

## CANNING OF MACKEREL IN NATURAL STYLE (SALMON STYLE)

**Aim:** To study the canning of mackerel in natural style

**Introduction:** The mackerel belong to the family “*Scombridae*” and are composed of many genera and several species varying in size and weight, but similar in shape and form as well as anatomical features.

Indian mackerel (*Rostrelliger Kanagurta*) is one of the most important pelagic fishery of India, known to occur all along the East and West coasts of India from Kathiawar in North West coast to Kolkata in North East coast of India. The mackerel fishery is exploited using shore seine (Rampani), boat seine and purse seines from September to March. The commercial fishery has a size range of 18-22 cms, weighing in the range of 90-130 grams and has a life span of 6-7 years. The spawning season on the East Coast starts from October and ends in the month of April. Fish measuring less than 14 cms and weighing 70-85 grams are not suitable for canning due to less yield rate, less fat content and more precook loss.

In earlier days more than half of the catch was used for drying with or without salt. In recent years the consumption of mackerel in fresh condition has greatly increased due to better transportation and preservation facilities. To some extent the Indian mackerel is also used for canning purpose, with brine/oil/tomato sauce as the packing medium for supply to the military personnel and the people of North Eastern States of India.

In the ‘*Natural*’ style, fresh fish with skin and bones are packed with minimum pretreatment. Only very fresh fish are canned in this style.

The mackerel are related to tunas, resemble them in shape though smaller in size. They are almost scale-less swift moving fishes. They live long shore and far at sea. They have high commercial value. Canning of mackerel was started in USA in 1893.

In India mackerel used to be a sizeable catch in the marine landings. It is liked as fresh, but the abundance of the catches made it necessary to be preserved. Salting, drying and smoking were the methods used until recently. Canning of mackerel became more popular on account of the demand by army and by the general populace.

### **Product Code: MKN**

Cans Used : a) 8-Oz. Can, SR- lacquered  
b) No.1 Tall can, SR- lacquered

Std. net weight : a) 425 grams for No.1 Tall can.  
b) 210 grams from 8-Oz. can

Std. solid weight : Minimum 65% of net weight (BIS)

### **Materials and Equipments:**

Fish, salt, tables, cutting boards, knives, trays, tubs, empty cans with lids, seaming machine, retort etc.

### **Procedure:**

Raw material : Fresh Fish (whole)



Washing : To remove dirt, slime and other unwanted material



Weighing : To determine yield



Dressing : It is an operation involving removal of head, splitting the belly, removal of viscera, cutting of tail and fins, scaling the fish and removal of slime.



Washing : To remove blood and clean the fish



Cutting : The dressed fish are size cut to required length, discarding tail ends (10.8 cms for No.1 tall can; 5.5 cms for 8-Oz. Can).



Washing : To clean the fish pieces



Weighing : to determine dressing yield



Brining : It is done by immersing the size cut fish pieces in saturated brine solution for 8-12 minutes depending on the size of pieces; to remove blood stains, improve texture and appearance, prevent turbidity in the filling media and prevent 'curd' formation on the product.



- Dipping : It involves giving a quick dip in fresh water to remove excess of salt from the surface of fish.  
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 Packing : The product is packed axially to net weight + 3 or 2 grams extra.  
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 Salt adding : Add 0.5-1.0 gram dry, powdered table salt for taste.  
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 Seaming : It is done by vacuum or after proper exhausting for 10-12 minutes at 100<sup>0</sup>C, using a double seaming machine set to can size.  
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 Can washing : With soap water and then fresh water.  
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 Processing : It is done in retorts / autoclaves at 115<sup>0</sup>C (10 psi) for 90 minutes in case of No.1 Tall cans and 70 minutes for 8-Oz.. cans.  
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 Cooling : The hot cans are to be rapidly cooled to 37-38<sup>0</sup>C, either in running water or ice cold water, which usually takes 45 minutes.  
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 Drying : After cooling, wipe the can surface. The heat remaining within the meat helps to dry the outer surface of the can, thus preventing rust formation.  
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 Labeling : Indicate the batch, date of production, product code, net weight, etc. on the label stuck to the surface of the can.  
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 Storage : In cool and dry place

**Observations:**

- Weight of raw material :  
 Weight of dressed fish :  
 Number of cans produced :  
 Weight of fish packed /can :  
 Number of persons involved :  
 Total weight of salt added :  
 Size of can used :  
 Cost of fish, sub materials, cans etc. cost per can :

**Calculations:**

1. Dressing Yield (%) =  $\frac{\text{Dressed fish weight}}{\text{Raw material weight}} \times 100$

*Weight of raw material*

$$2. \text{ Canning yield (\%)} = \frac{\text{Packed weight} \times \text{Number of cans produced} \times 100}{\text{Weight of raw material}}$$

Weight of raw material

$$3. \text{ Yield Rate (kg/case)} = \frac{\text{Total raw material weight} \times \text{Number of cans/ case}}{\text{Number of cans produced}}$$

$$4. \text{ Efficiency} = \frac{\text{Number of cans produced (or cases)}}{\text{Man-hours (No. of persons} \times \text{No. of hours worked)}}$$

**Note:**

- 1) The capacity of round cans per case is 48.
- 2) The capacity of quarter Dingley rectangular cans per case is 100.

**Precautions:**

1. Minimize the handling of fish.
2. Avoid delay at all stages
3. Keep the fish with crushed ice, if the processing is delayed.
4. Clean the dressing table and floor area frequently
5. Keep the fish cutting knives always sharpened.
6. The limit of freshness of raw mackerel was found to be 20mg% VBN. If the mackerel is held at 20<sup>0</sup>C, it should be packed and processed within 15 hours.
7. Mackerel meat autolysis more rapidly than does other fish therefore the use of good preservation technique like ice chilling, and freezing or sometime salts is used with ice. The chilling temperature is considered to be best at -6<sup>0</sup>C or below.

*Technical Problems concerning the Processing of Canned Mackerel*

- 1) **Curds Formation:** Even with fresh raw material, the formation of “*curd*” is often found in the canned product. Such curd formation is due to the coagulation of soluble protein in mackerel meat. This is more common where mackerel is generally canned without pre-cooking. The meat protein coagulated by heat, adheres to the inner side of the can ends and presents a poor appearance on opening the can. The lacquer may get peeled off while

removing the curd from the can ends. Curd is a salt soluble protein that exudes and coagulates during heating.

Use of raw fish, which is not very fresh and inadequate brine and pre-cooking are some of the reasons responsible for formation of curd. Curd formation can be prevented if the raw fish is soaked in 10-15% NaCl solution for 20-30 minutes followed by thorough washing before filling.

**2) Adhesion:** Adhesion means that the meat adheres to the inner side of the cover of the can. The cause of such adhesion is considered to be due to the raw meat coagulated by heating coming in contact with the inner side of the cover.

To prevent the development adhesion, the inner side of the can is moistened with distilled water or with 0.1% silicon resin solution before filling.