

A Highly Relished Food Fish of India



T. K. GOVINDAN

INTRODUCTION

The Indian mackerel, christened by scientists as *Rastrelliger kanagurta* (Cuvier), occupies an important position in the Indian fishery as a delicious, nutritious and highly relished food fish. Wide fluctuations are observed in the quantity of this fish harvested in our country as shown by the figures for the last decade shown below.

| Year | Quantity of mackerel landed : Metric tonnes | % of total marine fish landed |
|------|---|-------------------------------|
| 1961 | 34,485 | 5.0 |
| 1962 | 29,103 | 4.5 |
| 1963 | 76,980 | 11.7 |
| 1964 | 23,863 | 2.7 |
| 1965 | 43,095 | 5.2 |
| 1966 | 31,959 | 3.6 |
| 1967 | 29,194 | 3.4 |
| 1968 | 18,525 | 2.1 |
| 1969 | 91,837 | 10.1 |
| 1970 | 1,33,607 | 12.4 |

The reasons for this sort of fluctuation in the landings is not established yet even though it is presumed that a correlation exists between the quantity of fish landed and the abundance of its principal food materials in the region. The entire Indian fishery is constituted by a single species of mackerel mentioned above, even though two other species viz; *R. neglectus* and *R. Brachysoma* are also encountered in the Indo-Pacific region. Ninetyeight percent of the mackerel landed in India come from the west coast, east coast accounting for only the rest. Even on the west coast, the region from Ratnagiri to Quilon yields the bulk of the mackerel landed. It is a purely seasonal fishery commencing in August-September and ending in March-April.

CHEMICAL COMPOSITION

The important chemical constituents of the mackerel muscle are as follows:

| | |
|----------|---------|
| Moisture | : 74.7% |
| Protein | : 19.5% |
| Fat | : 5.5% |
| Ash | : 1.8% |

| | |
|------------|-------------|
| Calcium | : 778.2 mg% |
| Phosphorus | : 48.1 „ |
| Iron | : 8.5 „ |

However, some variations in moisture and fat contents are liable to occur according to seasons.

TRANSPORTATION

Mackerel is one of the important items occurring in the mudbanks of Kerala and considerable quantities of it used to go waste due to spoilage during glut seasons. Of late, this sort of wastage has been fully controlled by employing quick means of transport like lorries for rushing the fish to interior markets like the high ranges of Kerala and using ice for preservation of the fish during transport. Fresh mackerel is at present transported in carrier launches from Malpe and Ratnagiri to Bombay and by refrigerated rail wagons from Calicut and Mangalore to Madras and from Bombay to interior places like Delhi. By this kind of transportation and employing other methods of preservation, wastage of the fish is completely avoided at present.

PRESERVATION

For short periods, say upto a week, mackerel can be preserved in sound condition by means of crushed ice. However, for long term preservation, other methods like freezing, canning or salt curing and drying will have to be resorted to. Even though it has been experimentally shown that mackerel can be preserved well for a couple of months by freezing and frozen storage, the method is not found to be employed commercially, probably due to the cost factor involved. By far the most common single method of preservation applied to this fish (as also to almost 50% of the landed fish) in our country is curing,

for which several modifications are followed generally. The simplest and oldest method is salt curing and drying in which the fish is split open dorsally or ventrally, intestines and gills removed, washed and smeared with one-fifth the weight of common salt. The salted fish are stacked in large cement tanks and heavy logs of wood placed over them. The self brine formed covers the fish in the course of a day. After about 48 hours, the fish are taken out, rinsed with fresh water to remove adhering salt, dried in the sun, packed in baskets improvised with coconut leaves and transported to the interior markets.

SOME DEFECTS IN CURED FISH

Some defects are observed in our cured fish products and our cured mackerel is also not free from these. The first and foremost point in this connection is that the people engaged in this trade are mostly illiterate and unaware of the requirements of the degree of cleanliness and hygiene with which a food material intended for general distribution is to be handled. As such, due care is not taken in the process of dressing and salting, the dressed fish is not often cleaned with the required quantity of potable water and the salting tanks and surroundings are not maintained in good hygienic condition. Due to the same reasons, the salted fish takes up a lot of bacterial and insect contamination which develop and multiply when the fish is dried and stored, causing quick spoilage of product. Use of insufficient proportion of salt and insufficient drying accelerate the process of spoilage. Fungus attack and red discolouration (due to red halophilic bacteria) are the first signs of spoilage generally observed. By adhering to strict hygienic conditions, main-

taining correct proportions of salt to fish and dehydration to the required levels (30% moisture), dried mackerel can be preserved in good edible condition for eight to nine months. Methods are now available for doubling the shelf life of cured and dried mackerel. One such method consists in smearing the mackerel previously salted and dried as mentioned before, with a preservative mixture consisting of 3% sodium propionate and 0.05% butylated hydroxy

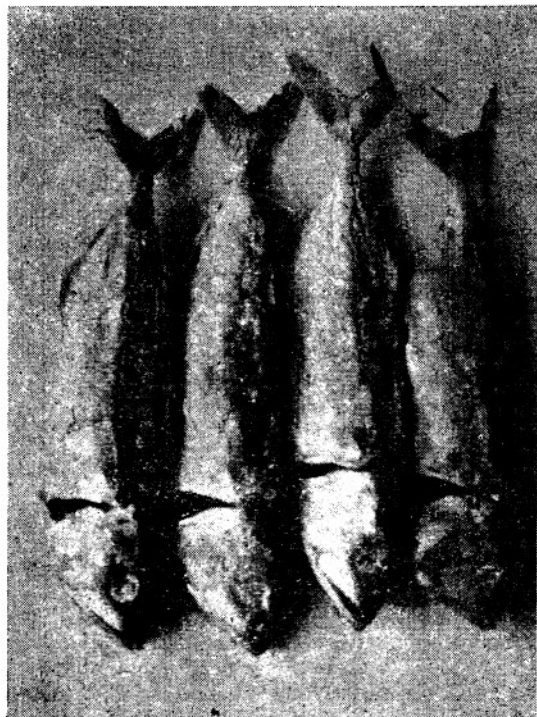


Fig. 1 *Dry cured mackerel smeared with preservative mixture. Photographed nine months after preparation.*

anisole (BHA) in refined salt. These chemicals are harmless in the above concentrations and are permitted food preservatives. Moreover, they are

leached out when the dried fish is soaked in water prior to cooking.

