

Vietnam

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1. Introduction

Specific requirements on chemical residues in fish and fish products were set up to meet the strict standards of food safety and hygiene of importing countries.

For this reason, survey and study activities organized by SEAFDEC and funded by JTF IV were significant in providing an overview on the residue levels of chemicals and contaminants in fish and fish products in the South-East Asian region. Member countries would determine appropriate policies to control quality and safety of fish and fish products for meeting importing countries' requirements and protecting domestic consumers' health.

In Vietnam, as the national competent authority responsible for controlling quality, hygiene and safety of fish and fish product since 1997, the National Fisheries Quality Assurance and Veterinary Directorate – NAFIQAVED (now renamed as the National Agriculture, Forestry and Fisheries Quality Assurance Department-NAFIQAD) has been carrying out the Monitoring Program for certain harmful substances and residues in aquaculture animals. The authority had also actively participated in “Research and Analysis of chemical residues and contamination in fish and fish products and in their environment such as fishing ground and aquaculture field” as well as other activities organized by SEAFDEC.

2. Objectives And Goals

Survey of heavy metals was carried out to provide information on residue levels of contaminants in fish and fish products as well as their environment in South-East Asia. The results of the survey were deposited in the database of the Fish and Fish Products Safety Information Network.

3. Survey Methodologies

- NAFIQAVED (now NAFIQAD) was the Lead for implementing all activities in 2006 to 2008. NAFIQAVED Branches took samples and analyzed them as required by the activity.
- Activities carried out by NAFIQAD include the following:
 - a) Activities using SEAFDEC's budget
 - b) Activities using budget from the Monitoring Program for certain harmful substances and residues in aquaculture animals and certification activities for exported fishery consignments
- NAFIQAD had signed contracts with its Branches for the implementation of activities, and then is responsible for data analysis and treatment and making report.
- NAFIQAD branches carry out the procedures of sampling, sample preservation, dispatch of samples to laboratories and analysis, in compliance with the Residues Monitoring Program Manual and Quality Manual of NAFIQAD.

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

Species

- Black Tiger Shrimps: *Penaeus monodon* (semi and final products have been taken from processing plant and the market)
- Bigeye tuna: *Thunnus albacares*
- Tra Catfish: *Pangasius hypophthalmus* (semi and final products have been taken from processing plant and the market)
- Clam: *Meretrix lyrata*
- Octopus: *Octopus* spp.
- Squids: squid (*Loligo edulis*), cuttlefish (*Sepia* spp.)

- Marlin fish: *Makaira indica*
- Swordfish: *Xiphias gladius*
- Ribbon fish: *Trichiurus lepturus*
- Mackerels: *Acanthocybium solandri*

b. Method of Analysis

Method: AOAC 999.10.1999

Equipment: AAS Perkin Elmer

Testing method had been accredited with ISO 17025 by BoA – VILAS.

c. Limit of Detection and Limit of Quantification

Limit of Detection (LOD):

- Hg: 10 ppb
- Pb: 5 ppb
- Cd: 1 ppb

d. National Regulatory Limits

MRLs required:

- Vietnam: Pb: 0.5 mg/kg, Cd: 1 mg/kg, Hg: 0.5 mg/kg
- EU: Hg, Cd: 0.5 mg/kg; Pb: 0.2 mg/kg
- USA: Cd (crustaceans: 3 ppm, bivalve mollusk: 4.0 ppm), Pb (crustaceans: 1.5 ppm, bivalve mollusk: 1.7 ppm)

4. Results And Discussion

a. Participation in Inter-laboratory Proficiency Testing and Results

Year of participation	Program Name	Analyte Tested	Remarks
2007	Canned fish/FAPAS/2007	Cd, Hg	Passed
2007	NAFIQAVED Proficiency Test	Cd	Passed

Year of analysis & Sampling location	Analyte	Fish sample analysed		Average value of results (ppm)
		Common name	Scientific name	
2006	Cd	Black Tiger Shrimp	<i>Penaneus monodon</i>	0.003
		Tuna	<i>Thunnus albacares</i>	0.030
		Tra/Basa catfish	<i>Pangasius spp.</i>	0.001
		Clams	<i>Meretrix lyrata</i>	0.993
		Octopus/ squid	<i>Octopus spp./ Loligo edulis</i>	0.134
		Others	-	0.090
2006	Pb	Black Tiger Shrimp	<i>Penaneus monodon</i>	0.077
		Tuna	<i>Thunnus albacares</i>	0.100
		Tra/Basa catfish	<i>Pangasius spp.</i>	0.115
		Clams	<i>Meretrix lyrata</i>	0.015
		Octopus/ squid	<i>Octopus spp./ Loligo edulis</i>	0.025
		Others	-	0.030
2006	Hg	Black Tiger Shrimp	<i>Penaneus monodon</i>	ND
		Tuna	<i>Thunnus albacares</i>	ND
		Tra/Basa catfish	<i>Pangasius spp.</i>	ND
		Clams	<i>Meretrix lyrata</i>	ND
		Octopus/squid	<i>Octopus spp./ Loligo edulis</i>	ND
		Others	-	ND

