

# Present Status Of Fish Processing In Malaysia

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## Introduction

Malaysia is known as a fish-eating nation; and with good reason. Fish is one of the main sources of animal protein available to the country and accounts for about 60 per cent of the population's total protein intake.

In 1989, total production by the marine-capture and aquaculture sectors combined was 935,610 mt. This represented a value of M\$1,784 million.

Of this total, marine-capture fishery accounted for the bulk of production and value: for 882,492 mt and M\$1,665.8 million. Aquaculture's share was 53,118 mt valued at M\$118.2 million.

In the same year, total fish production accounted for about 2.3 per cent of Malaysia's Gross Domestic Product (GDP).

Sixty-three per cent of the total volume of fish landed was consumed fresh, 13 per cent was processed, and 24 per cent was classified as "trash".

In 1989, 109,610 people or 1.7 per cent of Malaysia's work force, were employed directly in the industry as fishermen and fish farmers. This figures does not include people engaged in secondary fisheries activities, such as processing, freezing and boat-building.

## Post-Harvest Losses

Post-harvest losses occur at two main points, on board fishing vessels and between landing centres and retail centres. Use of ice and insulated facilities on board fishing vessels and at various outlet points is minimal. Losses due to post-harvest handling, according to a survey, are estimated at

25%. Of these losses, 20% are due to fish spoilage and 5% to pilferage. At the current marine capture harvest of 882,492 mt valued at M\$1,665.8 million, post-harvest losses due to spoilage may well be approximately 176,000 mt valued at M\$330 million. This is considerably higher than the value of fish import which is M\$206 million.

## Status Of Fish Processing

Except for fish-canning factories and prawn and fish freezing plants, most of which are situated inland, the majority of Malaysia's fish processing is carried on by small operations with capital assets of less than M\$100,000. These plants are located in coastal areas, close to fish-landing ports. They produce dried fish, fish crackers, shrimp paste, fermented fish, fish satay, canned tuna/sardine, frozen prawn/fish/squid, and fishmeal for animal feed.

## Dried fish

The species most commonly processed into dried fish are Queen fish (*Chorinemus lysan*), Red snapper (*Lutianus malabaricus*), Spanish mackerel (*Scomberomorus guttatus*) and Jewfish (*Sciaena* spp). Dried products are still prepared in the traditional way: the fish is either submerged in 30 % brine-solution, or salt is spread over the cut body of the fish. Drying under the sun takes from one to five days. Some entrepreneurs have experimented with the use of machines to generate hot dry air for the drying of fish during the monsoon season when sunshine hours are reduced by rain. However, because of the high costs associated with this technique, few processors use it.

In terms of quality control the industry has not changed much over the years. Since there is no standard method of preparation, products of the same kind can vary in colour, taste and chemical content. Some processors use a higher percentage of salt than others, and some may even spray insecticide on the fish to prevent the growth of blow-fly larvae.

### Dried Anchovy

Dried anchovy (*Stolephorus* spp) is the most important Malaysian dried fish product and in 1989 amounted to 7,510 mt. A quality standard has been established for dried anchovy. The factors considered are size, species, degree of breakage, smell and colour.

Processing methods depend on the equipment available on the fishing vessel. On crafts equipped with the necessary processing facilities, the fish are put in rattan baskets and are dipped in boiling seawater or in ten per cent brine solution for three to five minutes. After this they are sun-dried for about six to ten hours. Some vessels based in the east coast states of Peninsular Malaysia have no on-board facilities for boiling. Fish caught by these boats are boiled at the landing sites, sometimes many hours after being caught. As a result the quality of these products is inferior to that of fish processed aboard.

Recently, some processors in Kedah have begun using hot-air driers to dry their anchovy, and they keep the dried products in cold rooms to maintain quality. These measures have been made possible by the high price commanded by dried anchovy.

### Dried Squid

Common squid (*Loligo* spp), cuttlefish (*Sepia* spp) and octopus (Octopodidae) are cleaned and washed with sea water and then dried under the sun on wooden racks. Most processing is done by the wives of fishermen. Production in 1989 was 121 mt.

### Fish Cracker

Fish crackers, packaged in sealed plastic bags, are a popular snack in Malaysia. For the most part, these products are made from pelagic species, including the Wolf herring (*Chirocentrus dorab*), herring (*Clupea/Sardinella* spp) and trevally (*Selaroides* spp).

