

# **SOUTHEAST ASIAN FISH PRODUCTS**

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## SOUTHEAST ASIAN FISHERIES DEVELOPMENT CENTER

The Southeast Asian Fisheries Development Center (SEAFDEC) is a technical organisation devoted to the accelerated development of fisheries in the region. The member countries of SEAFDEC are Japan, Malaysia, Philippines, Singapore and Thailand. SEAFDEC has three departments, viz, the Marine Fisheries Research Department in Singapore, the Marine Fisheries Training Department in Thailand and the Aquaculture Department in the Philippines.

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## **PREFACE**

Fish is a major traditional source of animal protein in the Southeast Asian region. There are many varieties of fresh water and marine fish which is widely accepted by most peoples and religions.

These fish are also available as traditional fish products and these are listed in this report. They are broadly classified as dried, salted and fermented fish products, minced and powdered fish, and fish sauces, etc. More recently, fish products have been developed to meet the requirements of foreign markets.

In 1976, the SEAFDEC Council requested the government of Japan to send a Survey Mission to SEAFDEC member Countries to determine the status of fish processing and preservation in order to decide on the priorities of a research and development program. The program identified was carried out by the MFRD.

In 1984, the MFRD was requested to compile an inventory of fish products in Southeast Asia. The objective of the survey was to list the fish products available in countries in the region and the technical problems and constraints in meeting market requirements.

This report is a comprehensive record of fish products in the region, and will be of interest to researchers, food scientists, fish technologists and administrators. It will also be useful for fish traders, and may be used as a reference for further improvement of the quality of these products in the region.



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# INTRODUCTION

At the 17th Meeting of the Council of the Southeast Asian Fisheries Development Center in 1984, the Council Director for the Philippines stressed the need for drawing up an inventory of fish products in Southeast Asia.

After deliberation the Council decided that an inventory survey of fish products in the region would be conducted by the Marine Fisheries Research Department.

The MFRD clarified the objectives of the survey and provided a questionnaire for the survey which was conducted as follows.

## 1. Objectives of the survey

The general objectives of this compilation were to identify:

- (a) the products available in the region,
- (b) the quality level of the products, and
- (c) the constraints in their marketing and promotion.

This inventory will also serve as a reference for information on fish products as well as a guide for SEAFDEC in their research and development of fish products in the Southeast Asian region.

## 2. Subject of the survey

The following countries in the region were covered by the survey:

- (a) Brunei
- (b) Indonesia
- (c) Malaysia
- (d) Philippines
- (e) Singapore
- (f) Thailand

## 3. Survey methods

A comprehensive questionnaire (see Annex II) was provided by MFRD and sent to the countries concerned in October 1985 and by May 1986 almost all the information was collected.

## 4. Survey items

The items surveyed in the questionnaire were as follows:

- (a) Name of the products (both English and Local)
- (b) Description of products
- (c) References in Literature
- (d) Materials used
- (e) Outline of production methods
- (f) List of machines used
- (g) Production (metric ton)
- (h) Export (metric ton)
- (i) Packing conditions
- (j) Storage
- (k) Shelf-life
- (l) Ways of consumption
- (m) Problems in marketing & quality control
- (n) Remarks

## 5. Products surveyed

A preliminary literature search was conducted to identify the products. It was found that the types of fish products available in the region, could be classified into 11 main product categories. The detailed information for each fish product was compiled for each country as follows:

- (a) Dried products (including salted dried, semi-dried, etc.)
- (b) Cured products (e.g. salting without drying, pickling, etc.)
- (c) Fermented products (e.g. fermented fish/fish paste/fish sauce, etc.)
- (d) Smoked products
- (e) Boiled products
- (f) Powdered/flaked products
- (g) Frozen products
- (h) Canned products
- (i) Comminuted products (e.g. fish jelly products, surimi, fish fingers, etc.)
- (j) Fish meals, and
- (k) Other fish products (e.g. crackers, satay fish, etc.)

## **6. Analysis of the information**

After compilation of the information, the compilers examined the contents from the food technologists' view point, and summarized the problems and constraints in each category of fish products in order to meet the requirements of consumers in both the domestic and external markets.



## SUMMARY OF FISH PRODUCTS FROM COMPILED INVENTORY

The important products in Southeast Asia were identified from the returns of the questionnaire received from participating countries. This included dried, cured, fermented, smoked, frozen and communitated products, fish meal and miscellaneous products such as fish crackers.

### DRIED PRODUCTS

Drying is one of the common methods of preservation of fish in South-east Asia, mainly in Philippines, Malaysia, Thailand, Brunei and Indonesia. The main products in this category are dried fish eg. anchovies (*Stolephorus* spp.), dried shrimp, dried shellfish and dried salted fish.

The outline of processing methods in most countries are similar. It involves mainly headed and gutted or whole fish, salting and sun-drying. The types of equipment used are simple, eg. gas or kerosene stove, drying machine for dried shrimps and dried shark fins. The use of sophisticated machinery is normally not required, as indicated by most countries in the survey.

The dried products can be sold in loose form or packed in standard weight in hard cardboard boxes, braided bamboo, baskets, plastic bags, gunny sacks and wooden boxes. They are best kept in cool dry places or in well ventilated storage rooms, for 1–4 months provided they are not attacked by insects and moulds.

The main problems encountered in marketing and quality control of final products are:

1. Spoilage due to insect infestation and mould growth during storage. As most products are sun-dried in the open, insects tend to lay eggs on the fish during the drying process. This affects the quality of the products during storage and lowers their market value.

2. Poor sanitation and hygiene during processing, and handling of final products during marketing.
3. In some cases the raw material used are of poor freshness and this also affects the quality of final products.

Steps must be taken to improve the sanitation and hygiene of premises, handling and processing of raw materials and final products in order to improve the quality of the final products.

Most of these dried products are consumed locally while some are exported. They are usually deep fried till crispy or used in soups as taste and flavour enhancers. They can also be cooked with vegetables or meat, mixed with salads or widely used in various ways.

### CURED PRODUCTS

Curing by salting without drying or pickling is another traditional method of preservation. This method is common only in the Philippines. The cured product is known as *kench* style cured fish eg. skipjack, herring and roundscad.

The equipment used for production of cured fish are simple, viz barrel, jar, pot or tank. The materials are mixed together and left to cure for certain days after which it can be eaten. This product is packed in wooden boxes for local consumption.

The problems encountered in the production of Philippines *kench* style cured fish are mainly concerned with handling and sanitation. This resulted in reddening, souring, salt burn or slimy products. Suggestions to improve the quality of products include better methods of processing, handling, transportation, marketing and packaging of final products.

### FERMENTED PRODUCTS

Fermentation of fish is widely practised in all countries except Singapore. The common fermented products are fish/shrimp/prawn paste, fish sauce and fermented fish. The materials for fermentation consists of a mixture of raw material eg. fish, shrimp/prawn, and salt. Sometimes rice bran or roasted rice is added to the mixture to obtain a specific taste of flavour. The mixture is left to ferment till a desirable taste, colour and flavour is matured before it is ready for consumption.

The equipment used depends on the scale of production and this ranges from manual eg. pounding gear to use of powered machinery eg. mincer, mixer to prepare the raw material. The mixture of raw material and salt are left to ferment in wooden tubs, vats, earthenware pots, plastic drum, etc. The outline of fermentation is similar in most countries although sometimes substrates eg. garlic, chilli, rice are added to give additional taste and flavours as desired by the consumers.

The fermented products are normally packed and sold in bottles, plastic bags, tins, glass jars, banana leaves, bamboo baskets, etc, in standard weight. The products are stored in well ventilated rooms or cool dry places and have a storage life of 2 weeks to more than a year depending on the types of fermented products.

The fermented products can be consumed in various ways and are popular as seasoning and flavouring to foods.

The main problems encountered in fermented products are:

1. The traditional method of production requires a long fermentation period,
2. Sanitation and hygiene eg. insect infestation and microbial spoilage during fermentation and marketing results in undesirable colour, flavour and odour,
3. Packaging — the packaging of low-cost products does not appeal to some consumers and some packaging material eg. bottles has problem of rust on the bottle caps.

Most of the fermented products are for local consumption although some are for export, eg. fish sauce, shrimp paste. However the figures for production/export are usually not available from member countries.

### SMOKED PRODUCTS

Smoked products are produced for local consumption in all the countries, except for Singapore. The fishes used are normally tuna (skipjack), milkfish, sardines, roundscad, sharks, rays, snake head, swamp eel, catfish, Clupidae, etc.

The processing method is traditional and quite similar in most countries. The fish are normally headed and gutted. Larger sized fishes are usually split into half, salted, sun dried, smoked; or smoked and sun dried. The main equipment and material needed are smoke house and charcoal as indicated by most countries.

The products are packed in plastic bags, wooden boxes, sacks and sometimes wrapped on the spot during sale. They have a storage life of 2 days to 1 year depending on whether they are kept in well ventilated storage rooms at air temperature, in refrigerators or freezers. This depends also on the moisture content in the products which influences the bacterial and mold growth during storage. Data for production and export are not available from most countries.

The main problems encountered are related to spoilage due to bacterial and mould growth during handling and distribution resulting in shorter storage life.

### FROZEN PRODUCTS

Frozen products are produced widely for local consumption as well as for export. The main products are frozen fish, fillet, prawn and cuttlefish/squid.

The processing outline is generally similar for most countries and the products can be stored for 6–12 months at or below  $-18^{\circ}\text{C}$ . Most countries do not encounter problems in the production of frozen products.

### COMMINUTED PRODUCTS

Comminuted products, made from the mince meat of fish, are produced and consumed in all member countries. The products include fish jelly products, fish burger, fish sausages, surimi (an intermediate frozen material), etc.

The outline of processing is also very similar in most countries. Machinery is available and used for the production of comminuted products. The products are made for local consumption and production figures are not readily available.

Most countries do not encounter problems in the production and quality control of comminuted products. However, the short storage life of fish jelly products of 2–3 days in some countries is a problem which hampers their marketing.

A new intermediate raw material, frozen surimi, is produced in Thailand. However the data for production and export are not available. This frozen surimi can be used for production of comminuted and fish jelly products.

### FISH MEAL

Fish meal is mostly manufactured from trawl by-catch and is described as dried fish powder with a high protein component and used as animal fish feed.

Malaysia, Philippines, Singapore and Indonesia produce fish meal for their own consumption; Thailand produces it for local use and for export.

The main problems in producing fish meal are shortage and poor quality of raw material; and spoilage caused by mould growth during storage of the product.

### OTHERS

The other fish products available are mainly boiled and powdered products, crackers and satay fish from Malaysia; canned products and crackers from Philippines; boiled products, crackers and seasoned cuttlefish from Singapore; boiled fish, powdered and canned products, and crackers from Thailand, crackers from Brunei; and boiled products, canned fish and crackers from Indonesia. These products are produced mainly for local consumption although some products are exported, especially canned products and crackers.

## DISCUSSION ON PROBLEMS AND SUGGESTIONS FOR IMPROVEMENT

The compilation indicated that the Asean countries produced similar types of traditional fish products which would continue to be favoured by their consumers. The respondent countries also shared related problems in their production of these products.

Generally the main problems indicated are as follows:

1. Raw material
  - (i) shortage of supply,
  - (ii) poor quality of supply due to poor handling, and
  - (iii) inconsistency of supply.
2. Final products
  - (i) lack of in-plant quality control,
  - (ii) poor sanitation & hygiene of premises & processing treatments,
  - (iii) lack of proper facilities/equipment,
  - (iv) use of outdated processing technology, and
  - (v) inadequate packaging.

These problems affect the quality of the final products resulting in inconsistent product quality, high degree of spoilage and short storage life. These are manifested as marketing problems which are critical especially in the main products identified, viz dried, fermented and smoked products.

One of the needs of the region is to improve the quality of traditional fish products, and a first step is to educate fishermen on the proper handling of the raw material. Fish is highly perishable, and its deterioration in quality begins from the moment it is harvested. The inconsistent and low quality of fish may be due to improper on-board handling, poor storage and transportation.

On arrival at the processing plant, fish should be treated just as carefully. Assuming that raw materials received are in good or acceptable condition, fish should be washed and iced as soon as possible to maintain their freshness.

Attention must be paid to the processing of the fish to ensure the best quality possible in the final product. Further improvements can be made through better sanitation and hygiene in the plants. There is also a need to look into proper lay-out of facilities and types of equipment used, improvements to processing technology and better packaging. Improved distribution and marketing methods and techniques are also needed.

Dried fish, one of the main products, is often dried in the open. This attracts insects, which cause the main spoilage in this product. An alternative method is to dry the fish in a screened shed. Although this improved method is inconvenient, it reduces spoilage caused by insect infestation. In some countries, insect repellents approved by the health authority have been used, namely, pyrethium and pirimiphosmethyl or Silosan. However care and guidance should be given to its proper use.

Moreover the common practice of storing raw materials with final dried products should be discontinued. It results in cross-contamination, another cause of spoilage. This practice is common when there is a shortage of space or facilities in the processing plant.

The traditional fermentation method is considered to be a time-consuming process. Work can be done to shorten the fermentation period and to improve the sanitation and hygiene of working appliances and premises. As the main ingredients are raw material and salt, the salt used must be of good quality. A poor quality salt will result in darkening or poor colour of the fermented product. The products are also subject to insect infestation, which should be prevented.

Similarly, smoked products which are also faced by problems of insect infestation and spoilage caused by mold and bacterial growth can be improved by cleaner premises, more efficient processing technology and appliances.

There was no clear indications that the other main products identified, eg. frozen product, fish meal suffered from any critical problems. However, in the case of comminuted products, one of the main problems is the short storage life of 2–3 days of fish jelly products during refrigerated storage. This in turn causes problems in marketing. Additives can be used as an immediate means to prolong the storage life; however its use must be permitted in the country.

In the case of fish meal, the problem is the shortage of raw materials especially in Malaysia and Thailand. It is interesting to note that with research and promotion on utilisation of trawl by-catch, the resource is now increasingly used for human consumption, although only selected species are being used.

Products such as cured, boiled and powdered products are produced mainly for local consumption. The quantity produced is usually small and do not pose serious problems as indicated by respondents.

Although the production of canned products (eg. tuna, crab meat, mackerel) which are mainly for export, do not present serious problems in Thailand and Malaysia, however there is concern on the rejection of products exported. This is again mainly due to the familiar problems of inconsistent quality of raw material and lack of in-plant quality control, resulting in inconsistent quality of final products.

