Testing and Results

Cambodia did not participate in any inter-laboratory proficiency testing program.

b. Survey Results and Discussion

The results of the three years survey showed that histamine was detected in some specimens of fresh water and marine fish products. The level of contamination did not exceed the Cambodian National Standard and the standard enforced by USA, Canada and Japan.

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						
2006, pond culture 12 km from Phnom Penh, Kandal Province	Basa-catfish	<i>Pangasius bocourti</i>	12	-	-	-	-	Detected but not quantifiable
2007, From fishing vessels, markets and processing plants at Kompong Som Province (Marine fish coastal areas)	Grouper	<i>Epinephelus coioides</i>	14	5.3224	8.1208	6.8236	-	Detected but not quantifiable
	Indo-Pacific mackerel	<i>Scomberomorus guttatus</i>						
2008, fishing vessels, markets and processing plants at Kompong Som Province (Marine fish coastal areas)	Indo-Pacific mackerel	<i>Scomberomorus guttatus</i>	4	5.647	9.234	7.923	-	Detected but not quantifiable

c. Corrective Actions

These results indicated that the three targeted species were of good quality and were safe for exporting and domestic use.

5. Problems and Challenges Encountered

- In 2006, the cost of analyzing the samples was every expensive due to the need to transport the samples to Vietnam.
- Cambodian Fisheries Administration had limited budget for inter-laboratory proficiency test each year.

6. Recommendations and Suggestions for Future Follow up Action

- This activity should be continued until year 2010 if the budget allows. Budget for implementing all activities should be released earlier.