Issues facing the traditional fish products industry in Southeast Asia

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Abstract

In Southeast Asia, traditional fish products represent a significantly large part of total fish utilization and are a major source of animal protein. As a result, these products are vitally important to food security, especially considering that most of them go to marginalized sectors of the population. Traditional fish products are generally of low value and intended mainly for the domestic market, although some specialty products are of high value and other products, such as fish sauce, are also now being exported. Issues facing the industry are: obtaining a reliable supply of raw materials—particularly good-quality raw materials; a lack of infrastructure; poor processing techniques; a poor knowledge base; inadequate marketing; and a lack of food safety standards. To address these issues and improve traditional fish products, it is essential that the Southeast Asian countries promote and preserve the production and use of these products, strengthen research and training activities, improve their marketing, and ensure that they meet food safety standards. However, in an effort to improve these products, their unique nature and their cultural and social importance should not be compromised.

Introduction to the Marine Fisheries Research Department

THE Marine Fisheries Research Department (MFRD) in Singapore is one of four departments in the Southeast Asian Fisheries Development Center (SEAFDEC). SEAFDEC is an autonomous inter-governmental body established in December 1967 for the purpose of promoting fisheries development in the Southeast Asian region. Presently, all the Association of South-East Asian Nations (ASEAN) member countries except for the Lao PDR are members of SEAFDEC.

Established in 1969, MFRD is hosted by the Singapore government through its Agri-food and Veterinary Authority (AVA) and is responsible for SEAFDEC's activities in fisheries postharvest technology. Its main objective is to maximize utilization and reduce wastage of fish resources in the Southeast Asian region through improved processing, preservation and quality assurance of fish and fish products. These are achieved through MFRD's three core activities, namely research and development, training and extension, and information services.

Currently, MFRD's research and training programs are focused on two main areas of fisheries postharvest technology: fish processing and packaging technology, and fish quality management. Under fish processing and packaging technology, the main programs focus on the improvement of processing and packaging technology for traditional fish products (dried shrimps and fermented fish sauce), and development of value-added products from low-value, under-utilized pelagic fish resources. The main programs under fish quality management include heavy metals and other chemical residues (pesticides, antibiotics) in fish and fish products, nutritional composition of Southeast Asian fish products, and hazard analysis and critical control point (HACCP) procedures for the traditional fish processing industry.

Since 1984, MFRD has been compiling an inventory of fish products in Southeast Asia which lists the common fish products available in the countries in the region. The inventory includes data on production and export, if any, of the common fish products, brief descriptions of their processing methods, quality

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problems and marketing constraints. The first edition of the inventory, entitled *Southeast Asian Fish Products*, was published in 1987, followed by the second and third editions in 1991 and 1996, respectively. The fourth edition is in the final stages of preparation.

Background on traditional fish products

TRADITIONAL fish products are a major source of animal protein in the Southeast Asian countries and the production of traditional fish products is an important means of preserving fish in these countries. Traditional fish products include products that are boiled, dried, salted/cured, smoked, marinated, fermented, minced/comminuted, and powdered. Many products are unique to each country, but the technology underlying their production is similar in all countries.

Boiled products are produced either by cooking fresh fish in boiling water with added salt or in steam (Table 1). Pelagic fish such as mackerel, scad and anchovy are most commonly used. Drying is a common method of preserving fish in the region and *dried* products are one of the most widely processed and popular products (Table 2). The raw materials used are generally fish, shrimp and squid, and the process usually involves boiling the raw materials in brine and drying in the sun or by mechanical means. Smoking is another common method to preserve fish and *smoked* products include tuna (skipjack), milkfish, sardine, scad, mackerel, sharks, rays, snake-head fish, eel and catfish (Table 3). Smoking is carried out in a smoke-house, using charcoal in most countries. *Fermented* products are processed by the addition of salt to fish or shrimp, which is then allowed to ferment naturally (Table 4). This will result in the production of fermented fish/shrimp paste or fish/shrimp sauce. *Comminuted* products are made from minced fish meat and surimi and include all forms of fish/prawn/cuttle-fish balls and cakes, fish sausages and burgers, and imitation crabsticks and scallops (Table 5). *Powdered* products are also known as floss, granulated/flaked products or concentrate (Table 6). They are made from by-products of dried shrimp or the mince from tuna, mackerel, sardine etc. The raw material is then mixed with other ingredients to enhance the product taste. Other products (Table 7) include fish and prawn/shrimp crackers and skewered seasoned fish meat (satay fish).