Another main problem stressed by most countries is the lack of proper packaging of the final products. This resulted in spoilage caused by contamination leading to lower market value of the products and reduce consumer acceptance. There is therefore a need to look into the improved packaging of final products, especially for traditional products which has export potential eg. dried, fermented and smoked products. Proper and attractive packaging can raise the value of traditional products and increase consumer appeal.

## CONCLUDING REMARKS

The information provided by participating countries helped in identifying the important fish products in the Southeast Asian region. It records the current status of a large variety of interesting products and states the needs for improvement.

Fish products which need urgent improvement are the Traditional Products, especially dried, fermented and smoked products. Traditional products meant for the local market and for export need to be improved. Some products presently produced for the local market are perceived to have export potential. Upgrading these products will benefit both the local and overseas markets at the same time.

The compilers recommend that this Inventory should be updated periodically so that participating countries will be able to see the changes and trends in the production of fish products. This exercise should also provide opportunities for improving the coverage and the accuracy of data collected. This may be done in two ways.

At the 6th Regional Workshop on Fishery Statistics in Southeast Asia, Bangkok, 1–4 Jul 86, a revision of the classification of fish products based on the present findings was adopted. This revision provides not only for more comprehensive information to be collected but also redefined some categories of fish products. However this revision excluded "powdered/flaked" products; it is hoped that the status of these products will be reviewed in future when the volume increases. New issues of SEAFDEC's Fishery Statistical Bulletin of the South China Sea Area will therefore reflect the important conclusions of this exercise.

The compilers also feel that to provide more accurate information, the Inventory should be reviewed and necessary changes made in 1989, and every three years subsequently. It is hoped that participating countries will provide cooperation and assistance as readily as before so that the compilation can better serve scientists and food technologists concerned with research and development of fish products in Southeast Asia.

**TABLE OF  
FISH PRODUCTS  
IN  
SOUTHEAST ASIA**

## TABLE OF FISH PRODUCTS IN SOUTHEAST ASIA

Country \ Products	Dried Products	Cured Products	Fermented Products	Smoked Products	Boiled Products
<b>Malaysia</b>	Dried anchovy Salted fish Dried fish Dried prawn Dried cockle Dried cuttlefish Dried shellfish Dried jelly fish	—	Prawn paste Shrimp paste Fermented anchovy Pickled prawn	Smoked tuna	Boiled fish Boiled prawn Boiled tuna
<b>Philippines</b>	Dried milkfish Dried salted fish Dried anchovy Dried shrimp Dried squid Dried shark fin Dried abalone Dried sea cucumber	Kench cured: Skipjack Herring Roundscad Finbriated sardine Deep boiled sardine Striped mackerel Short bodied mackerel	Shrimp paste Fish paste Fish sauce	Smoked boneless milkfish Smoked sardine ( <i>law-law</i> ) Smoked roundscad Smoked herring Smoked sardine ( <i>tunsoy</i> ) Smoked milkfish	—
<b>Singapore</b>	Dried sea cucumber Dried shark fin	—	—	—	Cooked fish
<b>Thailand</b>	Dried salted fish Dried shrimp Dried squid Dried shellfish Dried salted freshwater fish Dried jelly fish	—	Fermented fish ( <i>pla-ra</i> ) Fermented fish sauce Fermented fish ( <i>pla-som</i> ) Fermented fish ( <i>pla-jom</i> ) Thai sweetened fish ( <i>chao</i> ) Shrimp paste Fish sauce	Dried smoked fish Semi-dried smoked fish	Steamed fish
<b>Brunei Darussalam</b>	Salted fish Dried anchovy Chilled sour-salted fish	—	Fermented fish Fermented 'fish stomach' Fermented mussel Shrimp paste Cured shrimp	Smoked fish	—
<b>Indonesia</b>	Salted dried fish Dried shrimp Salted jelly fish Dried fish	—	Fish peda Belachan ( <i>shrimp paste</i> ) Fish sauce	Smoked fish <i>Katsuobushi</i>	Boiled product Presto milkfish



Powdered/Flaked Product	Frozen Product	Canned	Comminuted Products	Fish Meal	Other Fish Products
Prawn dust	Frozen cuttlefish	—	Fishball Fishcake	Fish meal Manure fish	Fish cracker Prawn cracker Fish satay
—	Shrimp Prawn Milkfish	Canned milkfish in tomato sauce Canned milkfish <i>Salmon</i> style Canned milkfish in oil Canned tuna in oil	Native sausage Fishball Fish burger	Fish meal	Shrimp kroepeck
	Fish ( <i>including fillet</i> ) Prawn Cuttlefish/squid	—	Fishball	Fish meal	Prawn cracker Prepared cuttlefish
Fish floss Seasoned fish powder	Frozen octopus Frozen cuttlefish Frozen squid Frozen fish & others Frozen shrimp	Canned tuna Canned pet food Canned mackerel Canned crab meat Canned shrimp Canned baby clam	Fishball Fish noodle <i>Surimi</i>	Fish meal	Shrimp cracker Fish cracker Fish satay
—	—	—	Fishball Fishcake	—	Prawn cracker Fish cracker
<i>Abon ikan</i> ( <i>seasoned fish mince</i> )	Frozen shrimp/prawn Frozen lobster Frozen fish Frozen snail Frozen crab Frozen squid Frozen frogleg	Canned fish	Fishball Fishcake	Fish meal	Shrimp cracker Fish cracker



# **INVENTORY OF FISH PRODUCTS**

# **BRUNEI DARUSSALAM**

## TYPES OF PRODUCTS AND ITS DETAILS

## a) Dried Products (including salted dried, semi dried, etc.)

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Salted fish	Ikan masin	Usually as whole or split (large one) Size range: 8–12 cm	NA	Fish Scombridae – <i>Rastrelliger brachysoma</i> , Clupeidae – <i>Anodontosoma chacunda</i> ; salt	Fish   degut and split (small fish whole)   Mix with salt keep overnight   dry (1–2 days)   Products	NA	NA	NA	NA	NA	NA
Dried anchovies	Pusu kering	Sun-dried small fish	NA	Fish <i>Stolephorus spp</i>	Anchovies   Boil in brine solution for 15 mins   Drain   Sun dry   Dried product	NA	NA	NA	NA	NA	NA
Chilled sour-salted fish	Liking	Type of salted fish (semi dried)	NA	Fish: Scombridae <i>Rastrelliger brachysoma</i> , Scianidae – <i>Johnius spp</i> ; salt, chilli, tamarind	Fish   Wash and degut (not split)   Add tamarind, chilli, salt   Keep overnight (1 day)   Dry (1–2 days)   Products	NA	NA	NA	NA	NA	NA

NA – not available

NIL – none

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	NA	NA	NA	Packed in boxes with plastic lining	NA	2-3 months	<ol style="list-style-type: none"> <li>1. Fried and eaten as side food.</li> <li>2. Boiled and mixed with vegetables.</li> </ol>	Infestation – usually by flies.	NIL
NA	NA	NA	NA	NA	NA	NA	months	<ol style="list-style-type: none"> <li>1. Fried and eaten as snack together with peanuts.</li> <li>2. Boiled as a 'flavouring' material in soups and vegetable dishes.</li> </ol>	NA	NIL
NA	NA	NA	NA	NA	Packed in plastic bags or sometimes in leaves.	Dry place	2-3 weeks	Fried and eaten as side food.	Infestation by flies which lay eggs on the fish.	NIL

## TYPES OF PRODUCTS AND ITS DETAILS

## c) Fermented Products (eg. Fermented fish paste, fermented fish sauce, etc.)

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Fermented fish	Budu ikan	Fermentation of small fish	NA	Fish — anchovies, salt, rice (fried & pounded)	Fish/Fish stomach/Mussel (wash and drain)   Add fried rice powder, salt   Allow to ferment for at least 3 days   Fermented product	NA	NA	NA	NA	NA	
Fermented "fish stomach"	Budu perut ikan	sometime "stomach of fish"									
Fermented mussel	Budu kupang										
Shrimp paste	Belacan	NA	NA	Shrimp (acetes), salt	Shrimp   Wash and mix with salt   Place in a sack (weight on top) to drain it   Sun dry (1-2 days)   Pound   Shrimp paste	Pounding gear	NA	NA	NA	NA	
Cured shrimp	Cincajuk	NA	NA	Shrimps (acetes), salt, sugar	Shrimp   Wash and drain   Mix with salt, sugar   Allow to ferment 1 week   Products	NA	NA	NA	NA	NA	

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	NA	NA	NA	Packed in bottles.	NA	3-4 weeks	As a side dish.	NA	NIL
NA	NA	NA	NA	NA	The paste is packed tightly in a clay jar for storage.	Cool dry place.	Months	As a flavouring additive and eaten as a 'sambal' either fried or as it is.	NA	NIL
NA	NA	NA	NA	NA	NA	Cool dry place.	1 month	As side dish.	NA	NIL

## TYPES OF PRODUCTS AND ITS DETAILS

## d) Smoked Products

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Smoked fish	Tahai	Small fish smoked and dried	NA	Fish: Clupeidae <i>Sardinella gibbosa</i> , <i>Sardinella spp.</i>	Fish   Wash and arrange on wire grill mesh   Smoke   Dry   Smoked fish	NA	NA	NA	NA	NA	

## i) Comminuted Products (eg. fish jelly products, fish portion, fish burgers.)

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Fishball	Bola-bola ikan	Fish jelly products made into balls.	NA	Fish – Lutjanidae (usually <i>Caesio</i> spp). Lutjanus spp.  Ingredients: flour, salt, msg, water.	Fish   Fish meat   Grind with ingredients   Form   Set   Fishball	Grinder/mincer	NA	NA	NA	NA	NA
Fishcake	Kek-kek ikan	Fish jelly products made into bar or oval shape block.  Some incorporated with vegetables.	NA	Fish – Lutjanidae spp, Lutjanus spp., Scombridae (Scomberomorous commerson)  Ingredients: flour, salt, msg, water	Fish   Fish meat   Mix with ingredients   Set on trays   Fry	Grinder/mincer, gas stove (fryer)	NA	NA	NA	NA	NA



Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	NA	NA	NA	Packed in sacks/rattan baskets.	NA	2 months	Eaten boiled or sometimes added to soup.	NA	NIL

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	NA	NA	NA	Packed in plastic bag with or without water. Usually 9–12 balls/pack.	Refrigerator	1–2 weeks	Fried/boiled, serve as side dish or boiled and eaten with soup.	NA	Raw material must be in cold condition. Processing temperature have to be as low as possible, less than 20° C. Highly favoured by some ethenic groups (chinese).
NA	NA	NA	NA	NA	Packed in plastic bag.	Refrigerator	1–2 weeks	Deep fried, cooked with vegetables and noodles.	NA	NIL

## TYPES OF PRODUCTS AND ITS DETAILS

## k) Other Fish Products (eg. fish cracker, satay fish, seasoned cuttle fish, etc.)

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Prawn crackers	Keropok udang	NA	NA	Prawn — <i>Peneus</i> spp. small prawn, tapioca flour, msg, salt, water.	Prawn   Mince meat & mix with ingredients   Make into rolls   Steam   Cool   Dry	Mincer, mixer, gas stove, steamer	NA	NA	NA	NA	NA
Fish crackers	Keropok ikan	NA	NA	Fish, tapioca flour, msg, salt, water.	Fish   Mince meat & mix with ingredients   Make into rolls   Steam   Cool   Dry	Mincer or mixer, gas stove, steamer	NA	NA	NA	NA	NA

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	NA	NA	NA	Packed in plastic bags of 600 gm.	Dry place	Months	Deep fried and eaten as snacks.	NA	NIL
NA	NA	NA	NA	NA	Packed in plastic bags of 600 gm.	Dry place	Months	Deep fried and eaten as snacks.	NA	NIL



# **INVENTORY OF FISH PRODUCTS**

# **INDONESIA**

## TYPES OF PRODUCTS AND ITS DETAILS

## a) Dried Products (including salted dried, semi dried, etc.)

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Salted dried fish	Ikan asin	Salted dried fish are fish or anchovies salted and dried	Anonymous, 1983. Kumpulan Hasil Penelitian Teknologi Pasca Panen Perikanan, BPTP Jakarta. pp. 25-28	Fish or anchovies, salt.	Fish   Wash   Soak in salt (20-30% salt)   Wash   Drain   Dry (3 days)   Salted, dried fish	Traditional equipment: dresser, drum, dryer.					
Dried shrimp	Ebi (undang kering)	Ebi is made of shrimp by salted and dried process.	Anonymous, 1983. Kumpulan Hasil Penelitian Teknologi Pasca Panen Perikanan, BPTP Jakarta. pp 23-24	Shrimp, salt.	Shrimp   Boil in brine, 3%/15 mins   Dry   Peel shell and remove head   Dried shrimp	Peeler, boiler.	306289	270639	272860	320647	NA
Salted jelly fish	Ubur-ubur asin	Jelly fish is processed by salted & semi-dried process	Anonymous, 1983. Kumpulan Hasil Penelitian Teknologi Pasca Panen Perikanan, BPTP Jakarta. pp 20-22.	Jelly fish, salt	Jelly fish (medula part)   Pre-brine (10% salt + alum. 24 hrs)   Wash & drain   Salt I, 15 days   Drain   Salt II, 10 days   Drain   Saturate with saturated salt, 15 days   Drain   Pack	Dresser, fiberglass drum, packaging machine					
Cured and dried fish product	Dendeng ikan	Dendeng ikan is made of split fish which undergoes seasoning and drying process.	Anonymous, 1983. Kumpulan Hasil Penelitian Teknologi Pasca Panen Perikanan, BPTP Jakarta.	Fish/shrimp salt, spices, sugar.	Fish   Cut into slices   Season & cure (12 hrs)   Dry (12 hrs)   Sort   Pack	Grinder	NA	NA	NA	NA	NA

NOTE: DATA OF ALL DRIED PRODUCTS.

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
1170	896	1144	1261	NA	Bamboo basket, wooden box, plastic bag, carton box.	Dry condition	6 months	Fried, boiled and other ways of consumption.	The problems are sanitation, hygiene in processing and handling of marketing channel. Although this product is widely marketed, but its consumption is limited by underlevel society.	Raw material of salted dried fish product is usually produce of low standard fish.
33	285	43	14	NA	Plastic bag, carton box.	Dry condition	6 months	Fried, boiled, etc.	Usually the dried prawn is not peeled but pounded, as a result the ebi size is not uniform.	Ebi is commonly made of low standard shrimp.
1174	3088	2238	4108	NA	Plastic bag, carton box.	Dry condition	3 months	Mixed in salad, noodles, etc.	The salt used is from the home industry which is of lower quality in term of hygiene and sanitation.	This product is for export only.
NA	NA	NA	110	NA	Plastic bag, carton box.	Cool dry condition	1-3 months	Fried	This product is less popular than cured meat, it has limited marketing.	The taste of dendeng product has salty and sweetness taste.