Year of analysis & Sampling location	Analyte	Fish sample analysed		Average value of results (ppm)
		Common name	Scientific name	
2007	Cd	Black Tiger Shrimp	<i>Penaneus monodon</i>	0.001
		Tuna	<i>Thunnus albacares</i>	0.001
		Tra/Basa catfish	<i>Pangasius spp.</i>	0.001
		Clams	<i>Meretrix lyrata</i>	3.335
		Octopus/ squid	<i>Octopus spp./ Loligo edulis</i>	1.200
		Others	-	0.351
2007	Pb	Black Tiger Shrimp	<i>Penaneus monodon</i>	0.051
		Tuna	<i>Thunnus albacares</i>	1.009
		Tra/Basa catfish	<i>Pangasius spp.</i>	0.089
		Clams	<i>Meretrix lyrata</i>	0.010
		Octopus/ squid	<i>Octopus spp./ Loligo edulis</i>	0.010
		Others	-	0.010
2007	Hg	Black Tiger Shrimp	<i>Penaneus monodon</i>	ND
		Tuna	<i>Thunnus albacares</i>	ND
		Tra/Basa catfish	<i>Pangasius spp.</i>	ND
		Clams	<i>Meretrix lyrata</i>	ND
		Octopus/ squid	<i>Octopus spp./ Loligo edulis</i>	ND
		Others	-	ND

Year of analysis & Sampling location	Analyte	Fish sample analysed		Average value of results (ppm)
		Common name	Scientific name	
2008	Cd	Tra/Basa catfish	<i>Pangasius</i> spp.	ND
		Tuna	<i>Thunnus albacares</i>	0.023
		Clams	<i>Meretrix lyrata</i>	0.010-0.063
		Mackerel	<i>Acanthocybium solandri</i>	0.166
		Ribbon fish	<i>Trichiurus lepturus</i>	0.142
		Marlin fish	<i>Makaira indica</i>	0.946
		Swordfish	<i>Xiphias gladius</i>	0.790
		Octopus	<i>Octopus</i> spp.	1.132-1.396
		Squid	<i>Loligo edulis</i>	0.210-0.621
2008	Pb	Tra/Basa catfish	<i>Pangasius</i> spp.	0-0.010
		Tuna	<i>Thunnus albacares</i>	ND
		Clams	<i>Meretrix lyrata</i>	0-0.005
		Mackerel	<i>Acanthocybium solandri</i>	ND
		Ribbon fish	<i>Trichiurus lepturus</i>	ND
		Marlin fish	<i>Makaira indica</i>	ND
		Swordfish	<i>Xiphias gladius</i>	ND
		Octopus	<i>Octopus</i> spp.	ND
		Squid	<i>Loligo edulis</i>	ND
2008	Hg	Tra/Basa catfish	<i>Pangasius</i> spp.	ND
		Tuna	<i>Thunnus albacares</i>	ND
		Clams	<i>Meretrix lyrata</i>	ND
		Mackerel	<i>Acanthocybium solandri</i>	ND
		Ribbon fish	<i>Trichiurus lepturus</i>	ND
		Marlin fish	<i>Makaira indica</i>	ND
		Swordfish	<i>Xiphias gladius</i>	ND
		Octopus	<i>Octopus</i> spp.	ND
		Squid	<i>Loligo edulis</i>	ND

Note: ND - Not detected

c. Corrective Actions

- Carry out investigation such as traceability studies to the fishing ground areas.
- Verification of sampling and analytical methods.
- Perform repeat sampling.
- Intensive control of chemical contaminants in fish and fish products during fishing and processing.

5. Problems and Challenges Encountered

Heavy metals are some of the parameters that can reflect the contamination level in fish due to the environment. Analysis results showed that heavy metals (Pb, Cd, Hg) are mostly detected in fish. This also meant that the heavy metals contamination caused by industrial wastes, is one of the criterias to be controlled. In

spite of some samples exceeding the MRLs, it could be concluded that the contamination of heavy metals is under good control in Vietnam with reference to control results achieved since 1999.

6. Recommendations and Suggestions for Future Follow up Action

- Due to limited budget for each activity, collected data are not representative enough to reflect the real impact of chemical contaminants and antibiotics residues on fish.
- It would be highly appreciated if the Project could focus on training in new analytical methods, specifically in multi-residues analysis methods in order to improve testing capabilities in fish quality and safety control in the South-East Asia region.