While traditional fish products are very popular in the region, people still prefer to consume fresh fish and prices reflect this preference. With a few exceptions, traditional fish products are usually of low value and restricted to domestic markets. However, because of the cost and limited availability of fresh fish, traditional fish products represent a significantly large part of the total utilization of fish in the Southeast Asian region, accounting for approximately 30–45% of the landed catch. Consequently, they are vitally important for food security, especially as most of these products go to marginalized sectors of the population where they play an essential role in the diet. The traditional fish products industry is generally comprised of household producers and small and medium-size enterprises (SMEs), which are family-owned operations with little mechanization.

Due to the nature of the industry and the low value of the products, statistics on production are either not available or at best incomplete for most traditional fish products. This is one of the main problems faced by MFRD when compiling the inventory of fish products. Traditional fish products are also intended mainly for the domestic market, although some products, such as fish sauce, are also now being exported to markets in the United States of America (USA) and Europe because of the increasing popularity of Southeast Asian cuisine. Thai cuisine, in particular, has become very popular and fish sauce is an essential ingredient in almost all Thai dishes. Thailand produced close to 41,000 t of fish sauce in 2000 and exported about 28,000 t in the same year.

Table 1. Boiled fish products.

Product	Local name	Country	Product description
Boiled fish	Ikan pindang naya	Indonesia	Salted and boiled fish. Slightly savory with distinctive flavor
	Ikan pindang badeng/paso	Indonesia	
	Ikan rebus	Malaysia	Salted and boiled fish. Deep-fried or cooked in curry before serving
Boiled mackerel	Trey cham hoy	Cambodia	Steamed fresh mackerel
Cooked crab	Gananather	Myanmar	Boiled and meat removed
Cooked fish	Sek-hu	Singapore	Whole fresh fish boiled in brine
Steamed fish	Pla nung	Thailand	Steamed, slightly salted fish. Normally fried in oil or served with chilli paste

Table 2. Dried fish products.

Product	Local name	Country	Product description
Dried abalone	Sopas	Philippines	
Dried anchovy	Ikan bilis/Pusu kering Teri nasi kering Ikan bilis/Bilis kering Nganitu Daing na dilis	Brunei Indonesia Malaysia Myanmar Philippines	Salted, boiled and sun-dried small fish. It is deep fried or boiled in soup
Dried barracuda	Daing na torcillo	Philippines	Has savory taste and fishy flavor
Dried big-eyed scad	Daing na matambaka	Philippines	Has savory taste and fishy flavor
Dried cockle	Kerang kering	Malaysia	Product is sun-dried. It is used in soup or fried with chilli sauce as a dish
Dried cuttlefish	Sotong kering	Malaysia	Product is sun-dried. It is served in local dishes
Dried deep-bodied herring	Daing na lapad	Philippines	Has savory taste and fishy flavor
Dried eastern little tuna	Daing na bonito	Philippines	Has savory taste and fishy flavor
Dried fish	Trey ngiet	Cambodia	Dried fillet fish
Dried jellyfish	Ubur-ubur Yekhu	Malaysia Myanmar	Salted and dried. Product is rubbery in texture
Dried lizard fish	Daing na kalaso	Philippines	Has savory taste and fishy flavor
Dried marine catfish	Ikan asin jambal roti	Indonesia	Fermented and salted in dried form
Dried milkfish	Daing na bangus	Philippines	Has savory taste and fishy flavor
Dried salted fish	Trey pra laak Ikan masin	Cambodia Malaysia	Whole fish, salted and dried
Dried sea cucumber	Chleun samot Myaut chauk Daing na trepang Hai-som	Cambodia Myanmar Philippines Singapore	Gutted, boiled and dried. It needs to be soaked in water before cooking. It is boiled in soup, fried with meat or vegetables
Dried sea urchin	Tugon	Philippines	Has savory taste and fishy flavor
Dried shark	Ngamantaung	Myanmar	
Dried shark fin	Pinatuyong palikpik ng pating Hu-chi	Philippines Singapore	Delicacy in Chinese cooking
Dried shellfish	Siput kering	Malaysia	
Dried shellfish	Hoi hang	Thailand	Deep fried before serving
Dried short-bodied mackerel	Daing na hasa-hasa	Philippines	Has savory taste and fishy flavor
Dried shrimp	Hibe Kung hang Udang kering Pazun chauk Bankear kream	Philippines Thailand Malaysia Myanmar Cambodia	Sun-dried, boiled and salted
Dried squid	Meuk kream Ye kyet chauk Daing na pusit Pla muk hang	Cambodia Myanmar Philippines Thailand	Sun-dried
Dried stingray	Borbel ngiet	Cambodia	Dried fillet
Dried tilapia	Nga chauk	Myanmar	
Salted fish	Pla chem	Thailand	Sun-dried. Product is deep-fried in oil before serving