## TYPES OF PRODUCTS AND ITS DETAILS

## c) Fermented Products (eg. Fermented fish paste, fermented fish sauce, etc.)

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Fish peda	Ikan peda	Fermented fish made from Indian mackerel. It has a specific flavour and color.	Winarno, F. G., Srikandi F., Djundjung D., 1973 Indonesian Fermented Foods. Bogor Agricultural University, Indonesia.	Indian mackerel, salt 25%	Indian mackerel   Dress & wash   Drain + 25% salt   Ferment I (3 days)   Wash & drain + salt (30%)   Ferment II (1 wk)   Clean   Aerate   Peda	Traditional equipment: dresser, fermentor (paso)	5409	5428	5927	5428	NA
Belachan	Terasi	Fermented fish paste made from trash fish or small shrimps	— do —	Trash fish or small shrimp, salt	Trash fish/waste fish   Wash   Dry (2 days)   Grind + 15% salt   Dry the lumps (3 days)   Pack with banana leaves   Ferment (30°C, 1-4 wks)   Terasi	Traditional equipment: grinder, pounder, fermentor.	11.475	30.186	20.358	26.395	NA
Fish sauce	Kecap ikan	Fish sauce (ketchup) is made of fish by fermentation process. The sauce is yellowish in color and has a salty taste.	— do —	Trash fish or anchovies, salt	Fish   Wash   Salt (30% salt)   Ferment (4-6 months)   Filter   Filtrate (sauce)	Traditional equipment: fermentor	484	231	115	54	NA



Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NIL	NIL	NIL	NIL	NIL	Bamboo basket, wooden box	Dry condition	1 month	Fried, boiled	The problems are dealing with sanitation & hygiene. The appearance of packed product is not so attractive, particularly for uplevel society.	Higher grade of Peda is characterised with brown color & has a specific flavour. Lactic acid and salt has an important role in the preservation.
11	31	25	12	NA	Plastic bag	Dry condition	3 months	As seasoning	— do —	Belachan could be in paste or powder form.
NIL	NIL	NIL	NIL	NIL	Glass or plastic bottle	Dry condition	2-6 months	As seasoning	The traditional method of fermentation takes a long time.	This product is less popular than soy been sauce for Indonesia consumers.

## TYPES OF PRODUCTS AND ITS DETAILS

## d) Smoked Products

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Smoked fish	Ikan asap	Fish is processed by smoking.	Anonymous, 1984. Petunjuk Teknis Teknologi Tepat Guna Pengolahan Ikan Tradisional. Direktorat Jenderal Perikanan, Department Pertanian, Jakarta.	Milkfish <i>Katsuwonus pelamis</i> , <i>Sardinella sp.</i> , <i>Euthynnus sp.</i> , salt	Fish   Wash & dress   Brine (30 mins)   Wash & drain   ┌──────────┐ Cold smoke    Hot smoke 6-7 days at    6-8 hrs at 40-50°C       60°C └──────────┘   smoked fish	Smoking room	21919	25259	28104	51991	NA
<i>Katsuo bushi</i>	Ikan kayu	Fish is processed by boiling, smoking and drying.	Anonymous, 1983. Kumpulan Hasil Penelitian Teknologi Pasca Panen Perikanan, BPTP Jakarta, pp 4b-48.	Skipjack, salt	Skipjack   Dress   Boil   Smoke I   Patch   Smoke II   Dry   To plane   Mold   Storage	Smoking room, boiler	NA	NA	NA	NA	NA

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
4	38	39	4	NA	plastic bag	Dry condition	Hot smoked products can last for a few days. Cold smoked products can last 2-3 weeks.	Ready to eat, fried, etc.	Shelf life of this product is short, the problems are growth of mold and slime during distribution of products.	NIL
NA	NA	10	NA	15 (Est)	Wooden box	Cool dry condition	6-12 months	Rasped, boiled, fried.	Sometimes growth of mold and attacked by insect.	Not popular for domestic consumption. Mainly for export to Japan.

## TYPES OF PRODUCTS AND ITS DETAILS

## e) Boiled Products

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Boiled product	Pindang	Fish is boiled in brine.	Anonymous, 1983. Kumpulan Hasil Penelitian Teknologi Pasca Panen Perikanan, BPTP Jakarta. pp 49-51.	Milkfish, skipjack, sardine and salt.	Fish   Was & dress   Pack in bamboo basket or clay basin (paso)   Salt   Boil in brine   Drain   Pindang	Cooker	64427	63348	74594	82643	NA
Presto milk fish	Bandeng presto	This product is modification of pindang with added pressure process.	Anonymous, 1983. Kumpulan Hasil Penelitian Teknologi Pasca Panen Perikanan, BPTP Jakarta. pp 52-53.	Milkfish, salt and other seasonings	Milkfish   Wash & dress   Brine (3% salt, 15 mins)   Add salt and seasonings   Pack with banan leaf or aluminium foil   Boil in autoclave (1 atm., 1 hr)   Bandeng presto	Autoclave or press cooker	NA	NA	NA	NA	NA

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NIL	NIL	NIL	NIL	NIL	Bamboo basket or paso	Dry condition	3 days to 1 months	Ready to eat, fried, boiled, etc.	The problems are sanitation, hygiene and short shelf-life; these conditions cause limited marketing.	The name of this product depends on processing methods, raw material, origin area and packaging. For examples: Pindang (P) Muncar, P. Bawean, P. Mudus are names based on the area of origin. P. tongkol, P. bandeng, P. lemuru are based on raw materials.  P. cue, p. paso are based on processing methods.  P. bedeng, P. besek are based on packaging used.  Shelf life depends on the processing method and packaging used.
NIL	NIL	NIL	NIL	NIL	Plastic bags	Cool room (0°C)	7-10 days	Ready to eat, fried.	Marketing is limited to supermarket that has cool room facility.	This product is not as popular as pindang because it is still a new product (product development).

## TYPES OF PRODUCTS AND ITS DETAILS

## f) Powdered/Flaked Products

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
NIL	Abon ikan	Fish meat is scraped and seasoned	Anonymous, 1983. Kumpulan Hasil Penelitian Teknologi Pasca Panen Perikanan, BPTP Jakarta	Fish, coconut, sugar, seasoning	Fish   Wash & dress   Boil   Mince   Fry with seasoning till dry   Dried products	Traditional equipment: boiler, mixer, fryer	NA	NA	NA	NA	NA

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NIL	NIL	NIL	NIL	NIL	Plastic bags	Dry condition	6 months	Ready to eat	Rancidity	Local consumption

## TYPES OF PRODUCTS AND ITS DETAILS

## g) Frozen Products

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Frozen shrimp/prawn	Udang beku	Shrimp/prawn is processed by quick frozen.	Anonymous, 1984. Standar. Pertanian Indonesia Perikanan (SPI-KAN). Department Pertanian, Jakarta.	Prawn, shrimp	Prawn/shrimp   Wash with/without dressing   Grade   Glaze   Pack   Cold storage (max - 26°C)	Freezer, cold-storage, ice-crusher, ice-machine					
Frozen lobster	Lobster beku	Lobster is processed by quick frozen.	- do -	Lobster	Same as frozen shrimp	- do -					
Frozen fish	Ikan beku	Fish is processed by quick frozen.	- do -	Tuna, skipjack	Fish   Wash with/without dressing   Grade   Glaze   Pack   Cold storage	- do -	43663	43823	35431	53280	NA
Frozen snail	Pekicot beku	Snail is processed by quick frozen.	- do -	Snail	Snail   Boil in salt-alum   Dress   Glaze   Pack   Cold storage	- do - & boiler					

NOTE: DATA OF ALL FROZEN PRODUCTS



Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
30471	23604	24583	24241	NA	Carton box, plastic	Cold storage (max - 26°C)	1 year	Cocktail, boiled, fried, etc.	Frozen products of Indonesia are still block list commodity, especially to USA.	Frozen products are aimed for export. Frozen prawn/ shrimp are graded A, B, C, D and E ie. head on, headless, shell-on and peeled.
77	123	82	268	NA	- do -	- do -	- do -	- do -	- do -	NIL
11155	20131	37905	25113	NA	- do -	- do -	- do -	- do -	- do -	NIL
NIL	3	211	204	NA	- do -	- do -	- do -	- do -	- do -	NIL

## TYPES OF PRODUCTS AND ITS DETAILS

## g) Frozen Products (con't)

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Frozen crab	Kepiting beku	Crab is processed by quick frozen.	-- do --	Crab	Crab   Wash   Glaze   Pack   Cold storage	Freezer, cold-storage, ice-crusher, ice-meching & boiler.					
Frozen squid	Cumi-cumi beku	Squid (cuttle fish) is processed by quick frozen.	-- do --	Squid	Squid   Dress and wash   Glaze   Pack   Cold storage	-- do --					
Frozen frog-leg	Paha kodok beku	Frog is processed by quick frozen.	-- do --	Frog	Frog   Dress and wash   Glaze   Pack   Cold storage	-- do --					

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NIL	NIL	19	7	NA	-- do --	-- do --	-- do --	-- do --	-- do --	NIL
NIL	1319	720	335	NA	-- do --	-- do --	-- do --	-- do --	-- do --	NIL
612	2600	1472	3262	NA	-- do --	-- do --	-- do --	-- do --	This product is often contaminated by <i>Salmonella</i> because the frogs are caught in open water.	NIL

## TYPES OF PRODUCTS AND ITS DETAILS

## h) Canned Products

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Canned fish	Ikan kaleng	Fish is processed by sterilization in hermetically tin cans.	Anonymous, 1983. Kumpulan Hasil Penelitian Teknologi Pasca Panen Perikanan, BPTP Jakarta, pp 12.	Sardine, mackerel, tuna, skipjack, and medium.	Fish ↓ Dress/slice ↓ Brine (25% salt, 1 hr) ↓ Fill in can ↓ Exhaust (100°C, 15 min) with medium (oil/sauce) ↓ Seal ↓ Sterilise (115°C, 1-1.5 hrs) ↓ Cool ↓ Pack	Boiler, retort, sealing machine, conveyer belt.	5472	6170	5665	10720	NA

## i) Comminuted Products (eg. fish jelly products, fish portions, fish burgers.)

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Fish cake	Empek-empek	Fish jelly product is made of belida fish (knife fishes), mixed and seasoned.	Anonymous, 1977. Mina Rasa, Kumpulan Masakan Ikan dan Hasil Perikanan lainnya. Direktorat Jenderal Perikanan.	Fish, sago flour, seasoning (spices)	Fish ↓ Separate meat from bone and skin ↓ Grind ↓ Add cassava flour & spices ↓ Mix and shape ↓ Boil ↓ Product (empek-empek)	Blender	NA	NA	NA	NA	NA
Fish ball	Bakso ikan	Fish jelly product is made of mackerel, yellow tail or giant gourami.	Anonymous, 1983, Kumpulan Hasil Penelitian Teknologi Pasca Panen Perikanan, BPTP Jakarta, pp 54-56.	Fish, cassava flour, salt, spices	Fish meat ↓ Grind ↓ Add sago flour & seasonings ↓ Mix and shape ↓ Boil ↓ Bakso ikan	Blender	NA	NA	NA	NA	NA

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
6	495	855	2550	NA	Hermetically tin cans.	Cool dry conditions	2 years	Fried, boiled, etc.	The supply of raw materials is not continuous. The processing plants commonly do not have cold storage facility and processors have to rely on the small fishermen for stock.	Tin cans used has variation in sizes and types. For example, oval, cyliner, etc.

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	NA	NA	NA	Plastic bag	Cool dry place	2-3 days	Fried or boiled and used in vinegar sauce.	Shelf life of this product is short, it is a problem in marketing.	NIL
NA	NA	NA	NA	NA	Plastic bag	Cool dry place	2-3 days	Boiled and eaten with soup.	- ditto -	This product is less popular than meatball.

**TYPES OF PRODUCTS AND ITS DETAILS**

**j) Fish Meals**

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Fish meal	Tepung ikan	Dried fish is minced.	Anonymous, 1983. Kumpulan Hasil Penelitian Teknologi Pasca Panen Perikanan, BPTP Jakarta, pp 69-74.	Trawl by-catch, by-product of fish processing plant.	<pre>           Fish                       Cook                       Press           /  \         Desluger  Solid                     Centrifuges         /  \       Oil  Evaporate                    Water  Solid →   Dry                                       Presscake   Grind   Pack                     </pre>	Boiler, cooker, presser, grinder, evaporator, centrifuger, packaging mechine, etc.	1073	1300	2481	3967	NA

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NIL	NIL	NIL	54	NIL	Plastic bags, carton box.	Cool dry conditions	3 months	For animal/fish feeding.	NIL	NIL





Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
2551	3188	2647	2103	NA	Plastic bag	Dry condition	12 months	Fried	Processors sometime use textile colouring agent.	NIL
(include fish cracker data)					Plastic bag	Dry condition	12 months	Fried	- do -	NIL

# **INVENTORY OF FISH PRODUCTS**

# **MALAYSIA**

## TYPES OF PRODUCTS AND ITS DETAILS

## a) Dried Products (including salted dried, semi dried, etc.)

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Dried anchovies	Ikan bilis Bilis kering	Salted, boiled and sundried small fish made from anchovies. ( <i>Stolephorus</i> species)	1. Annual Fisheries Statistics 1980, 1981, 1982, 1983 & 1984. 2. Berita Nelayan Bil. 21, Bil. 29, Bil. 13 (1978).	Fish <i>Stolephorus</i> species, brine 10%.	Anchovies   Boil in bamboo basket in 10% brine for 15 mins.   Remove basket, drain   Spread out/sun dry for 2-4 days depend on weather   Dried anchovies	Gas stove, steel kualai.	9437	9724	9574	9332	6962
Salted fish Dried fish	Ikan masin Ikan kering	Salted and sundried fish	1. Berita Nelayan 2. Teknologi Makanan Jld. 4, Bil. 1 (April 1985) 3. Infofish Marketing Digest 2/83 4. Report on FAO/EPTP Regional Training Center on Fish Processing Technology 1961.	Rastrelliger kanagurta Sciaena spp., Scomberomorus spp., Lutianus spp., Fomioniger, Nemipterus spp., any fish which cannot be distributed as fresh fish.	Fish   Wash with sea water   Remove gills & entrails   Remove scale (optional)   Place dressed fish in wooden tub   Add 10% salt, based on wt. of fish   Salting time - 2 days   Spread out/sun dry (10-30 hrs)	Mechanical fuel heated dryer, wooden tubs or concrete basin, wooden platforms and mats.	7994	9513	7698	10063	11630
Dried prawn	Udang kering	Salted, boiled and sundried prawns	1. Berita Nelayan 2. Report on FAO/KATA Regional Training Center on Fish Processing Technology 1961.	Solenocera sub-nuda, salt.	Shrimps   Wash with sea water and mix with salt (salt/shrimp is 4:100)   Cook   Remove skin   Spread out to sun day (1-4 days)	Gas stove/ kerosene stove.	1268	1106	1936	2062	667

