



Assisting ASEAN Fish Processing Meet Safety and Quality Assurance Requirements

SME

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A major source of animal protein among the Southeast Asians, traditional fish products also represent a significant component of fish utilization in the region accounting for 30-45% of the total landed catch (Yeap and Tan, 2002). The production of these economically and culturally important products is an important means of preserving fish in the developing countries where storage facilities for fresh fish are rather scarce.

Yagi (2006) reported that in 2003, the value of internationally traded fish and fishery products amounted to more than USD 68.0 billion, of which about 48% was supplied by the developing countries. Among the major importers of fishery products from the ASEAN region are the US, EU, and Japan. In 2004, the export of fishery products from the ASEAN countries to Japan amounted to USD 2.9 billion or about 20% of the total value of fish and fishery products imported by Japan. However, the developing countries are faced with difficulty in coping with the food safety requirements imposed by the importing countries because of technical and financial constraints.

In the Southeast Asian culture, condiments and seasonings produced from fish materials are integral part of the people's meals to perk up soups or simply as dips or spicy accompaniments. The most popular condiments in the region are fish sauce and fermented fish or shrimps (known in the region's local languages as either *bagoong*, *sambal belacan*, *terasi*, *budu*, *cincajuk*, *patis*, *pha ork*, *nam pla*, *hmyin ngapi*, *kecap ikan*, *teuk Trey*, etc.). The production of condiments and seasonings in the region through fish processing is an industry in itself.

For economic as well as cultural reasons and as a means of maximizing the utilization of fish catch, the production of traditional fish products, which contribute largely to providing additional protein supply for the ASEAN populace and to the region's food security, should therefore be promoted. However, there are various issues and concerns in the sustainable production of traditional fish products. One of the most important concerns is the need to provide appropriate support to the fish processing industry especially in the development and adoption of safety standards for the well-being of the consumers.

The ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security in the New Millennium “Fish for the People” convened in Bangkok, Thailand in November 2001, recognized the need to improve the quality of the traditional fish products as these are oftentimes far from satisfactory. The consumers, increasingly becoming aware of the hygiene requirements, are demanding for better quality of the fish products that they eat. Since fish processing in the region is usually done by small-scale industries, the Conference in its adopted Resolution on Sustainable Fisheries for Food Security for the ASEAN Region, stipulated the need to “improve post-harvest technologies to ensure fish quality assurance and safety management systems, which are appropriate for small- and medium-sized enterprises in the region, taking into account the importance of traditional fish products and food security requirements” (**Resolution 14**). Guided by the Resolution, the Conference also adopted the Plan of Action which included the need to “develop and apply fish quality and safety management systems that ensure food safety and support the competitive position of ASEAN fish products on world markets through the implementation, validation and verification of Hazard Analysis and Critical Control Point (HACCP) based systems and improved laboratory practices, and adapting quality and safety management systems so that they may be applied to small and medium enterprises in the ASEAN region” (SEAFDEC, 2001).

Towards this end, the Southeast Asian Fisheries Development Center (SEAFDEC) through its Marine Fisheries Research Department (MFRD) based in Singapore, has been conducting R&D on the development of sustainable fisheries post-harvest technology. With financial support from the Trust Fund Program of the Government of Japan, MFRD’s programs concentrated in the development of two major areas, namely: fish processing and packaging technology; and fish quality management. The program on fish processing and packaging technology focused on the improvement of processing and packaging of traditional fish products as well as the development of

value-added products from low-value, under-utilized pelagic fishes. For fish quality management, MFRD conducts R&D on heavy metals and chemical residues (e.g., pesticides, antibiotics) in fish and fishery products, and also on hazard analysis and critical control point (HACCP) procedures for the traditional fish processing industry.