Table 3. Smoked fish products.

Product	Local name	Country	Product description
Smoked boneless milkfish	Tinapang boneless bangus	Philippines	Smoked fish fillet
Smoked fish	Trey chyer	Cambodia	
	Ikan asap	Indonesia	
	Nga gyi chauk	Myanmar	
Smoked herring	Tinapang tunsoy	Philippines	
Smoked mackerel	Hasa-hasa	Philippines	
Smoked milkfish	Tinapang bangus	Philippines	Smoked whole
Smoked round scad	Tinapang galonggong	Philippines	
Smoked sardine	Tinapang tamban	Philippines	
Smoked tuna	Ikan aya asap	Malaysia	
Smoked tuna	Tinapang tuna	Philippines	

Table 4. Fermented fish products.

Product	Local name	Country	Product description
Cured fish, kench style	Balbacua	Philippines	Heavily salted and moist fish product. It can be broiled, sautéed with vegetables and noodles
Cured shrimp	Cincaluk	Brunei	Fermented *Acetes* shrimp. Used as side dish
Fermented anchovy	Budu	Malaysia	Product is the liquefaction of anchovies in salt. Used as condiment in dishes
Fermented crab	Kdarm pray	Cambodia	Fermented crab with salt
Fermented fish	Phor-ork	Cambodia	Salted and fermented fish
	Prorhok	Cambodia	Fermented and salted whole fish
	Peda	Indonesia	Boiled and fermented whole fish without gut. It has distinctive flavor, pink meat color and a salty taste
	Nagpi yecho	Myanmar	Fermented fish with boiled broken rice
	Ngachin	Myanmar	
Fermented green mussel	Budu kupang	Brunei	Used as a side dish
Fermented mussel	Budu kupang	Brunei	Fermented mussel with rice and salt
Fermented mysis	Hmyin ngapi	Myanmar	Salted and fermented
Fermented small shrimp	Ki	Cambodia	Salted and fermented
Fish sauce	Kecap ikan	Indonesia	Clear brown or yellowish
	Nam-pla	Thailand	
Fish sauce (mixed species)	Teuk trey	Cambodia	
Pickled prawn	Cincaluk	Malaysia	Suspension of tiny, pink shrimp in sauce. It is eaten with rice
Shrimp paste	Belacan	Brunei	Made from boiled *Acetes* shrimp (small shrimp) or head of shrimp
	Terasi	Indonesia	
	Petis	Indonesia	
	Belacan	Malaysia	

Fish sauce for export is produced in modern plants with HACCP-based quality management systems in place and is consequently of a higher grade and quality than that destined for the local market. The Thai fish sauce industry is a good example of how the production of a traditional product can be upgraded to international standards to meet market requirements for high quality and food safety. Other traditional fish products, such as dried shrimp, dried salted fish and other fermented fish products, are also finding niche markets among the immigrant ethnic communities in the USA and Europe. However, to enable their export into these countries, the products have to be produced under strict hygiene and sanitary conditions to ensure high quality and food safety.

Table 5. Comminuted fish products.