NA - not available  
NIL - none

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	NA	NA	NA	1. Hard cardboard boxes in 10 kg per box. 2. Braided bamboo baskets in 60 kg per basket.	1. Cool dry place. 2. Dried cold room for long storage.	1-6 months	1. Deep fried till crispy. 2. Boiled in soup for taste and as flavour seasoning. 3. Widely use in various ways.	Turn over of product is fairly fast but there is a tendency in price drop due to glut especially imports from Thailand which are cheaper than our locally produced.	For good grade anchovies the body is slightly brown and the moisture content should be low. The texture looks dry and glistening in appearance.
4250	5687	9331	4374	2763	Braided rattan/ bamboo baskets in 50-60 kg per basket.	Cool dry place.	6 months	1. Deep fried till crispy. 2. Cooked with vegetables. 3. Steamed with ginger and oil to be taken with porridge. 4. Widely used in various preparations of food.	Turn over of product is good based on the dryness. Lack of quality control. The pricing and marketability of main products are imposed by determiners.	Quality salted fish such as this is imported from Burma.
343*	915*	554*	331*	224*	1. Baskets 2. Plastic bags 3. Paper bags.	Cool dry place.	3-6 months	1. Used to cook with vegetable and meat. 2. Usually used in soups. 3. Widely used.	Same as dried anchovies.	NIL

\* Includes prawns salted in brine, dried or simply boiled.

## 47. Southeast Asian Fish Products

## TYPES OF PRODUCTS AND ITS DETAILS

## a) Dried Products (con't)

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Dried cockles	Kerang kering	NIL	NA	Blood cockle	NA	NA	1297	411	39	684	735
Dried cuttle fish	Sotong kering	Cuttle fish, sundried	FAO Workshop on Development of Small Scale Processing Industry in Fishing Villages, Penang, Malaysia. (29/6-1/7/85)	Cuttlefish	Cuttlefish   Cut open & wash   Spread out on tray   Dry	Netted or woven trays	200	167	136	174	409
Dried shellfish	Siput kering	Sundried shellfish	NA	Shellfish	NA	NA	340	NA	NA	NA	NA
Dried jelly fish	Ubur-ubur	Rubbery textured product	Berita Nelayan Bil. 26. FAO Workshop of Small scale Processing Industry in Fishing Villages, Penang, Malaysia. (29/6 - 1/7/85)	Jellyfish, alum, sodium metabisulphite.	Jelly fish   Clean   Put in alternate layers of salt (salt:fish:4:1) for 2-3 weeks   Add sodium metabisulphite to decolourise the product   Arrange and dry in shade (2-10 days)	salting tank, drying platforms	308	582	379	645	2542

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NIL
NA	NA	NA	NA	NA	NA	NA	NA	Local dishes.	Moisture content is between 18-30%.	Can be improved by controlled drying.
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NIL
NA	NA	NA	NA	NA	Packed for export.	NA	NA	NA	NA	NIL

## TYPES OF PRODUCTS AND ITS DETAILS

## c) Fermented Products (eg. Fermented fish paste, fermented fish sauce, etc.)

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Prawn paste	Otak udang	Thick viscous dark brown concentrate.	FAO Workshop on Development of Small Scale Processing Industry in Fishing Villages, Penang, Malaysia. (29/6 – 1/7/85)	Prawn extract – <i>Acetes nysiol</i> , salt.	Shrimps   Wash and mix with salt in bamboo baskets or wooden tubs   Spread out/sun dry for 5–8 hrs   Mince and left to ferment for 7 days	NIL	33	192	323	229	363
Shrimp paste	Belacan	Greyish pink to deep purple salty paste.	1. Berita Nelayan Bil. 10. 2. Teknologi Makanan Jil. 3, Bil. 1 (April 1984) FAO Fisheries Dep. No. 4, 1961. 3. Report on FAO/BOTA Regional Training Center on Fish Processing Technology 1961.	Acetes, Arabic salt,	NA	Combine mixer-mincer machine, bamboo baskets, wooden tubs	2770	1280	898	1692	2818
Fermented anchovies	Budu	Liquefaction of anchovies in salt. The clear liquid changes from amber to dark brown with some form of sedimentation.	1. Berita Nelayan Bil. 32, Bil. 17. 2. Teknologi Makanan Jil 3, Bil. 2 (Oct '84) 3. FAO Workshop on Development of Small Scale Processing Industry in Fishing Villages Penang, Malaysia. (29/6 – 1/7/85)	Anchovies, salt.	Anchovies   Rinse with salt water repeatedly   Add salt to anchovies (1:2–3)   Transfer to vats or pots   Add salt again on top.   Leave to fermented for (½–2) years.	Concrete vats or glazed earthen-ware pots.	23	9	100	112	115
Pickled prawns	Cincahluk	A suspension of tiny, pink acetes shrimp in sauce.	1. Berita Nelayan Bil. 23. 2. Teknologi Makanan Jil. 4, Bil. 1, (April 1985) 3. FAO Workshop on Development of Small Scale Processing Industry in Fishing Villages, Penang, Malaysia (29/6 – 1/7/85).	Acetes shrimp, salt	Shrimp   Wash   Mix with 20% coarse salt & 6% cold rice   Pack in jars   Ferment for 20–30 days	Earthen-wares, jars and bottles.	25	66	29	169	67

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	NA	NA	NA	In tins	NA	NA	As a condiment.	NA	NIL
8870	7237	8180	10047	9073	In plastic packets.	NA	NA	Ingredients for local dishes.	NA	NIL
NA	NA	NA	NA	NA	Bottles	NA	NA	As condiment in several dishes.	The supply of ingredient (anchovies) is irregular. Markets are limited to the state of Kelantan and Terengganu. The premises lack sanitation.	The alternative raw materials is to be determined such as bycatch. The introduction of certain anzyme to hasten the maturation period of the product.
NA	NA	NA	NA	NA	Bottles.	NIL	NA	Eaten with rice	Consumption limited mainly to the state of Malacca.	NIL



## TYPES OF PRODUCTS AND ITS DETAILS

## d) Smoked Products

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Smoked tuna	Ikan aya diasap	Smoked into hardened pieces.	FAO Workshop on Development of Small Scale processing industry in Fishing Villages, Penang, Malaysia. (29/6 – 1/7/85)	Tuna	NA	NA	NA	16	NA	NA	NA

## e) Boiled Products

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Boiled fish	Ikan rebus	Salted and boiled fish.	1. FAO Fisheries Rep. No. 4, Quezon City – 1961. 2. FAO Workshop on Development of Small Scale Processing Industry in Fishing Villages, Penang, Malaysia. (29/6– 1/7/85).	Rastrelliger spp	Fresh fish   Wash & keep in wooden tub in saturated brine for 3–4 hours   Arrange in baskets and boil in boiling saturated brine   Cool for 24 hrs before storage and dispatch for sale.	Gas stove, woven baskets	6394	1796	917	2112	6472
Boiled prawn	Udang rebus	NA	NA	Prawn	NA	NA	NA	NA	102	2166	
Boiled tuna	Sardin	NIL	NIL	Tuna	NIL	NIL	NIL	NIL	NIL	NIL	



## TYPES OF PRODUCTS AND ITS DETAILS

## f) Powdered/Flaked Products

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Prawn dust	Tepong/Kulit udang	In dried form.	NA	Dried shells of prawn.	The shells are removed from dried prawns through trashing whereby the dried prawns and shells are separated in this process.	No machine used.	91	47	NA	1068	NA

## g) Frozen Products

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Frozen cuttlefish	Sotong beku	Frozen form.	Berita Nelayan Bil. 24 Mac, 1981.	Cuttlefish	Cuttle fish is cleaned and packed into tins before storing in the cold room. They are then packed for export.	Tin	NA	NA	NA	NA	320

## i) Comminuted Products (eg. fish jelly products, fish portion, fish burgers.)

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Fishball	Bebola ikan	White and round shape, rubbery texture and shiny in outlook.	1. Berita Nelayan Bil. 31. 2. Risalah MARDI No. 14 (Panduan Usahawan).	Fish, salt, pepper, onions, celery and chillies. Flavour enhancer, tapioca starch, sodium borate and polyphosphate.	Fish Remove head, scale & viscera Debone Mince to fine structure Add ingredients Mix thoroughly Form into balls Press into trays set (2-3 hrs) Boil Aircool Fishball	Mixer, fishball forming machine, basins, cooker and drying shelf.	NA	NA	232	1594	1966
Fishcake	Tahu ikan	Brownish and cut in portion.	FAO Workshop of Small Scale Processing Industry in Fishing Villages. Penang, Malaysia. (29/6-1/7/85)	- do -	set Boil Aircool Fishball	Mixer, fishcake forming machine, basins, cooker and drying shelf.	NA	NA	NA	NA	10

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
328	210	201	102	79	NA	NA	NA	NA	NA	NIL

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Packed for export.

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	NA	NA	NA	In plastics packs.	NA	NA	Used in soups.	Small demand in the East coast states.	The elasticity of the fishballs can be improved by using double step heating.
NA	NA	NA	NA	NA	In plastics packs	NA	NA	Used in soups or fried with noodles.	Small demand in the East coast states.	NIL

## TYPES OF PRODUCTS AND ITS DETAILS

## j) Fish Meals

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Fish meal	Tepong ikan	Feed ingredients used in swine and poultry formulation.	FAO Workshop on Development of Small Scale Processing Industry in Fishing Villages, Penang, Malaysia. (29/6-1/7/85).	Trawl by-catch.	Cook by the dry or wet method. Press the cooked fish to remove moisture contents. Dry and then grind before packing.	Boiler, screw press, mechanical stirrer and hammermill.	32891	42614	26788	34920	27097
Manure fish	Ikan baja	NA	NA	Trawl by-catch.	NA	NA	11770	13635	9502	9130	4396



## TYPES OF PRODUCTS AND ITS DETAILS

## k) Other Fish Products (eg. fish cracker, satay fish, seasoned cuttle fish, etc.)

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Fish cracker	Keropok ikan	1. Round or oblique shaped dried chips. 2. Stick shaped.	1. Berita Nelayan Bil. 13, Bil. 29, Bil. 25. 2. Teknologi Makanan. 3. Annual Report. 4. Risalah MARDI No. 8.	Fish, starch, salt, sugar, flavour enhancer.	Fish   Remove heads, tails and viscera   Debone   Mince   Mix ——— Add ingredients   Form   Cook   Cool   Slice   Dry   Cool   Pack	Deboning machine, mincer, mixer and cutter.	636	1432	2109	2649	6126
Prawn cracker	Keropok udang	— do —	1. Berita Nelayan Bil. 13, Bil. 23, Bil. 25, Bil. 29. 2. Teknologi Makanan. 3. Annual Report. 4. Risalah MARDI No. 8.	Prawn, starch, salt, sugar, flavour enhancer.	Form   Cook   Cool   Slice   Dry   Cool   Pack	— do —	32	132	101	35	38
Fish satay	Sate ikan	Snack food	FAO Workshop on Development of Small Scale Processing Industry in Fishing Villages, Penang, Malaysia (29/6—1/7/85).	Fish, sugar, chilli powder, soysauce, ginger and salt.	Fish   Dress   Sun dry   Cool   Roll   Dip in viscous sauce   Oven   Cool   Pack	Step-roller	NA	NA	NA	NA	NA

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	NA	NA	NA	In plastic packs.	NA	NA	Snack item.	Shortage of raw materials.	NIL
NA	NA	NA	NA	NA	NA	NA	NA	Snack item.	NIL	NIL
NA	NA	NA	NA	NA	In plastic packs.	NA	NA	Snack item.	Shortage of raw materials.	Production of satay fish is being carried out at Pangkor Island only as a cottage industry.





# **INVENTORY OF FISH PRODUCTS**

# **PHILIPPINES**

## TYPES OF PRODUCTS AND ITS DETAILS

## a) Dried Products (including salted dried, semi dried, etc.)

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)					
English Name	Local Name						1980	1981	1982	1983	1984	
Dried milkfish	Daeng Na Bangus	Salted and dried split, salty taste and fishy odour.	Milkfish (Bangus) As Food NSDB.	Milkfish, coarse salt.	Fresh milkfish   Wash   Split   Soak in brine   Dry for 2 days	NIL	17.8	26.6	12.2	14.6	NA	(Dried fish in general)
Lizard fish	Kalaso	Salty taste and fishy odour.	Milkfish (Bangus) As Food NSDB.	Lizard fish	Fresh fish   Preparation of raw material   Brine   Dry   Storage	NIL						
Hairtail	Balila			Hairtail								
Striped-mackerel	Alumahan		Philippine Handbook On Processing Technology NSDB.	Striped mackerel								
Big eye scad	Matambaka			Big eye scad								
Soft-bodied mackerel	Hasa-hasa			Soft-bodied mackerel								
Long tailed Nemipterid	Bisugo			Long tailed Nemipterid								
Barracuda	Torcillo			Barracuda								
Round scad	Galonggong			Round scad								
Crevalle	Salay-salay			Crevalle								
Slip mouth	Sap-sap			Slip mouth								
Deep-bodied herring	Lapad			Deep-bodied herring								
Fimbriated herring	Tonsoy			Fimbriated herring								
Indian sardine	Tamban			Indian sardine and salt.								