Most fish cracker processors are located in the east coast states. The level of modernisation varies. Although most plants have mechanised mixers and mincers, some still use traditional manual methods for the forming of products. In this operation a mixture of fish meat and sago or tapioca flour, combined in a 1:1 ratio, is shaped into cylindrical form by hand. (The Malaysian Agriculture Research and Development Institute (MARDI) has been encouraging the use of a forming machine for this process). The product is then either boiled or steamed for one to one and a half hours after which it can be eaten fresh, or dried and then fried in oil.

There are variations in the quality and colour of fish crackers. These reflect the use of different species of fish, flour, recipes and processing methods. Deep fried fish crackers, packed in plastic package are available as snack food.

### Fish Satay

This is a new product and one that is growing rapidly in popularity. The main species used are goatfish (*Upeneus sulphureus*). Small jewfish and anchovy have been tried but the results have not been quite as acceptable.

There are two levels of processing. The primary processors gut, clean and dry the fish, which is then sold to a secondary processor who rolls the fish and adds sauce. The fish is then roasted in the oven for 25-40 minutes. The quality of fish satay differs according to the species of goatfish and the sauce used. Only 665 mt were produced in 1989.

### **Shrimp Paste**

Local shrimp paste is orange/red or chocolate in colour and most of it is made by smallscale processors in the traditional way. The raw material is *Acetes* spp. to which salt is added at eight to ten percent by weight. The mixture is drained for five to eight hours to reduce the water content and then pounded. It is kept in wooden boxes for seven days. Before being sold the paste is shaped into oval or rectangular blocks, packed in paper and labelled.

### **Fish Sauce**

Most of the fish sauce was produced and consumed by people in the states of Peninsular Malaysia. The species used are anchovy, small goatfish or herring. The fish is gutted and cleaned before being put in brine solution in concrete tanks where it is kept for six to twelve months. The fermented solution is filtered and then boiled with brown sugar and lime juice. It is cooled before being bottled.

There has been little change in the method of preparation. A suggestion has been made by MARDI that the industry use starter culture/enzymes to reduce the fermentation time.

### **Shrimp Sauce**

This product is produced with a process in which cleaned *Acetes* are mixed with 20% salt and 6% cold rice. The mixture is kept in airtight earthen pots for 20-30 days.

Processors are now adding colour to their products to enhance their consumer appeal. Production in 1989 was 34 mt. This product is commercially produced in Malacca and is popular with the local people.

### **Fishball-Fishcake**

Most fishball plants are on the west coast of Peninsular Malaysia. The majority are partially mechanised, that is, they are equipped with at least a deboner and a mixer. Larger plants may also have

ball-forming machines. The smaller ones shape the product by hand.

The recipe of the mixture is always a trade secret. Usually fish is mixed with salt, flour, chilli powder, onions, sodium borate and polyphosphate. The fishball is left to set in cold water for two to three hours. Production in 1989 was 2,905 mt.

### **Tuna/Sardine Canning, Prawn/Fish Freezing**

These are the products of large companies. These firms are subject to the standards of the foreign countries to which they export most of their production, and they usually practice strict quality control. In 1989, a total of 3,177 mt of fish and prawn were frozen while 14,184 mt of fish, prawn, molluscs and cuttlefish were canned. Except for the cleaning and filling of raw materials, most of the other activities of these factories are mechanised.

### **Fish Meal**

Most unwanted fish is converted into fishmeal; 41,082 mt of it was produced in 1989. The technology and the product quality are low compared with that of other advanced countries.

### **Problems Faced By The Industry**

Fish landings in Malaysia have remained constant over several years but is expected to increase with the development of the offshore fishery. This should open up opportunities to increase the output of value-added fish products. However, this may be offset by the tendency of processors in the same area to rely on just one species of fish, a practice that leads to fierce competition for that species.

The quality of landed fish varies according to the handling method and the quantity of ice used. Unless sufficient ice is available on the vessel, it is difficult to prevent deterioration of the fish. And, since fishermen do not get good prices for their catch, they cannot afford to use as much ice as they should.

Although the processors know that mechanisation can improve their efficiency and product quality, they usually cannot afford the equipment. As a result, they are forced to use low-level technology and traditional methods. This often contributes to higher production costs and to excessive wastage of product.