Product	Local name	Country	Product description
Breaded fish finger, nugget	–	Singapore	Made from surimi and fish mince, breaded and deep-fried. It is eaten as a snack
Chikuwa	–	Singapore	Tube-shaped, baked fish jelly product made from surimi. It can be eaten as a snack or cooked in noodles and soup
Cuttlefish ball	Bebola sotong Sotong-ei	Malaysia Singapore	Round-shaped product made from cuttlefish and surimi
Cuttlefish sausage/cocktail	Sosej sotong	Malaysia	Tube-shaped product made from cuttlefish and surimi, packed in casing. It is deep-fried or cooked with vegetables, or pan-fried and eaten like a 'hot dog'
Fish ball	Bebola ikan Nga soke Bola-bola	Malaysia Myanmar Philippines	Round-shaped fish jelly product. It is used in soup or eaten as a snack and deep-fried before serving
Fish ball/fish cake	Kek ikan/Bebola ikan Hu-ei/Hu-kueh	Brunei Singapore	As above, but made into balls and cakes
Fish burger	Burger ikan Burger	Malaysia Philippines	Made from fish meat paste or mince and formed into burger shapes
Fish sausage	Sosej ikan	Malaysia	Tube-shaped product made from surimi and fish meat, packed in casing. Used in soup, fried noodles and fried vegetables
Fried fish cake	Nga soke	Myanmar	
Imitation crab meat	Poo tium/Poo aud –	Thailand Singapore	Made from surimi with flavorings and formed into crabsticks. It can be eaten as it is or used in soups and salads
Native sausage	Longanisa	Philippines	Tube-shaped product made with fish meat packed in casing. It is fried and eaten as a snack or cooked with other ingredients
Otah-otah	Otah-otah	Singapore Malaysia	Spicy fish paste with coconut milk wrapped in banana leaf. It is grilled before consumption and eaten as a snack
Prawn ball/finger	–	Singapore	Similar to fish ball but with prawn flavor and coloring
Prawn burger	Burger udang	Malaysia	Patty-shaped product made from surimi and prawn. It is fried and served with bread
Prawn dumpling/won ton	–	Malaysia	Made from surimi and fresh prawn wrapped in dumpling skin. It is deep-fried and cooked with soup
Prawn sausage	Sosej udang	Malaysia	Tube-shaped product made from surimi and prawn paste. It is deep-fried, cooked with vegetables, or served with sandwiches
Squid ball	Bola-bola	Philippines	Round-shaped squid jelly product. It is deep-fried before serving

Table 6. Powdered fish products.

Product	Local name	Country	Product description
Fish floss	Pla yong	Thailand	Light, flossy fish product with savory taste. It is eaten with rice or as a ready-to-eat snack
Fish powder	Pla pon	Thailand	Roasted and powdered fish floss made from lizard fish. Mixed with spices and soya sauce, served with rice
Prawn dust	Tepong/Kulit udang	Malaysia	Made from by-product of dried prawns

Table 7. Other fish products.

Product	Local name	Country	Product description
Barbequed fish	Ikan panggang	Brunei	Barbequed fish
Chilled-sour salted fish	Liking	Brunei	Marinated fish with spices
Fish cracker	Keropok ikan Kerupok Nga moke, papala Khau kriab pla/Khau kriab kung	Malaysia Indonesia Myanmar Thailand	Dried chip or stick. It is deep-fried and eaten as a snack
Fish satay	Pla satay Satay ikan	Thailand Malaysia	Dried, minced fish, seasoned, skewered and deep fried or baked. Ready-to-eat snack
Prawn cracker	Keropok udang Keropok udang Hay-pia	Brunei Malaysia Singapore	Similar to fish cracker but made from shrimp/ prawn
Seaweed	Gulamang dagat	Philippines	Cream colored, noodle-like gelatinous form. It is used for preparing gelatin products, pharmaceutical, dental, and cosmetic products
Shrimp kroepeck	Sitsarong hipon	Philippines	Dried steamed mixture of rice and shrimp

Issues

SOME of the issues faced by the traditional fish products industry are the availability and low quality of raw materials, the lack of appropriate infrastructure, education, standard processing methods, research and development, safety and hygiene, financial assistance and marketing know-how. There are also postharvest losses (physical and economic) in traditional fish product processing involving spoilage before processing, fragmentation, moldiness, and insects. These losses were estimated at about 25% of world production of cured fish in 1991, but, of course, vary from place to place and product to product. Improving traditional fish products is one of the factors in improving the utilization of fish within a country, as it will stimulate demand for more and better quality fish for human consumption.