NA - not available  
NIL - none

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
0.17	0.13	0.26	0.24	0.27	Plastic, carton boxes.	Refrigerated temperature.	49 days	Fried and serve with tomatoes.	Packaging problem.	NIL
					Pastic, carton boxes, wooden boxes.	Room temperature.	42 days			
						Clean, dry cool places.	Number of months if properly stored.	Cooked with vegetables.	Packaging problem, mold occur during storage.	NIL

## TYPES OF PRODUCTS AND ITS DETAILS

## a) Dried Products (con't)

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Anchovies	Dilis	Salty taste and fishy odour.	Philippine Handbook On Processing Technology NSDB.	Anchovies	Anchovies   Clean   Mix 1 kg salt with 10 kg small fish   Stand for 2 hours   Dry under the sun	NIL	(refer to dried fish data)				
Dried shrimp	Hibe	Dried whole and shell removed.	- do -	Shrimp	Shrimp   Wash   Boil   Dry   Pound   Store	Stove	NA	NA	NA	NA	NA
Dried squid	Pusit	Bicol style, reddish brown colour and about the consistency of leather.	Philippine Handbook On Processing Technology NSDB. Fish Processing Handbook For The Philippines. A. Avery.	Squid	Squid   Wash with salt water   Arrange in split bamboo racks   Dry, turning over once or twice a day   Bind in bales   Store in cool place	NIL	NA	NA	NA	NA	NA

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
(refer to dried fish data)					Wooden boxes	Clean dry cool place.	Number of months if properly stored.	Included in chinese dishes.	NIL	NIL
NA	NA	NA	NA	NA	Sack	-- do --	-- do --	Cooked with vegetables.	NIL	NIL
NA	NA	NA	NA	NA	Plastic packaging, wooden boxes	-- do --	-- do --	Fried, broiled. Soaked in sugar, salt, soy-sauce, spices and then fried or broiled.	Packaging problem. Mold occur during storage. Hygiene and sanitation.	NIL

## TYPES OF PRODUCTS AND ITS DETAILS

## a) Dried Products (con't)

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Dried shark-fin	Pinatuyong Palikdik Ng Pating	Tasty and nutritious.	Fish Processing Handbook For The Philippines A. Avery	Shark fin	Fins are cut off   Dust with salt (1:10)   Stand for 24 hours   Wash   Hang or spread out on wire   Dry over a month   Pack in sack or barrel	NIL	NA	NA	NA	NA	NA
Dried abalone	Sapas	Flesh hard but delicious.	Philippine Handbook On Fish Processing Technology NSDB.	Abalone	Shuck   Soak   Clean   Drain   Pre-cook   Dry   Pack	NIL	NA	NA	NA	NA	NA
Dried sea-cucumber	Trepang	Elastic and rubbery boiled dried products.	Fish Processing Handbook For The Philippines by A. Avery.	Sea-cucumber	Scak & clean   Boil   Slice   Dry   Fry	Knives, gas stove	NA	NA	NA	NA	NA

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	NA	NA	NA	Sack or barrel.	Clean, cool dry place.	Last for a number of months if properly stored.	For soup or gelatin content and other chinese delicacy.	Packaging problem. Very expensive.	NIL
NA	NA	NA	NA	NA	Carton boxes	- do -	- do -	Chinese dishes added to noodle & chopsuey.	Raw material is very expensive.	NIL
NA	NA	NA	NA	NA	Carton boxes	- do -	- do -	Deep fat fried with msg, salt, vinegar, garlic as sauce.	Packaging problem.	NIL



## TYPES OF PRODUCTS AND ITS DETAILS

## b) Cured Products (eg. salting without drying, pickling, etc.)

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Kench Cured 1. Skipjack 2. Herring 3. Roundscad 4. Fimbriated sardine 5. Deep bodied sardine 6. Striped mackerel 7. Short bodied mackerel	Balbacua Tulingan Tamban Galunggong Tunsoy Lapod Alumahon Hase-hasa	Heavily salted, moist fish product.	Fish processing handbook: Philippine Handbook on Fish Processing Technology NSDB, Bicuton Teguig M.M., Philippines 1980.	Fish & salt	Fish   Fish saturated salt   Wash with 2% salt   Drain   Pack in wooden box in layers of fish/salt	Barrel, jar, pot, tank.	NA	NA	NA	NA	NA

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	NA	NA	NA	Packed in wooden boxes	Stored in room temperature	90 days	Broiled. Sauted garlic, onions, tomatoes and vegetables for noodles.	Handling and sanitation 1. reddenning 2. dun fish 3. souring 4. salt burn 5. slimy	Improved method of processing, handling and transport and market and packaging.

## TYPES OF PRODUCTS AND ITS DETAILS

## c) Fermented Products (eg. Fermented fish paste, fermented fish sauce, etc.)

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Shrimp paste	Bagoong Alamang	A mixture of shrimp ( <i>Acetes</i> sp.) and salt that has been allowed to ferment.	Philippine Handbook in Fish Processing Technology NSDB, 1980 p. 15. Fish Curing and Processing Mir Publishers Moscow.	Small shrimp ( <i>Acetes</i> sp.), salt.	Small shrimp   Clean and wash   Drain   Salt   Ferment   Pack	Fermenting tanks, mixing vats	NA	NA	NA	NA	NA
Fish sauce	Patis	A liquid that can be drained off from the mixture of fish and salt that has been allowed to ferment.	— do —	Fresh fish, salt	Fresh fish   Clean and wash*   Drain   Salt (1.3)   Ferment   Filter   Pack	Fermenting vat, earthenware jars mixing tank, mixing ladle	NA	NA	NA	NA	NA
Fish paste	Bagoong Isda	A mixture of fish and salt that was allowed to ferment.	Philippine Handbook in Fish Processing Technology NSDB, 1980.	Fresh fish ( <i>Stolephorus</i> sp.) salt.	Fresh fish   Wash   Salt (1.3)	Earthen jar, concrete tank, wooden vat, plastic drum, oil drum, oil can.	NA	NA	NA	NA	NA

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
769.4	NA	NA	64.6	NA	Packed in glass, jars, bottles or cans.	Clean, dry place	3 weeks to 6 months	Sauted in garlic, pork fat fare and used as dips for some mangoes and other food stuffs.	Packaging and sanitation: 1. Long fermentation period. 2. Rust on bottle caps.	NIL
128.7	107	69.9	25.4	12	Packed in bottles	Clean, dry place	6-12 months	Added to vegetables, as seasoning and flavorings. As dips for other food stuffs	Packaging and sanitation: 1. Long fermentation period. 2. Rust on bottle caps.	NIL
146	212.7	308.5	328.4	221	Packed in glass, jar and bottles.	Clean, dry place	6-12 months	Added to food stuffs as seasoning and flavorings.	Packaging and sanitation: 1. Long fermentation period. 2. Rust on bottle caps.	NIL

## TYPES OF PRODUCTS AND ITS DETAILS

## d) Smoked Products

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Smoked boneless milkfish	Bangus	Smoked fish made from milkfish <i>chanos-chanos</i> .	Philippine Handbook on Fish Processing Technology NSDB, 1980. Fish Curing and Processing Mir Moscow.	Milkfish brine 60 s.	Milkfish   Split/fillet   Clean & wash   Debone   Brine   Dry   Smoke   Pack   Distribute	Smoke house, forceps, knives.	NA	NA	NA	NA	NA
Smoked sardines	Law-Law	Smoked fish made from sardines- <i>Sardinella sp.</i> ferporate.	- do -	Sardines brine 60 s.	Fresh sardines   Weigh   Clean & wash   Brine   Pre-cook   Dry   Smoke   Cool   Pack	Brining tank, smoke house, cooking table, weighing scale, bamboo tray, charcoal store, carajay.	NA	NA	NA	NA	NA
Smoked roundscad	Galunggong	Smoked fish made from roundscad- <i>Decapterus macrosoma</i> .	- do -	Roundscad, brine 60 s.	Fresh roundscad   Weigh   Clean & wash   Brine   Pre-cook   Dry   Smoke   Cool   Pack	Brining tank, smoke house, cooking table, weighing scale, bamboo tray, charcoal store, carajay.	NA	NA	NA	NA	NA

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	NA	NA	NA	Plastic bags (0.03 mm polyethylene)	Refrigerated, freezing.	15 days, 3-6 months.	Fried	Mold, bacterial spoilage.	NIL
NA	NA	NA	NA	NA	Packed in: 1. Basket with banana leaves. 2. Shallow basket-bilao with newspaper/banana leaves. 3. Plastic bags (polyethylene)	Room temperature, refrigerated.	3 days, 6 days.	1. Fried 2. Normally eaten with tomatoes. 3. Flaked 4. Normally eaten with noodles etc.	Mold, bacterial spoilage.	NIL
NA	NA	NA	NA	NA	Packed in: 1. Basket with banana leaves. 2. Shallow basket - bilao with newspaper/banana leaves. 3. Plastic bags (polyethylene)	Room temperature, refrigerated.	3 days, 6 days.	Fried	Mold, bacterial spoilage.	NIL

## TYPES OF PRODUCTS AND ITS DETAILS

## d) Smoked Products (con't)

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Smoked herring	Tamban	Smoked fish made from herring <i>Sardinella Longiceps</i> .	Philippine Handbook on Fish Processing Technology NSDB 1980.	Herring, salt.	Fish   Weigh   Clean & wash   Brine   Pre-cook   Dry   Smoke   Cool   Pack	Brining tank, carajay, working table, smoke house, weighing scale, bamboo tray, charcoal store,	NA	NA	NA	NA	NA
Smoked sardines	Tunsoy	Smoked fish made from sardines- <i>Sardinella sp.</i>	- do -	Sardines, salt.	- do -	- do -	NA	NA	NA	NA	NA
Smoked milkfish	Bangus	Smoked fish made from milkfish- <i>Chanos-Chanos</i> .	- do -	Milkfish, salt.	- do -	- do -	NA	NA	NA	NA	NA

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	NA	NA	NA	Packed in: 1. Basket with banana leaves.  2. Plastic bags (polyethylene).	Room temperature, refrigerated, freezing.	3 days, 15 days, 3-6 months.	Fried	Mold, bacterial spoilage.	NIL
NA	NA	NA	NA	NA	-- do --	-- do --	-- do --	-- do --	-- do --	NIL
NA	NA	NA	NA	NA	-- do --	-- do --	-- do --	-- do --	-- do --	NIL



## TYPES OF PRODUCTS AND ITS DETAILS

## g) Frozen Products

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Shrimp	Suake	Frozen products arrange in blocks.	Prawn Preservation and Processing, Australian Fisheries Newsletter, January, 1968, p. 7-11.	Shrimps	Wash   Sort/grade   Head   Weight	Weighing balance, blast contact freezer, cold storage.	27133	38511	46370	36989	49737
Prawn	Sugpo	- do -		Prawn	Arrange in aluminium trays   Glaze   Blast freeze/contact freeze   Pack						
Milkfish	Bangus	Individually quick frozen.	NA	Milkfish	Wash   Sort/grade   Weigh   Pack   Freeze	Weighing balance, freezer, refrigerator.	171779	406567	432564	428432	439464

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
2633288	2899488	4259818	4571478	6228465	Packed in: 1. Polyethylene bags. 2. Boxes/cartons.	-18°C	6 months	1. Pickled. 2. Cooked with vegetables. 3. Steamed. 4. Other speciality preparations.	NIL	NIL
1360	NA	304	NA	120						
NA	NA	NA	NA	NA	- do -	-18°C to -12°C	6 months	NA	NIL	NIL

## TYPES OF PRODUCTS AND ITS DETAILS

## h) Canned Products

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Canned milkfish in tomato sauce	Bangus	It is prepared fishery products which has been sealed hermetically and subject to high temperature to kill spoilage micro-organism.	Philippine Handbook on Fish Processing Technology NSDB 1980. Fish Curing and Processing Mir Publishers Moscow.	Milkfish, tomato sauce, corn oil, salt, tin cans.	Clean & gut   Pack into cans   Exhaust   Fill up ingredients   Seal	Gas stove, electric can-sealer, pressure cooker, working table.	NA	NA	NA	NA	NA
Canned milkfish <i>Salmun</i> style	Bangus	— do —	— do —	Milkfish, salt.	Process   Cool   Label	— do —	NA	NA	NA	NA	NA
Milkfish in oil	Bangus	— do —	— do —	Milkfish, salt, oil.	Inspect/grade	— do —	NA	NA	NA	NA	NA
Canned tuna in oil	Tambakol	— do —	— do —	Tuna, salt, oil.	Dehead   Pre-cook   Cool   Cut/slice   Pack   Fill/ingredients   Seal   Process   Cool & label   Store	Pressure cooker, steamer, electric can-sealer, cutting knives, gas stove, working table.	NA	NA	NA	NA	NA

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	NA	NA	NA	Packed in fibre board boxes/cartons.	Cool dry place at room temperature.		Salted in garlic, onion with the addition of vegetable.	1. Low fish supply. 2. High price of tin cans.	NIL
NA	NA	NA	NA	NA	-- do --	-- do --	12 months or more.	1. Salted in garlic, onion with the addition of vegetable. 2. Salad. 3. Sandwich spread.	-- do --	NIL
NA	NA	NA	NA	NA	-- do --	-- do --			-- do --	NIL
70.6	18.0	19410	23537	22598	-- do --	-- do --		1. Used as sandwich spread. 2. Salted in garlic and vegetable.	High price of tin cans.	NIL

## TYPES OF PRODUCTS AND ITS DETAILS

## i) Comminuted Products (eg. fish jelly products, fish portion, fish burgers.)

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Native sausage	Longanisa	Fish meat paste packed in animal casing or artificial casing like, eg. <i>collagin</i> .	The Chemistry of Technology of Marine Prod. processing.	Fish, Tuna, <i>Neothunnus-macropodus</i> , brine.	Tuna   Dress   Fillet   Separate meat   Crush   Bleach   Drain   Fix colour   Stuff   Boil or steam   Reboil   Wrap   Store	Meat grinder, silent cutter, casing.	Note: No fish sausage exported, included in fish paste.				
Fish balls	Bola-bola	Ground white meat fish.	PDS fish recipe.	Dalagang Bukid. Eng. name: Denticulated-caesio, Scientific name: <i>Caesio cunning</i>	Chop   Salt   Dissolve into corn starch & baking powder   Mix   Form ball, cook   Drain   Fry	Meat grinder, silent cutter, agitator.	NA	NA	NA	NA	NA

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	NA	NA	NA	Packed in: 1. Plastic/vacuum pack or not. 2. Styrofoam plates covered with plastic.	Refrigerator (5°C) but not in freezer.	1-6 days.	1. Fried till cooked. 2. Mixed to other recipes.	NA	NIL
NA	NA	NA	NA	NA	Packed in: 1. Plastic. 2. Styrofoam plate covered with plastic.	Cool (5°C) but not freezing condition.	1-6 days.	1. Deep fried. 2. Cooked and vegetable. 3. Boiled with soup for taste and flavour. 4. Usually used in various conditions.	No problems in supply of raw materials, fishes used are available and fish meat could be stored or refrigerated.	Good quality fishballs must have a soft and less springy texture and white in colour.