Safety and Quality of ASEAN Fishery Products: Issues and Concerns

For the ASEAN region, it has been recognized that traditional fish products are cheap sources of protein for human consumption. The region has a wide range of processed products, varying from country to country according to traditional processing practices, such as boiled, dried, salted, smoked, marinated, fermented, minced and powdered. However, most of these traditional fish products are usually of low value and supplied for domestic market, except for some specialized products such as fish sauce that are exported to the US, EU as well as to Japan. These concerns have been taken into consideration during the production of the Regional Guidelines for Responsible Fisheries in Southeast Asia: Responsible Post-Harvest Practices and Trade under the SEAFDEC Project on the Regionalization of the Code of Conduct for Responsible Fisheries, which was funded by the Government of Japan Trust Fund Program.

Most of the traditional fish products in the ASEAN region are produced through backyard processing and their production has been a source of income generation and rural livelihood. However, the region’s fish processing industry is faced with constraints that include seasonal availability and low quality of raw materials since the materials used are mostly the fish by-catch, leading to seasonal production and to some extent low-quality of the products. In general, processors are poorly educated, lack the know-how in preservation as well as in standardized processing techniques, and do not have access to skills development and information on food hygiene. This makes it difficult for the processing industry to comply with the safety and quality standards and requirements.

The absence of proper infrastructures and the unsanitary surroundings make some traditional processes not hygienic which lead to low quality and market value. With many processors not equipped with ample knowledge in marketing strategies, most products end up in local markets only. Nevertheless, it is important to maintain the confidence of seafood safety and quality assurance for the traditional fish processing industry. Attention should therefore, be given to the development and implementation of food safety standards for the traditional processing methods to ensure food security. Like in some progressive ASEAN countries,



Vietnam has established a competent authority through its National Fisheries Quality Assurance and Veterinary Directorate (NAFIQAVED) of the Ministry of Fisheries, which is tasked to manage and control the quality, safety and hygiene assurance conditions in its fisheries sector “from farm to table.”

Moreover, many countries in the region also lack the necessary regulatory tools related to food safety and quality, especially regulations and standards on quality, safety and hygiene for fishery products that meet the requirements of the domestic as well as the foreign markets. The adoption of good manufacturing practices (GMP) and standard sanitation operating procedure (SSOP) should be enforced as there have been reported cases of adulteration in some of the region’s traditional fish products and some incidence of food-borne diseases. These are the concerns being addressed in the projects and activities of SEAFDEC/MFRD, and related SEAFDEC initiatives that are in consonance to the articles in the Regional Guidelines,

specifying the development of appropriate guidelines in food safety measures such as GMP; and providing appropriate technical and other assistance to the various kinds of SMEs in order to ensure the effective implementation of the applied safety measures taking into account economic, social, environmental and nutritional aspects (SEAFDEC, 2005).

Thus, with financial assistance from the Government of Japan Trust Fund Program, MFRD implements a project mainly aimed at assisting the SMEs in the fish processing industry. The project, Quality Assurance Systems for Small and Medium-Sized Fish Processing Establishments in ASEAN Member Countries specifically aims to develop GMP/SSOP programs for SME Fish Processing Establishments in the ASEAN; and promote the implementation of GMP/SSOP as first step towards the implementation of HACCP by the SMEs and help the SMEs in meeting the safety and quality assurance requirements for their products.

ASEAN SMEs and Fish Processing Industry

The fish processing industry in the ASEAN region is basically dominated by the small- and medium-sized enterprises (SMEs). The varying definitions of SMEs in the ASEAN countries could be based on their capital assets or in the number of employees working in the establishments. Although in some countries, traditional (Malaysia) and micro industries are also reported to be engaged in fish processing. Micro establishments are those with less than USD 32,600.00 capital assets and employing 1-9 workers (Philippines).

Generally, SMEs in the region employ household labor and most establishments are home-based utilizing backyard areas with simple facilities, usually managed by traditional processing families or communities. The ASEAN SMEs engaged in fish processing comprised mainly of two types: (1) Pre-Processing Establishments (PPE) which produce semi-processed raw materials for inputs in main processing establishments; and Traditional Products Processing Establishments (TPE) which produce products for the market. Brunei Darussalam, Lao PDR and Singapore have only TPEs and no PPEs.