Another point of importance in this trade is about packaging. The packaging materials used at present (coconut and palm leaf mats) are not only unattractive and lacking in hygiene but also are not proof against insects and rodents which prey upon the dried fish. There is a proverb in Malayalam which means that even if the food is not of first rate, the short-coming will be more than compensated if it is served in neat and attractive plates. The same principle holds good in the case of our cured fish products also. Use of polythene lined dealwood boxes or gunny bags for bulk packaging and attractively printed polythene bags for retail/consumer packs can go a long way in improving and prospering our cured fish industry. The reason for our cured fish products not finding a good foreign market is also not far to seek. In case hygienic products making use of the above technological innovations are put in the market, our dried fish products are also sure to command as respectable a position as our frozen and canned fish products and they will be readily acceptable to any sophisticated market. Our industrialists should bestow the required efforts and care towards this end!

COLOMBO CURING

This is one modification of the curing process which is specially intended for the Colombo market from which fact it has derived the name. The initial stage of salting is the same as that followed for dry curing. After the mackerels are "struck through", they are taken out, excess salt rinsed off with fresh water, finely cut pieces of dried Malabar tamarind pods (Malayalam: Kudampuli or Gorukapuli, (Latin: *Garcinia cambogia*) placed inside the belly flap,

flaps pressed together and stacked in wooden barrels. Saturated brine is then poured to cover the fish, barrels closed water-tight and exported. Fish preserved in this way keeps well for about nine months. In commercial prac-



Fig. 2 *Colombo cured mackerel after six months of storage.*

tice, Colombo cured mackerels are stored in large cement tanks in bulk and packed in wooden barrels according to demand. The tamarind acts as a preservative for the fish. It has been shown recently that if saturated brine containing 0.5 to 1.0% propionic acid is used in the above process instead of the tamarind, the fish is preserved for much longer time without the least signs of spoilage.

OTHER CURING METHODS

In rainy seasons, the salted fish cannot be dried under our existing con-

ditions and hence they are sent as such to the market. This process is called 'wet curing'. However, fish preserved in this way gets spoiled in eight to ten days. After salting, the mackerel can be smoked and dried. This method is called 'smoke curing'. Smoking imparts an agreeable and attractive flavour to the fish. The flavour, however, is found to depend upon the firewood used for generating the smoke. Experiments with several types of wood have shown that a mixture of saw dust and coconut husk imparts the best flavour to the fish. Smoke cured mackerel used to be produced in large quantities in India and supplied to the defence forces during the second world war; but the method appears to have been discontinued after the war.

CANNING

Canning is widely employed for preservation of mackerel at present in our country. The bulk of the product is supplied to our defence forces, while a small quantity finds its way to foreign markets and a still smaller quantity is sold out in the internal markets. In this process, the fish is dressed, cleaned and washed. It is then kept immersed in 15% brine for 30 minutes and pre-cooked at 0.35 kg./cm^2 steam pressure for 45 to 50 minutes. They are then cut to can size, filled in cans of the required size, followed by hot refined oil, or boiling 3% brine or tomato sauce, as the case may be, exhausted, double-seamed and sterilized at 0.91 kg./cm^2 steam pressure for one hour. The processed cans are suddenly plunged into cold water, surface cleaned, dried and labelled. The cans are then packed in dealwood or cardboard boxes and sent to the market.

It is interesting to note that the Indian Standards Institution has formul-

ated and published quality standards for canned and cured mackerel. In case the mackerel is smoked after brining and then canned, the product becomes all the more tasty.

BIOLOGY

It has been inferred by scientists that mackerel spawns (reproduces) at the age of two. Even though the spawning grounds have not yet been clearly located, recovery of its fingerlings from near Vizhinjam in Kerala and off Madras has given rise to the speculation that spawning takes place at least near about these two regions. It is presumed that spawning takes place in the months of July and August on the west coast and in October on the east coast.

Examination of the stomach contents of mackerel has shown that it is a carnivorous fish. The chief food of the juveniles is plankton, no special preference being shown to either phytoplankton or

zooplankton. But adults prey upon small prawns and fingerlings of other fishes. Mackerel grows to 10 cm. in the first year. Our commercial fishery of mackerel is constituted by the 18-22 cm. size ones and hence are presumed to be of the second year group. Mackerels measuring upto 31 cm. have been encountered, occasionally. The total life span of mackerel is not yet known.

CONCLUSION

The bulk of the mackerel landed in our country at present is by country craft. Mechanised fishing is sure to be employed for this fishery sooner or later, which is bound to increase our landings several fold. Along with increased landings if we apply the modern technology of preservation as detailed herein, it is sure to go a long way in alleviating our food deficit conditions to a great extent, besides earning considerable amounts in foreign currency. ●●

BLYTH, GREENE, JOURDAIN & COMPANY, LIMITED

PLANTATION HOUSE,

FENCHURCH STREET,

LONDON, E. C. 3

IMPORTERS AND EXPORTERS OF

Canned and Frozen Seafoods