## TYPES OF PRODUCTS AND ITS DETAILS

## i) Comminuted Products (con't)

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Fish burger	NA	Fried patties made from chop fish meat.	PDS file.	Tuna fish meat. Ingredient added: hamburger seasoning, eggs, onion (chopped), salt, evaporated milk, white pepper, msg.	Fish meat   Chop   Mix   Mold into patties   Fry	Food cutter, gas stove, hamburger grill, meat chopper, meat separator.	NA	NA	NA	NA	NA

## j) Fish Meals

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Fish meal	Fish meal	Dried ground product derived from fish.	Fish Curing and Processing by A.D. Merindol, Mir Publisher Moscow 1969.  Philippine Handbook on Fish Processing Technology NSDB, Bicutan Taguig M. M. 1980.	Fish	Preparation of raw materials   Cook   Press   Grind   Pack   Store	Steam cooker, hammer mill, dryer, heavy duty weighing scale, boiler, masher.	NA	NA	7245	NA	300

## k) Other Fish Products (eg. fish cracker, satay fish, seasoned cuttle fish, etc.)

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Shrimp kroepack	Sitsarong Hipon	Brittle square chips.	Philippine Handbook on Fish Processing Technology NSDB, Bicutan Taguig, Metro Manila Phils. 1980.	Rice shrimp, salt, msg.	Weigh   Wash & Clean   Pre-cook of shrimp   Grind   Mix   Steam   Cut   Dry   Pack	Gas stove, steamer, dryer.	NA	NA	NA	NA	NA

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	NA	NA	NA	Packed in plastic.	Freezing and refrigerating temperature. Refrigerating temperature ( $3 \pm 2^{\circ}\text{C}$ ) Freezing temperature ( $-10^{\circ}\text{C}$ ).	1-3 months	Fried till golden brown. 1. Popularly used for making sandwich. 2. Can be serve as main dish.	NA	NIL

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	NA	NA	NA	Black-lined sack.	Store in cool, dry place.	6 months	Use mainly for feeding fish, poultry and hogs.	Surface mold and reddening.	NIL

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	NA	NA	NA	Airtight polyethylene bags.	Cool dry place. ( $28-33^{\circ}\text{C}$ )	12 months or more	Deep fry, snack food item.	Competition is most likely to exist with the manufacturers of similar snack food items such as chippy and crackers. However, there are only a small number of businessmen engaged in the industry and competition among them would be slight.	NIL





# **INVENTORY OF FISH PRODUCTS**

# **SINGAPORE**

## TYPES OF PRODUCTS AND ITS DETAILS

## a) Dried Products (including salted dried, semi dried, etc.)

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Bechedemer Sea cucumber	Hai-sim	Gutted, boiled, dried product	Infofish Mktg. Digest 6/83 p. 19-21.	Sea cucumber -- <i>Microthele nobilis</i> , <i>Holothuria-scabra</i>	Sea cucumber   Boil in sea water until they swell (a few mins)   Drain and cool   Slit body wall along back   2nd boiling until reach rubber-like hardness   Drain and cool   Remove guts   Dry over fire (24-48 hrs) until hard and dry   Sun cure for 4-5 days   Dried sea cucumber	Boiling drum, dryer or drying-shed	NA	NA	52.0	118.0	NA
Sharks fins	Hu-chi	Boiled dried product	NA	Dorsal fins, pectoral fins, tail fins - the fins are imported as dried fins	Raw dried fins   Soak overnight in water initially heated to 80-90°C   Scrap skin off   Separate fin needles from cartilage   Boil for 5 mins until fin needles expand & curl slightly   Cool by soaking overnight in water   Arrange fin needles into desired shape on trays   Dry in drier (45°C) for about 6 hours   Dried, refined sharks fins	Cooker/boiler, drier	3.0	2.0	3.0	4.0	2.0

NA - not available  
NIL - none

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	48.0	118.0	NA	In gunny sacks (60 kg)	Cool dry place at room temp.	Indefinitely if properly stored & not attacked by insects and molds	Soaked in water before use. Cooked by boiling for 5 mins. Use in: Soups, fried with meat and/or vegetables.	NIL	NIL
2.0	2.0	3.0	3.0	2.0	In cellophane about 50g — round or triangle shape.	Cool dry place at room temp.	Indefinitely if properly stored	Sharks fins soup — a chinese delicacy.	NIL	NIL

## TYPES OF PRODUCTS AND ITS DETAILS

## e) Boiled Products

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Cooked fish	Sek-hu	Boiled whole fish	NA	1. Indian mackerels (Kembong) <i>Rastrelliger kanagurta</i> 2. Horse mackerels (Selar) <i>Caranx</i> sp. 3. Anchovies <i>Stolephorus</i> sp.	Whole fish   Wash in water   Rub with salt (to prevent skin from peeling during boiling)   Arrange in bamboo basket   Boil in brine for 10–15 mins   Drain and cool	Boiler	122	130	149	149	154

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NIL	NIL	NIL	NIL	NIL	Sold fresh, packed in polyethylene bags on the spot.	Refrigerate at 4°C	1 week	Eaten fresh with porridge.	NIL	NIL

## TYPES OF PRODUCTS AND ITS DETAILS

## g) Frozen Products

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Fish (including fillets)	NIL	Frozen whole fish & fillets	NA	Dory, Shark, Sword-fish, Tuna, Red-snapper, Red mullet, Grouper, Mackerel, Pomfret, Seabream.	Fish are frozen usually IQF in blast freezers at $-25$ to $-30^{\circ}\text{C}$ Frozen fish (usually Dory, Snapper, Grouper) Thaw Fillet (largely manual) Fillets (blocks frozen or shatter pack as institutional packs 10–20 kg)	Blast freezer	491	1270	1637	1189	1271
Prawn	Sia	Frozen prawn – whole/ beheaded, peeled/ deveined, in blocks or IQF.	NA	Penaeid prawns (Chilled or frozen)	Prawns Thaw Sort Wash Behead Peel Devein Pack in trays/arrange on trays Freeze in blast freezer for 8–12 hrs or plate freezer for 4 hrs.	Blast/Plate freezer	274	248	555	443	509
Cuttle fish/ squid	NIL	Frozen whole, tubes, fillet	NA	Cuttle fish – <i>Sepia spp.</i> , <i>Sepioloa spp.</i> Squid – <i>Loligo spp.</i>	Cuttle fish/Squid Thaw Sort Remove head & guts Skin Wash Tubes Pack Freeze Fillet	Blast freezer	902	379	565	559	3000

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
356	627	1637	1189	1271	Packed in cardboard boxes. Size of pack varies according to buyers specifications but largely institutional packs, eg. 6 kg, 8 kg, 10 kg, 20 kg.	Frozen storage, at least - 18°C.	6mths - 1 yr	All forms of cooking	NA	NIL
198	178	555	443	509	Packed in cardboard boxes usually 1-2 kg packs.	Frozen storage, at least - 18°C.	6 mths - 1 yr	All forms of cooking	NA	NIL
729	320	565	559	3000	Packed in cardboard boxes. Size of packs according to buyers specifications varying from 2 kg - 20 kg blocks.	Frozen storage, at least - 18°C.	6 mths - 1 yr	All forms of cooking	NIL	NIL



## TYPES OF PRODUCTS AND ITS DETAILS

## i) Comminuted Products (eg. fish jelly products, fish portion, fish burgers.)

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Fishball	Hi-ei	Fish jelly product	NA	1. Big eye snapper <i>Priacanthus sp.</i> 2. Threadfin bream, <i>Nemipterus sp.</i> 3. Goat fish, <i>Upeneus sp.</i>  Raw materials are imported from Thailand by road either frozen or chilled and already headed and gutted.	Fish (Headed, gutted)   Meat bone separator   Wash meat in water for 10 mins   Press water out of washed meat   Strain   Grind for 5 mins with: salt            -1.5% sugar           -1.5% corn flour   -1.5% Water varies depending on species of fish   Fishball forming   Set in warm water (40°C) for 1-1½ hours   Boil for 10 mins in water   Deep fry (optional)	Meat bone separator, paddle washer, hydraulic press, strainer, grinder (capacity of 30 kg meat), fishball forming machine, cooker.	479	509	559	621	412

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NIL	NIL	NIL	NIL	NIL	Sold fresh	Refrigerated (4°C)	2-3 days	1. As an ingredient in noodles and soups. 2. As snacks.	NIL	NIL

## TYPES OF PRODUCTS AND ITS DETAILS

## j) Fish Meals

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Fish meal	NIL	Dried, ground (after cooking and pressing) fish & fish offal used as a high protein feed supplement.	NA	Trash fish' from Thai trawlers	Trash fish  — Screw conveyer Steam  — Screw conveyer Screw press to press out water  — Screw conveyer A series of 8 steam-jacketed driers (190° C)   Mill   Fish meal  The whole process takes 45 mins. Daily maximum production (working in 3 shifts) is 120 MT.	Steam cooker, screw press, steam-jacketed driers, mill.	1197	2417	2673	3222	3158

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	NA	NA	NA	2 types: 1. 81 kg gunny sack. 2. 50 kg kraft bag (made up of 4 layers of kraft paper, similar to cement bags).	Room temperature	4-5 mths at 4% moisture content.	As an ingredient in animal feed and fish feed.	1. Stable supply of raw material. 2. Competitive price.	NIL

## TYPES OF PRODUCTS AND ITS DETAILS

## k) Other Fish Products (eg. fish cracker, satay fish, seasoned cuttle fish, etc.)

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Prawn cracker	Kerupuk, Hay-pai	Toasted seasoned prawn chips.	NA	Prawn chips imported from Malaysia	Prawn chips (2 cm long each)   Dry in drier (40–45°C) for approx. 8 hrs   Toast in toasting machine (250 C)   Mix with seasoning liquid   Allow to dry   Pack	Drier, toasting machine, mixing vat, packaging machine.	NA	NA	NA	NA	53.0
Prepared cuttlefish	NIL	Roasted cuttlefish seasoned with spices and chilli.	NA	Semi-dried whole cuttlefish	Semi-dried whole cuttlefish   Sort and separate tentacles from body   Soak in seasoning for about 8 hrs   Toast on toasting machine   Crimp   Pack (approx. 25 g pack)	Toasting machine, crimping machine, packaging machine.	NA	NA	NA	NA	105.0

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	NA	NA	NIL	Packed in plastic retail packets (25 g)	Room temperature	1 year	As titbits and snacks	NIL	NIL
NA	NA	NA	NA	32.0	Packed in plastic retail packets 25–50 g.	Room temperature	1 year	As ready-to-eat snacks	NIL	NIL



# **INVENTORY OF FISH PRODUCTS**

# **THAILAND**



## TYPES OF PRODUCTS AND ITS DETAILS

## a) Dried Products (including salted dried, semi dried, etc.)

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Dried salted fish	Pla chem	Sun-dried marine fish made from Indo Pacific mackerel, Sharks, Indian mackerel, Ray & other food fishes.	1. Fisheries Record of Thailand 1981 by Fisheries Statistics Section. 2. Statistics of Fisheries Factory 1982 by Fish. Stat. Sec. 3. Fisheries Processing Method by FTDD.	Marine fishes. - <i>Restrelligar brachysorma</i> - <i>R. kanagarta</i> - <i>Dasyadis</i> spp. - <i>Aetobatus</i> spp. - <i>Darahathinus</i> spp. - etc. salt	Marine fish   Head & gut   Salt & soak about 1-2 days   Wash and drin   Sun dry for 1-2 days   Dried salted fish	NIL	NA	NA	NA	NA	NA
Dried shrimp	Khong hang	Sun dried boiled shrimp made from: - Banana shrimp - School prawn - Other shrimp	- do -	Shrimps - <i>Penaeus</i> spp. - <i>Metapeneus</i> spp. etc.	Shrimp   Boil in sea water   Sun dry for 8 hrs or dry in dryer machine for 4 hrs   Remove shell   Dried shrimp	Gas stove, dryer machine, shell removing machine	NA	NA	NA	NA	NA
Dried squid	Pla muk hang	Sun dried squid made from squids, cuttlefishes, Octopuses.	- do -	- <i>Loligo</i> spp. - <i>Sepia</i> spp. - <i>Octopus</i> spp.	Squid   Split, clean in brine or sea water   Flat dry in the sun for 2-3 days	NIL	NA	NA	NA	NA	NA
Dried shellfish	Hoi hang	1. Sun dried shellfishes. 2. Sun dried boiled shellfishes made from: - Green mussel - Other shellfishes	- do -	- <i>Mytilus smaragdinus</i> , etc,	1) Clean   Deshell   Sun dry 2) Clean   Boil   Remove the shell   Sun dry	NIL	NA	NA	NA	NA	NA

NA - not available  
NIL - none

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	NA	NA	NA	Plastic bag	Well ventilated storage room, beware of insects.	3-6 months	Deep fried in oil before serving.	1. Packaging problem. 2. Drying method.	NIL
NA	NA	NA	NA	NA	Plastic bag Glass container	- do -	- do -	- do -	1. Packaging problem. 2. Improvement of processing method.	NIL
NA	NA	NA	NA	NA	Plastic bag	- do -	- do -	- do -	1. Packaging problem. 2. Mold occur during storage.	NIL
NA	NA	NA	NA	NA	- do -	- do -	- do -	- do -	- do -	NIL