Another problem is that no single government agency is responsible for product quality. Various agencies, viz, the Department of Fisheries, the Fisheries Development Board of Malaysia and MARDI, have different roles to play but no one agency is responsible for coordinating or for follow-up. As a result, very little R & D is done in this area, and extension work is limited.

### Future Development

The government will embark on a programme to modernise the fish processing industry while at the same time, introduce improvement to the traditional processing sector. Research and development on fish processing will aim at bringing the Malaysian processing industry more into line with modern processing industry in other countries. At the same time, improved post-harvest handling and increased use of ice will be widely encouraged in both the commercial and traditional processing sectors.

In the traditional fish processing sector, more emphasis will be placed on hygiene; specifically on the cleanliness of handlers and premises. The programme will aim at all-round improvement of traditional processes as a means of boosting productivity and improving the income level of these largely family-owned businesses.

Significant extension and training services for the processing industry will commence with the establishment of regional extension centres being set up in Peninsular Malaysia and Sarawak.

### Recommended Activities In Processing Technology

Although the processing industry is still largely traditional in Malaysia, demand for processed fish products will cause it to grow and to develop

Summary table of processed marine fish products in Malaysia, 1989

Item	Production (mt)
Fish meal	41,082
Dried anchovies	7,510
Fish crackers	1,639
Salted/dried fish	4,735
Manure fish	20,993
Frozen prawn	3,019
Shrimp paste ( <i>belacan</i> )	4,456
Frozen fish	2,118
Boiled fish	12
Fish ball	2,905
Dried prawn	1,378
Frozen cuttlefish	158
Dried jellyfish	367
Dried cuttlefish	121
Fish satay	665
Prawn paste ( <i>otak udang</i> )	68
Fish sauce ( <i>budu</i> )	199
Shrimp sauce ( <i>cincaluk</i> )	34
Prawn crackers	14
Dried shellfish	13
<b>Total Production</b>	<b>91,486</b>

along commercial lines. Because of fierce and competitive pricing, higher-grade products are essential. Processing will have to be conducted under conditions more conducive to a high level of quality. The elements of this environment must include plentiful ice and cold stores, a reliable supply of good raw materials, good equipment and efficient processing lines.

Research and development on fish processing should be given top priority. Also needed is a concerted government-supported extension effort to transmit information to the private sector.

Regular training should be made available to both the trainers (extension workers) and the

processors. These are both areas in which the SEAFDEC/MFRD can provide useful service to member countries.

Introduction of new, proven technology, imported and domestic, should also be given a high priority. Foreign machinery of proven capability is often subject to high import duties which effectively put it out of reach of the average processor. A reduction of duties on machines for which no local equivalent is available, would help domestic processors overcome this handicap.

Also needed, if the processing industry is to expand, are loan facilities at low interest rates. This would allow processors to expand their operations and to become more competitive.

### Conclusion

Malaysia's industry has the potential to develop, particularly through the improvement of marketing channels for fresh fish. As a cottage industry, the processing sector has catered to and improved the living standards of rural people. Malaysia intends to develop this sector further.

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### Discussion

During the discussion, a query was raised about the use of sodium borate in fish ball in Malaysia. Mr Gan replied that although the use of sodium borate in food is no longer permitted, small-scale fish ball processors continue to use the additive.

On the comment that, generally, enzyme from fish gut is an important factor in fish sauce manufacturing, and when asked why in the Malaysian process, the fish gut was excluded, Mr Ismail explained that the use of whole fish including the viscera is unacceptable to the Muslim community. This is a recognized setback to the manufacturing process; however the use of refined enzyme is being encouraged.

In reply to a query about the total number of canning plants and prawn-freezing factories in Malaysia, Mr Gan estimated that there are 30 - 40 canning and freezing plants and promised to supply a precise figure

at a later date. (Update from Mr Gan: there are 15 canning and 35 prawn freezing plants).

Responding to the request for an elaboration of the method of production for manure fish, Mr Gan said that since this industry has not yet been modernised, the traditional way of mixing fish with agricultural produce before crushing and drying was used.

When asked whether the same kind of fish used in the manufacture of fish meal is used in the manufacture of fish "manure" (fish of minimal quality), Mr Gan replied that, most probably, similar fishes are being used but that the fish quality used in fish manure is much lower.