Poor-quality raw materials

Due to the low value of most traditional fish products, fish utilized for these products is also usually of low quality or of a species difficult to utilize fresh. But as the quality falls, so does the value of the product and too low a quality may make the product unacceptable for human consumption. In any case, whatever the final quality, these products must still meet minimum food safety requirements.

While some traditional products are produced from low-quality raw materials, too low a quality will lower the quality and price of the traditional product further. In some cases, the fish species cannot be used at all as a 'traditional product' and is used for fish feed or fishmeal instead. There are several causes of poor-quality raw materials being provided to the traditional products sector, which are discussed separately below. The greatest difficulty in improving the situation is the inherently low value of the traditional fish products. To address this, governments need to stimulate the industry, which in turn will stimulate a demand for better quality.

Lack of supply of raw materials

In some countries, there is a lack of supply of raw materials. As demand and utilization have changed, fish that had in the past been utilized for traditional products is now being utilized for fresh fish and value-added products (e.g. surimi). This diversion often results in a raw material shortage for traditional products. Government assistance is needed to search for new resources or to set up an appropriate fisheries

management system to ensure a consistent supply of raw materials in order to balance food security with the economic gains from the alternative uses of the fish. Work also has to be carried out on better utilization of the resources available so that more fish landed can be turned into products for human consumption.

Lack of appropriate infrastructure

Infrastructure and landing sites in many areas need to be improved. Infrastructure improvements include chilled distribution channels of fish to markets and processing centers, along with the provision or relatively cheap ice to harvesters. Hygiene and sanitation, including potable water, at the sites, and improved handling and storage of the product, are also necessary. This is basic to every country's development and should be addressed.

Lack of incentives to improve quality and the processing enterprise

Fish enters into the traditional processing sector because it cannot find a higher value elsewhere. Thus, traditional products and processes are generally of low value. However, even for low-value products, prices vary and unless the value of the traditional product is high enough, there will be no incentive to improve quality or the processing enterprise. Governments should consider the need for incentives to support and upgrade this industry so that it continues to play a vital role in the region's economy.

Lack of technical know-how in processing

In general, processors have a low education level and lack of know-how in processing and marketing, and a lack of standardized processing techniques. This, along with poor-quality raw materials, results in inconsistent quality of products. Training and education should be conducted at national levels for trainers as well as processors. Work should also be conducted to improve/standardize processing techniques, and improve packaging and distribution of the products so that producers can realize optimal prices for their products. This would also include investigations into product diversity, value-adding, and market promotion. This is the most important issue to resolve as the industry itself will cause changes in demand, but without the appropriate technical know-how these changes will take longer. Governments will need to strengthen their extension services, research and development activities, and market promotion activities in relation to these products.

Lack of food safety standards and information

Some traditional processes are unhygienic, use additives improperly, and use poor-quality raw materials. As a result, these products may be unsafe. Many existing laws/regulations/guidelines do not include food safety for traditional products. There is a general lack of information regarding the safety and social, economic, cultural and nutritive importance of traditional products; and with the development of improved traditional products, there is a fear that technology and standardization may destroy indigenous industry. Thus, promotion and documentation of such products is essential. Research, development and extension activities need to be carried out on product development, product identity, standards, safety and nutrition. Additionally, good manufacturing practice (GMP), HACCP and quality control requirements for the products need be established along with standard methods of analysis/audit as related to national, regional and Codex requirements.

Conclusions

TRADITIONAL fish products are an important component of the diet for people in the Southeast Asian countries, especially in the marginalized sectors of some populations. Considering the importance of these products to the diet of the people and the importance of a safe food supply to food security, it is imperative that the quality and safety of these products be improved. However, in improving traditional products, consideration must be given to their unique nature and their cultural and social importance.

Recommendations:

- promote and preserve production and use of the diversity of traditional fish products by
  - securing a stable supply of good quality raw materials
  - assisting processors to improve their processing and operational capabilities
  - assessing the importance of the social, economic, and cultural implications of the traditional fish products
- strengthen research and training activities to improve the quality and safety of traditional fish products
- improve the marketing of traditional fish products
- promote exchange of information on traditional fish products, with emphasis on their processing, identity, nutritive value, standardization, and safety
- take measures to ensure that the traditional products meet food safety requirements, taking into account traditional methods of processing, storage and distribution.