## TYPES OF PRODUCTS AND ITS DETAILS

## a) Dried Products (con't)

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Dried salted freshwater fishes	Pla chem	Sun dried salted fish made from freshwater fishes. -Snake head -Cat fish (Pla duk) -Climbing perch -Swam eel -Local carp -Common carp -Sepat siam -Cat fish (Pla swai) etc	1. Fisheries Record of Thailand 1981 by Fish. Stat. Sec. 2. Statistics of Fisheries Factory 1982 by Fish. Stat. Sec. 3. Fisheries Processing Products by FTDD.	Freshwater fishes - <i>Ophicephalus stolatus</i> - <i>Clarias</i> spp. - <i>Anabas testudineus</i> - <i>Flota alba</i> - <i>Puntius gonionotus</i> - <i>Cyprinus carpio</i> - <i>Trichogaster pacteralis</i> - <i>Pangasium</i> spp.	Scale, head & gut   Clean & soak in brine (10%) for 30 mins   Mix with salt (fish: salt=16:1) for 1 day or soak in brine (30%) for 15-30 mins   Wash & drain   Dry under sun for 2-3 days   Dried salted fishes	NIL	158	NA	NA	NA	NA
Dried jellyfishes	Mang ka proon hang	Sun dried jellyfishes	1. - do - 2. - do - 3. Some Thai Traditional & Developed Fish Product.	Use only the cap of <i>Rhopilema</i> spp. Salt potash-alum mixture 30%.	Soak in iced water 8-10 hrs to remove mucus   Drain away water   Mix with 30% salt potash-alum mixture & leave for 2-3 days   Wash and drain   Mix with 20% jellyfish weight of salt potash-alum mixture leave for 2-3 days   Wash, leave on wire mesh. Place in shady area for 3-4 days.	NIL	2164	28838	NA	NA	NA

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	NA	NA	NA	Plastic bag	Well ventilated storage room, beware of insects.	3-6 mths	Fried in deep oil before serving.	Improvement of processing method and packaging (only for local market).	NIL
NA	NA	NA	NA	NA	Plastic bag	Well ventilated storage room, beware of insects.	3-6 mths	Soaked in water till soft then steamed or boiled. Served in the form of soup together with noodles.	Improvement of processing method and packaging (only for local market).	NIL

## TYPES OF PRODUCTS AND ITS DETAILS

## c) Fermented Products (eg. Fermented fish paste, fermented fish sauce, etc.)

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Fermented fish	Pla ra	Fermented fish made from fresh water fish. (snake head, climbing perch, local carp, gourami) and marine fish (lizard fish); mixed with salt and ground roasted rice or rice bran.	National Research Council of Thailand (1982). Report on Thai Traditional Fermented Food, Research Project Phase. pp 5-11.	Fish: Fresh water fish, snake head, climbing perch, local carp & gourami. Marine fish: lizard fish. Solar salt, ground roasted rice or rice bran.	Fish   Head, gut, scale and wash in water   Drain Mix with salt (25% by wt.) and pack in the closed jar for about 30 days   Take the fish out and mix with ground roasted rice (10% by weight).   Pack in the closed jar for 2-6 mths   Fermented fish	Blender or mortar, store, pan.	15175	15656	14479	12268	NA
Fermented fish sauce	Nam pla	anchovies ( <i>Stolephorus spp</i> ), sardine ( <i>Sardinella spp</i> ), mackerel ( <i>Rastrelliger spp</i> ).	National Research Council of Thailand (1982). Report on Thai Traditional Fermented Food, Research Project Phase. pp 41-43. Rattagool, P and Methalip, P. Improving production of fish sauce. This paper was prepared for IPFC Working Party on Fish Technology and Marketing in Melbourne, Australia, 23-26 Oct. 1984.	Fish, solar salt	Fish   Mix with salt in the ratio fish to salt 2-3:1   Pack in jar or concrete tank for 8-12 months   Filter and pump to the open tank to improve the flavour.   Pack in the glass bottle	Mixer, electric pump.	78768	94034	88344	95066	NA

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	NA	NA	NA	Packed in earthen jar with salt on top.	A cool dry place (29–33°C)	1–3 years	<ol style="list-style-type: none"> <li>1. Consumed as it is by chopping and adding some vegetables.</li> <li>2. Consumed after cooking ie. wrapped in banana leave and roast, fry.</li> <li>3. Use as condiment for curries.</li> </ol>	Insect especially flies infestation always occurs during fermentation period and marketing phase. Another problem is molding.	Good quality product must have slightly pinkish meat and good aromatic flavour.
5432	6313	7534	7823	NA	Packed in glass bottle, polyethylene tank, earthen jar.	Cool dry place	More than 1 year	Used as condiment.	Blackening of the colour of fish sauce made the product unattractive to the consumer.	Good quality fish sauce must have clear red-brown liquid, meaty salty taste and sweet aromatic flavour

## TYPES OF PRODUCTS AND ITS DETAILS

## c) Fermented Products (con't)

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Fermented fish	Pla som	Fermented fish mixed with salt, boiled rice and pounded garlic.	Rattagool, P. 1984. Fermented fish products in Thailand. The paper was prepared for Regional Training Course for Fishery Extension Officers in Marine Capture Fisheries on Fish Handling and Processing at SEAFDEC, Thailand,	Fish-local carp (Ta-pun), silver carp (Soi) and snake head, solar salt, boiled rice, pounded fresh garlic.	Fish   Head, scale & gut   Wash and drain   Mix with salt (5%), boiled rice (10-15%) & pounded garlic (1%)   Pack tightly in the banana leaf or plastic bag   Leave at room temperature for 2-3 days	NIL	NA	NA	NA	NA	NA
Fermented fish	Pla jom	Fermented fish mixed with salt, ground roasted rice and pounded garlic.	- do -	Fish: many kinds of freshwater fish and marine anchovies, solar salt, ground roasted rice, pounded garlic.	Fish   Head, scale, gut and chop for big fish   Wash and drain   Mix with salt (10%), ground roasted rice (1%) and pounded garlic (1%)   Pack tightly in jar   Leave at room temperature for 3 days	NIL	NA	NA	NA	NA	NA
Thai sweetened fish	Pla chao	Fish mixed sweetened rice (Kao-mark).	- do -	Fish: Common carp and cat fish, solar salt, sweetened rice.	Fish   Scale, gut and chop into 2 cm cube   Mix with salt (25%) for overnight   Wash and drain   Sun dry one day   Mix with Kao-mark (50%)   Pack tightly in the jar at room temperature for one month	NIL	NA	NA	NA	NA	NA

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	NA	NA	NA	Plastic bag, banana leaf.	Cool dry place	3 weeks	<ol style="list-style-type: none"> <li>1. Consumed as it is.</li> <li>2. Consumed with vegetables and onion.</li> <li>3. Cooked with coconut milk, chilli and lemon grass.</li> </ol>	Insect infestation during fermentation and marketing. Parasites in fish meat, microbial spoilage in fish.	Good quality product must have a solid texture, maintain the color of fish and a sour flavour.
NA	NA	NA	NA	NA	Glass jar, plastic bag	Cool dry place	2 weeks	Consumed as it is.	— do —	Good quality product must have a solid texture, pinkish-brown color, sour and salty taste.
NA	NA	NA	NA	NA	Glass jar	Cool dry place	1–2 years	Cooked with coconut milk, lemon grass, onion and chilli.	Brownish color, unpleasant alcoholic flavour, rancid odour.	Good quality product must have a solid texture, pinkish-brown color, sweet and salty taste.



## TYPES OF PRODUCTS AND ITS DETAILS

## c) Fermented Products (con't)

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Shrimp paste	Kapi	Ground crustacean-krill and small shrimp with salt.	Saisithi, P. 1982. 'Fishery Products' Institute of Food Research and Product Development, Kasetsart University, Bangkok, Thailand.	Crustacean krill (Acetes sp.), small shrimp, solar salt.	Krill or small shrimp   Wash and drain   Mix with salt (16%)   Sun dry for 4-5 hrs till 40-45% moisture   Grind 2-3 times   Pack tightly in the jar or wooden barrel for 1-6 months	Grinding machine or stone mortar.	15412	17237	21638	21799	NA
Fish sauce (muslim sauce)	Budu	Thick fish sauce made from small fish (anchovy, scad, sardine).	National Research Council 1982. Report on Thai Traditional Fermented Food Research Project Phase I, p 37-39.	Fish: anchovy, scad, sardine, solar salt, brown sugar.	Fish   Wash and drain   Mix with salt (25%)   Pack in the earthen jar for 3-12 mths   Add brown sugar (10%)   Boil   Pack in the glass bottle	Stove	NA	NA	NA	NA	NA

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
5	120	107	105	NA	Plastic box, plastic bag.	Cool dry place	1-2 yrs	Used as condiment for making sauce and curry soup.	Insect infestation especially fly. Darkening of the product.	Good quality product must have a purple brown color, smooth texture, salty krill flavour.
NA	NA	NA	NA	NA	Glass bottle	Cool dry place	1-3 yrs	<ol style="list-style-type: none"> <li>1. Consumed as it is by adding chilli, onion, sugar and lemon juice.</li> <li>2. Mixed with boiled rice and vegetables which is called kao-yum.</li> </ol>	Insect Infestation during fermentation.	Good quality product must have a thick liquid consistency, brown color, slightly sweet and salty taste.

## TYPES OF PRODUCTS AND ITS DETAILS

## d) Smoked Products

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Dried smoke fish	Pla rom quan or Pla krob	Smoked dried fish made from marine fishes: —Sharks —Rays —Other foodfishes Fresh water fishes: —Snake head —Cat fish —Climbing perch —Swamp eel —Common carp —Sepat siam etc.	1. Fisheries Record of Thailand 1981 by Fisheries Statistic Section. 2. Statistics of Fisheries Factory 1982 by Fisheries Statistic Section. 3. Some Thai traditional and developed fish products by FTDD.	Marine fish: — <i>Dasyodis</i> spp. — <i>Aetobatus</i> spp. etc. Fresh water fish: — <i>Ophicocephalus</i> spp. — <i>Clarias</i> spp. — <i>Anabas</i> <i>tastudineves</i> — <i>Fluta alba</i> — <i>Pontius gonionotis</i> — <i>Cyrinus curpio</i> — <i>Pangasium</i> spp.	Gut, clean   Split fishes from the back (big fishes)   Sun dry or grill on fire for 4–12 hrs   Smoke for 4–24 hours   Dry in the sun again for 1–2 days   Smoked dried fishes	Smoke house	NA	NA	3366	NA	NA
Semi-dried smoked fish	Pla rom quan	Smoked fishes which have a moisture content higher than smoked-dried fishes.	— do —	— do —	Gut, clean   Split fishes from the back (big fish)   Soak drained fishes in brine solution for 4–12 hours   Hang and expose to the sun for 30 min   Smoke for 2 hours   Cool smoked fishes	Smoke house	NA	NA	NA	NA	NA

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	NA	NA	NA	Open air package. Product should always be sun dried every 1-2 weeks to prevent mold growth. Beware of insects during sun drying.	Well ventilated storage room	1 year	Used in Thai soup (tom-yum), chilli paste (grated before using)	Packaging problem.	NIL
NA	NA	NA	NA	NA	Plastic bag and place in refrigerator.	Refrigeration, room temperature, freezer.	7 days 2 days 1 year	Used in Thai soup, fried in oil and etc.	1. Short storage life. 2. Improvement of smoking method. 3. Handling of product.	NIL

## TYPES OF PRODUCTS AND ITS DETAILS

## e) Boiled Products

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Steamed fish	Pla nung	Steamed fish which has a salt content of 0.9–7.73% and is made from – Indo Pacific mackerel – Indian mackerel – Spotted tunny – Bonito – Trevallies – Bigeyes	1. Fisheries Record of Thailand 1981 by Fisheries Statistics Section. 2. Statistics of Fisheries Factory 1982 by Fisheries Statistics Section. 3. Fisheries Processing Method by FTDD.	Marine fishes: – <i>Restrelligar brachygoma</i> – <i>Restrelligar kanagurta</i> – <i>Thunnus tonggol hymus affinis</i> – <i>Caranx</i> spp. – <i>Priacanthus</i> spp.	Fishes   Gut   Clean in brine solution   Steam for 20 mins   Steamed fish	NIL	20844	28015	7854	NA	NA

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	NA	NA	NA	Bamboo tray	3 days in refrigeration	3 days	Fried in oil, served with chilli paste especially for steamed Indo Pacific mackerel.	1. Short storage life. 2. Improvement of processing method.	NIL

## TYPES OF PRODUCTS AND ITS DETAILS

## f) Powdered/Flaked Products

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Fish floss	Pla Yong	Fish mince from shark, ray, snapper, treadfin bream, mixed with ingredients.	Some Thai Tradition and Developed Fish Products by Mrs Rerngrudee Pruthi-arenun, FTDD.	<p>Fishes: <i>Scoliodon</i>, <i>Casuarhinus</i>, <i>Dasyatis</i> spp., <i>Lutianus</i> spp., <i>Nemipterus</i> spp.</p> <p>Ingredients: soy sauce, salt, sugar, water, black soy sauce.</p>	<p>Eviscerate, scale &amp; wash</p> <p>↓</p> <p>Cut into desired pieces</p> <p>↓</p> <p>Soak in 2% brine solution for 10–15 mins (2 times)</p> <p>↓</p> <p>Boil until almost cook (about 10 mins)</p> <p>↓</p> <p>Separate into small pieces from bones and skin</p> <p>↓</p> <p>Wash 2 times in order to remove fat</p> <p>↓</p> <p>Press out excess water using a screw press</p> <p>↓</p> <p>Heat all ingredients in pan, add fish meat, mix thoroughly until the liquid has dried.</p> <p>↓</p> <p>Dry in oven, separate into small fibres and dry again</p>	Dryer, screw press machine.	NA	NA	NA	NA	NA
Seasoned fish powder	Pla Pon Prung Ross	Fish powder made from cat fish or cheap fish and mixed with seasoning.	— do —	<p>Fish: <i>Pangasius sutchi</i> and others.</p> <p>Ingredients: minced fish, refined salt, sugar cane, pounded dried chilli.</p>	<p>Fish</p> <p>↓</p> <p>Head, gut, wash</p> <p>↓</p> <p>Pass through meat bone separator</p> <p>↓</p> <p>Heat mince until dry</p> <p>↓</p> <p>Mix with all ingredients</p> <p>↓</p> <p>Cool &amp; pack in non-tight air container</p>	Meat bone separator	NA	NA	NA	NA	NA

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	NA	NA	NA	Glass bottle, polyethylene bag.	Room temperature or refrigerator	6-12 months	Served with bread or used in rice soup.	Packaging problem, mold occur during storage.	NIL
NA	NA	NA	NA	NA	Glass bottle	Room temperature or refrigerator	6-12 months	Mixed with rice or chilli paste.	Packaging problem, mold occur during storage.	NIL