Many processors do not have access to improved technology and information on food hygiene and good manufacturing practices. As a consequence, food-borne illnesses occur that affects production and stability of household earnings. Since products are processed in unhygienic conditions, this usually results in low product quality and possible contamination of the products with pathogens. The ability of SMEs to apply HACCP programs is necessary to improve product safety and quality.



Backyard fish processing common in many countries in the ASEAN region (top); and fish fermentation by direct exposing to sunlight, sometimes in exposed jars (above)

Fish being prepared for fillet processing



premises, which needs investment aside from possibly causing labor displacement. The region's fishery products are mostly traded in domestic markets except for some products which are exported by some ASEAN countries to the US, EU and Japan. The need to expand the export market for the fishery products should be explored for the upliftment of the region's economies.

Pre-Processing Establishments (PPEs)

PPEs are mainly involved in such activities as preparing materials for frozen shrimp, crab meat picking, squid cleaning, fish filleting or loining, mollusk or bivalve shucking, preparing fish for otoshimi and surimi, etc. In preparing for frozen shrimp, the process includes washing, skinning, peeling and deheading. For the preparation of otoshimi and surimi, the process involves de-gutting, de-heading, and de-skinning. PPEs are usually located near fish landing areas or near shrimp farms or scattered in coastal areas close to the source of raw materials. In some cases, PPEs are operated by owners of processing plants. PPEs do not usually have proper and formal working areas where processing is done in open space or in fish landing jetties exposing the raw materials and products to flies and other disease-carrying insects. There is also the problem of unavailability of ice

However, this would require technological, manpower and financial resources, which many SMEs do not possess. This may also require processing to be relocated to more formal

Box 1: Major Fishery Products/Activities of PPEs and TPEs in the ASEAN Region

ASEAN Countries	Fishery Products/Activities	
	PPE	TPE
Brunei Darussalam	NA	Fermented (<i>belacan</i> /shrimp paste), Fish/shrimp crackers Comminuted/value-added products, Smoked fish, Dried salted fish, Marinated fish, Barbecued fish
Cambodia	Crab peeling, Shrimp peeling	Fish sauce, Shrimp paste, Fermented fish (<i>prahok</i>) Slated dried fish (snakehead)
Indonesia	Fish filleting, loining, Crab meat picking Squid skinning and cleaning, Shrimp peeling	Dried salted fish, Salted boiled fish (<i>pindang</i>) Fermented: fish paste, <i>peda</i> , <i>wadi</i> , <i>rusip</i> , <i>bakasang</i> , Smoked fish, Fish cracker, Fish floss, Minced fish product: fish ball
Lao PDR	NA	Fermented fish: <i>padek</i> , <i>pasome</i> , <i>pachao</i> , Fish sauce, Dried fish, Smoked fish
Malaysia	Raw materials for frozen shrimp Materials for canning fish and shellfish Otoshimi and surimi materials	Otoshimi and surimi-based products: fish ball/cake Fermented products, Salted-dried products, Boiled and smoked fish, Fish cracker (<i>keropak lekor</i>)
Myanmar		Fermented products, Dried products, Smoked products, Salted products, Fish paste, Fish sauce
Philippines	Salted shrimp for shrimp paste, Crab meat picking	Fish sauce, Fish paste (boneless), Smoked fish, Dried fish, Bangus fillet, deboned, choice cut (belly)
Singapore	NA	Fish ball, Fish cake, Fish <i>otah</i>
Thailand	Fish fillet, Tuna loin Squid, Shrimp	Dried shrimp, Dried fish, Fish sauce, Fish cracker
Vietnam	Peeling, de-heading, degutting, de-skinning, filleting (depending on raw materials involved)	Dried: shrimp, fish squid, Fish sauce, Fermented: tiny shrimp paste, fish paste



drying of fish crackers on cement ground

and potable/clean water, and with harsh tropical temperature changes the quality of the products deteriorates fast. The major activities and products of the PPEs in the ASEAN region are shown in Box 1.