## TYPES OF PRODUCTS AND ITS DETAILS

## g) Frozen Products

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Frozen octopus	NIL	Frozen whole octopus (skin on). Frozen whole octopus (skin off).	NIL	Octopus	Raw material   Grade   Wash   Pack   Freeze	Air blast freezer, contact freezer.	NA	NA	NA	NA	NA
Frozen cuttlefish	NIL	Frozen whole cuttlefish. Frozen whole cleaned cuttlefish. Frozen cuttlefish fillet. Frozen cuttlefish leg.	NIL	Cuttlefish	- do -	- do -	NA	NA	NA	NA	NA
Frozen squid	NIL	Frozen whole squid. Frozen whole cleaned squid. Frozen squid tube. Frozen squid leg.	NIL	Squid	- do -	- do -	NA	NA	NA	NA	NA
Frozen fish and others	NIL	Frozen freshwater fishes. Frozen marine fishes. Frozen snail. Frozen clam. Frozen slipper lobster.	NIL	Freshwater fishes. Marine fishes. Snail. Clam. Slipper lobster.	Fish   Wash   Pack   Freeze	Air blast freezer, contact freezer.	NA	NA	NA	NA	NA

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	861	477	934	NA	Cold storage (-18°C).	365 days	NA	NA	NIL
NA	NA	40054	37030	38461	NA	- do -	- do -	NA	NA	NIL
NA	NA	1741	1814	3426	NA	- do -	- do -	NA	NA	NIL
41435	56856	53217	53409	75786	NA	- do -	- do -	NA	NA	NIL

## TYPES OF PRODUCTS AND ITS DETAILS

## g) Frozen Products (con't)

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Frozen shrimp	NA	<p>Frozen head on, shell on shrimp.</p> <p>Frozen shrimp, head off shell on.</p> <p>Frozen shrimp meat.</p>	NA	Shrimp	<p>Shrimp</p> <p> </p> <p>Grade</p> <p> </p> <p>Wash</p> <p> </p> <p>Pack</p> <p> </p> <p>Freeze</p> <p>or</p> <p>Shrimp</p> <p> </p> <p>Dehead</p> <p> </p> <p>Grade</p> <p> </p> <p>Wash</p> <p> </p> <p>Pack</p> <p> </p> <p>Freeze</p>	Air blast freezer, contact freezer.	NA	NA	NA	NA	NA

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
7915	18761	22647	20150	19428	NA	Cold storage (-18°C)	365 days	NA	NA	NIL

## TYPES OF PRODUCTS AND ITS DETAILS

## h) Canned Products (con't)

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Canned tuna	NIL	Tuna in brine or oil	Utilisation & processing of marine products in Japan. Japan FAO Association 1984	Tuna, oil or brine	Tuna Head, gut, wash Cook in retort steam Cool Fillet, remove dark meat and clean Pack in cans Fill in oil (brine) solution Exhaust & vacuum seal Retort sterilization Cool & wash cans Pack in boxes	Retort, exhaust, vacuum sealer	NA	NA	NA	NA	NA
Canned pet food	NIL	Canned food for cats & dogs	NIL	Tuna or sardine	Flake from tuna or sardine Pack in can Fill in brine solution Exhaust & vacuum seal Retort sterilization Cool & wash cans Pack in boxes	- do -	NA	NA	NA	NA	NA
Canned sardine canned mackerel	NIL	Sardine or mackerel in tomato sauce or brine	NIL	Sardine or mackerel, tomato sauce, brine	Sardine, mackerel Head, gut, wash Pack in cans Steam cooking Fill in tomato sauce Exhaust & vacuum seal Retort sterilization Cool & wash cans Pack in boxes	- do -	NA	NA	NA	NA	NA

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	NA	NA	NA	Cans	At 30°C	180-365 days	Ready to eat	Shortage of raw material	NIL
NA	NA	NA	NA	NA	- do -	- do -	- do -	- do -	- do -	NIL
NA	NA	NA	NA	NA	- do -	- do -	- do -	- do -	- do -	NIL

## TYPES OF PRODUCTS AND ITS DETAILS

## h) Canned Products (con't)

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Canned crab meat	NIL	Crab meat in brine	NIL	Crab meat, brine	Crab   Remove carapace   Cook   Cool   Separate meat from shell   Wash & Sort meat   Pack in cans   Fill in brine solution   Exhaust & vacuum seal   Sterilize by retort   Cool & wash cans   Pack in boxes	Retort, Exhaust, vacuum sealer	NA	NA	NA	NA	NA
Canned shrimp meat	NIL	Shrimp meat in brine	NIL	Shrimp meat, brine	Shrimp   Wash   Cook   Separate meat from shell   Wash   Pack in cans   Fill in brine solution   Exhaust & vacuum seal   Sterilize by retort   Cool & wash cans   Pack in boxes	- do -	NA	NA	NA	NA	NA

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	NA	NA	NA	Cans	At 30°C	180-365 days	Ready to eat	Shortage of raw material	NIL
NA	NA	NA	NA	NA	- do -	- do -	- do -	- do -	- do -	NIL



## TYPES OF PRODUCTS AND ITS DETAILS

## h) Canned Products

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Canned baby clam	NIL	Baby clam in brine	NIL	Baby clam, brine	Baby clam   Wash   Grade   Cook   Cool   Pack in cans   Fill in brine solution   Exhaust & vacuum seal   Sterilize by retort   Cool & wash cans   Pack in boxes	- do -	NA	NA	NA	NA	NA

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	NA	NA	NA	Cans	At 30°C	180-365 days	Ready to eat	Shortage of raw material	NIL

## TYPES OF PRODUCTS AND ITS DETAILS

## i) Comminuted Products (eg. fish jelly products, fish portion, fish burgers.)

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Fish ball	Luk-chin Pla	Minced fish product made from either:— sharks, wolf-herring, barracuda, lizard fish, trevallines, bigeyes, king mackerel and other fishes, or mixed.	1. Fisheries Record of Thailand, 1981 by Fisheries Statistics Section. 2. Statistics of Fisheries Factory 1982 by Fisheries Statistics Section. 3. Some Thai Traditional & developed Fish Products by FTDD.	Minced fishes of <i>Stegostoma fasciatom</i> , <i>chiloscyllium</i> spp., <i>chirocentrus nudus</i> , <i>Sphyraena</i> spp., <i>Priacanthus</i> spp., <i>Scombero morus</i> spp. and other fishes, salt 2.5-3%, crushed ice 5%	Minced fish   Grind & add salt and crushed ice   Form into ball shape   Set in warm water 40–45° C for 20 mins   Boil in hot water 90° C/ 5 mins   Leave to cool	Meat-bone separator, mincer, kneading machine, fishball forming machine, water bath.	NA	NA	NA	NA	NA
Fish noodle	Ba Mee Pla	NIL	NIL	Minced fish, wheat flour, potassium pyrophosphate, msg, sodium bicarbonate, salt.	Grind fish meat for 3 mins, add all ingredients and continue grinding again.   Pass through the roller of noodle machine to make noodle shape   Weigh each lot of noodle 40 gm   Steam for 5 mins	Meat-bone separator, mincer, kneading machine, roller noodle machine.	NA	NA	NA	NA	NA
Surimi	Surimi	Minced fish which has been washed with water, added with additives and then frozen.	NIL	<i>Nemipterus</i> spp.	Fish   — deboner Mince   Wash with 2–5 times iced water   Remove excess water   — strainer Add polyphosphate, sugar and mix well   Keep frozen in block form	Meat-bone separator, fish washing tank, screw press, strainer, silent cutter, freezer.	NA	NA	NA	NA	NA

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	NA	NA	NA	Plastic bag	Refrigerator or in ice.	3 days	Used in noodle soup	Short storage life	NIL
NA	NA	NA	NA	NA	Plastic bag	Room temperature of refrigerator.	7 days 3 days	Used in noodle soup	Short storage life	NIL
NA	NA	NA	NA	NA	Plastic bag	Freezing temperature	NIL	Used as raw material for minced fish product. eg. Japanese style minced fish products, fishball, sausage, etc.	Gel quality	NIL

## TYPES OF PRODUCTS AND ITS DETAILS

## j) Fish Meals

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Fish meals	Pla Pon	Fish powder as animal feed made from trash fish (by-catch) or sardinellas.	Fisheries Record of Thailand 1981 by Fisheries Statistics Section.  Statistics of fisheries Factory 1982 by Fisheries Statistics Section.  Possibilities of Fish Powder Production in Thailand by Rerngrudee Pruthiarenun, FTDD	Fishes: trash fish or <i>sardinellas spp.</i>	Fish   Wash   Cook with coagulator   Screw press   Dry in rotary dryer   Mill   Fish meals	Coagulator, dryer, miller screw press machine.	184054	186201	182047	NA	NA

## k) Other Fish Products (eg. fish cracker, satay fish, seasoned cuttle fish, etc.)

Name of Product		Description of Products	Reference in Literature	Materials Used	Outline of Production Method	List of Machines Used	Production Figures (M-ton)				
English Name	Local Name						1980	1981	1982	1983	1984
Shrimp or fish crackers	Khau kriab Pla	Made from any kind of fishes mix with other ingredients mainly tapioca flour.	1. Statistics of Fisheries Factory 1982 by Fisheries Statistics Section. 2. Some Thai Traditional and Developed Fish Products by FTDD.	Minced meat of shrimp or fish, tapioca flour, salt, pepper, garlic, hot water, sugar.	Make dough by mixing and kneading all ingredients   Form into desired shapes eg. rolls, etc.   Steam about 1½ hr   Cool overnight   Cut into thin slices and sun dry 1–2 days   Keep in containers	Mincer, kneading machine, steam pot, slicer, drying tray.	NA	NA	19493	NA	NA
Fish satay	Pla satay	Dried minced fish product which is seasoned with sugar, soya sauce, sesame seed and deep fried.	NIL	Lizard fish, flour, soya sauce, sugar, salt, sesame & oil.	Fish   Mince fish   Mix with ingredient   Form to round sheet   Dry (sun dry) for 1/2 day   Deep fry   Pack	Meat-bone separator, deep fryer.	NA	NA	NA	NA	NA

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
114343	113821	83074	93246	85487	Jute bag and plastic bag.	Well ventilated storage room.	NIL	As animal feed.	Price, protein content, freshness of raw material, etc.	NIL

Export Figures (M-ton)					Packaging Conditions	Storage Conditions (State Methods/Temp)	Shelf Life (Days)	Ways of Consumption	Problems in Marketing & Quality Control	Comments
1980	1981	1982	1983	1984						
NA	NA	NA	NA	NA	Keep in air tight containers.	In room temperature, the packed products should be placed in shed to protect discoloration.	1 year	Fried in deep oil before serving.	Quality control in processing methods.	NIL
NA	NA	NA	NA	NA	Plastic bag or aluminium bag.	Room temperature	3-5 months	Consumed directly.	Quality control in processing methods.	NIL



**ANNEX I**

**NAMES AND ADDRESSES OF**

**CO-ORDINATORS AND**

**RESPONDENTS**



## **NAMES AND ADDRESSES OF CO-ORDINATORS AND RESPONDENTS**

### **BRUNEI DARUSSALAM**

Mr Matdanan bin Haji Ja'afar (co-ordinator)  
Director of Fisheries  
Jabatan Perikanan Fisheries Department  
P. O. Box 2161  
Bandar Seri Begawan

### **INDONESIA**

Mrs Enni Soetopo (co-ordinator)  
Chief, Sub-director of Foreign Relations/Co-operation  
Directorate of Planning  
Directorate General of Fisheries  
Department of Agriculture  
Jalan Salemba Raya 16  
Jakarta

Mr Sumitro  
Sub-directorate of Processing & Distribution Fisheries  
Directorate General of Fisheries  
Jalan Salemba Raya 16  
Jakarta

Mr Sudari  
Sub-directorate of Processing & Distribution Fisheries  
Directorate General of Fisheries  
Jalan Salemba Raya 16  
Jakarta

### **MALAYSIA**

Ms Badariah Mohd Ali (co-ordinator)  
Fisheries Division  
Ministry of Agriculture Malaysia  
Swettenham Road  
Kuala Lumpur

Ms Razidah Budin  
Fisheries Division  
Ministry of Agriculture Malaysia  
Jalan Mahameru  
Kuala Lumpur

### **SINGAPORE**

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Primary Production Department  
8th Storey, National Development Building  
Maxwell Road  
Singapore 0106

Mr Yeap Soon Eong  
Primary Production Department  
8th Storey, National Development Building  
Maxwell Road  
Singapore 0106

**PHILIPPINES**

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 Chief, Fisheries Utilisation  
 BFAR  
 Marcelo Building  
 880 Quezon Ave  
 Quezon City

**Fish Handling Section**

Ms Flor F. Abella  
 Ms Nalda Repito

**Product Development Section**

Ms Emma Marfori  
 Ms Lucerna Icapin  
 Ms Amelita Magbago

**Pilot Processing Section**

Ms Consuelo Camu  
 Ms Norma Borja  
 Ms Pilar Distor  
 Ms Macaria Andrade  
 Ms Marina Dumol

**THAILAND**

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 Director  
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Ms Sirilak Suwanrangi  
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 FTDD  
 Fish Processing Sub-division

Mrs Pongpen Rattagool  
 FTDD  
 Analytical Research Sub-division

Dr Poonsap Virulhakul  
 FTDD  
 Fish Quality Control Sub-division

The Thai Fishery and Frozen Products  
 4th Floor, BIS Building  
 119 Mahaesak Road  
 Bangkok, Thailand

Thai Food Processors Association  
 PO Box 2341, Bangkok 10500  
 Thailand



## **ANNEX II**

### **SURVEY QUESTIONNAIRE: PART I: COUNTRY CONTACTS PART II: TYPES OF PRODUCTS AND ITS DETAILS**



# INVENTORY OF FISH PRODUCTS IN SOUTHEAST ASIA

## Notes:

- (i) Please answer all items. If information is not available, please indicate by "N.A."
- (ii) General statements may be given if estimated figures are not available; please indicate this by abbreviation "Gen."
- (iii) When exact statistical figures are not available, estimated figures may be used; please indicate by abbreviation "Est." if figures are estimated.

## Part I: Country Contacts

a) Name/address of co-ordinator: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Telephone:

Cable:

Telex:

\_\_\_\_\_

b) Name/address of respondent [please indicate section(s) involved].

(1)

\_\_\_\_\_

Telephone:

Cable ;

Telex:

\_\_\_\_\_

(2)

\_\_\_\_\_

Telephone:

Cable:

Telex:

\_\_\_\_\_

(3)

\_\_\_\_\_

Telephone:

Cable:

Telex:

\_\_\_\_\_