In some countries, HACCP-based programs are in place especially for export-oriented (commercial scale) processing establishments, but many PPEs that supply the materials to the commercial processors do not adopt the HACCP-based programs, so the risks is eventually channeled to the final processed products.

Traditional Products Processing Establishments (TPEs)

TPEs produce the finished fishery products ready for the market, such as dried or salted shrimp, squid or fish, fermented shrimp or fish, fish sauce, snacks such as fish or shrimp cracker, surimi-based products, etc. Most TPEs are not mechanized and are operating manually in backyards. Possible contamination of the products by disease-causing elements could take place from handling, preparation and processing due to the unsanitary surroundings thereby producing poor quality products. Most workers are family members or from extended families, and often lack awareness on food hygiene requirements and oftentimes they do not see the need of implementing HACCP since



Dried fish ready for the market

they have been operating for many years without their products causing adverse effects on the consumers. This is coupled with the fact that in some countries there are no skilled food inspectors and many establishments have limited food analysis capacities. The major activities and products of the TPEs in the ASEAN region are shown in Box 1.

Action Plan

In an effort to assist the ASEAN fish processing SMEs meet safety and quality assurance requirements and as part of the implementation of the Project on Quality Assurance Systems for Small and Medium-Sized Fish Processing Establishments in ASEAN Member Countries, SEAFDEC/MFRD convened the Regional Planning Meeting in Singapore from 20 to 21 June 2007. Participated in by representatives from the ASEAN member countries and Japan, the Meeting finalized the national pilot projects for the development of GMP/SSOP programs for PPEs and TPEs. The pilot project activities in the countries will be implemented on cost-sharing basis with considerable operating funds to be provided by the Trust Fund Program of the Government of Japan while the capital outlay, other related expenditures and personnel requirements will be provided by the participating countries.

The Project, which will run from June 2007 until December 2011 with MFRD as the Lead SEAFDEC Department in-charge of managing, coordinating and monitoring all activities, is expected come out with three major outputs, namely, GMP/SSOP programs for SMEs (PPEs and TPEs); Manuals on GMP/SSOP to promote their implementation by the SMEs; and pilot projects on GMP/SSOP implemented in cooperation with the SMEs. In order to achieve the expected outputs, the Meeting considered the list of products for development of GMP and SSOP for PPEs and TPEs through the pilot projects in respective countries (Box 2).

Box 2: Approved Products for Development of GMP for PPE and TPE through the National Pilot Projects

ASEAN Countries	Products	
	PPE	TPE
Brunei Darussalam	NA	Fermented fish paste (<i>belacan</i>)
Cambodia	Crab meat (picking)	Fermented fish paste (<i>prahok</i>), Salted dried fish (snakehead)
Indonesia	Fish fillet (for surimi)	Salted boiled fish (<i>pindang</i>) Salted dried fish
Lao PDR	NA	Fermented fish; Dried fish
Malaysia	Shrimp peeling Fish dehead/ degut (for surimi/otoshimi)	Fermented fish (<i>keropok lekor</i>) Dried fish
Myanmar	Shrimp peeling/ deheading/ sizing	Fermented fish (pickled fish), Fish cracker
Philippines	Shrimp salting (for shrimp paste) Crab meat (picking)	Smoked fish Milkfish filleting (for choice-cut belly)
Singapore	NA	Fish balls/ fish cakes Fish <i>otah</i>
Thailand	Shrimp peeling	Fish sauce; Dried shrimp
Vietnam	Shrimp deheading Cuttlefish/ squid preparation (degutting, deskinning, semi dried)	Fish sauce Fermented tiny shrimp paste



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