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OF ARTS, SCIENCE & COMMERCE

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# DEPARTMENT OF ZOOLOGY

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## Unit 5: Preservation & Processing

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Subject : Fishery Biology  
TYBSc SEM VI

- 5.1 Traditional methods & their modifications:
  - i) Icing
  - ii) Drying
  - iii) Salting

# Conservation and storage:

Conservation is necessary to keep the dead fish in fresh condition for quite a long time. This is achieved by employing any one of the methods like freezing, drying, salting, smoking and canning.

# Icing

- Storing fish in sufficient ice
- Fish ice ratio 1:1
- Total height of fish pack not more than 20cm
- Dry ice ( solidifying liquid CO<sub>2</sub>) is use

# Drying

Drying involves dehydration i.e. the removal of moisture contents of fish, so that the bacterial decomposition or enzymic autolysis does not occur. When moisture contents reduce up to 10%, the fishes are not spoiled provided they are stored in dry conditions. Fish drying is achieved either naturally or by artificial means.

# Natural drying

In natural drying the fishes after being caught are washed and dried in the sunshine. They are suspended or laid out flat on the open ground. The process, however, has a number of disadvantages. It is slow and results in much loss, through putrefaction. It can be carried out only in dry, well aerated climate receiving sunshine which is not too hot. It, thus depends upon the environmental factors and availability of space. Lastly only the thin fishes can be preserved by this method, because the fat fishes have much flesh allowing bacterial decomposition to continue in deeper parts of their body. An additional disadvantage is that dried fishes require a long soaking period to restore water and that the sun dried fishes are not usually relished.

# Artificial drying

In artificial drying the killed fishes are cleaned, gutted and have their heads removed. They are then cut lengthwise to remove large parts of their spinal column, followed by washing and drying them mechanically.

- 1 .In hot air driers moisture content in the fish is evaporated by blowing hot air
2. Rotary driers use for preparation of fish meals
3. In Vacuum driers moisture is removed by applying low temp under vacuum. Heat is applied by conduction or radiation. Such dehydrated fish can be readily reconstituted.

# Salting

Salting is a process where the common salt, sodium chloride, is used as a preservative which penetrates the tissues, thus checks the bacterial growth and inactivates the enzymes. Salting commences as soon as the fish surface of the fish comes in contact with common salt and the end product shall have the required salinity with taste and odor. Some of the factors involved in salting of fish which play an important role are purity of salt, quantify of salt used, method of salting and weather conditions like temperature, etc. During the process the small fishes are directly salted without being cleaned. In the medium and large sized fish the head and viscera are removed and longitudinal cuts are made with the help of knives in the fleshy area of the body.



Then the fish is washed and filled with salt for uniform penetration through flesh. Large fishes like sharks are cut into convenient sized pieces. Generally, sardines, mackerels, seer fishes, cat fishes, sharks and prawns are used for salting.

The salt used should be pure common salt so as to keep the quality of the fresh fish. Traces of calcium and magnesium caused whitening and stiffening of the flesh and gives bitter or acid flavor to the product. In addition it does not allow the easy penetration of common salt. Dry salting, wet salting and mixed salting are the three methods employed in salting of fish.

# Dry salting

In this process the fish is first rubbed in salt and packed in layers in the tubs and cemented tanks. The salt is applied in between the layers of fishes in the proportion of 1:3 to 1:8 salt to fish. The proportion of salt to fish varies with the fish since the oily fish require more salt. At the end of 10 - 24 hours the fishes are removed from the tubs and washed in salt brine and dried in the sun for 2 or 3 days. Large fish lose about one third and small fish about one half of their dressed weights.

# Wet salting

The cleaned fish are put in the previously prepared salt solution. It is stirred daily till it is properly pickled. In some fishes like seer, black pomfret, Indian salmon etc., the gut is removed and filled with salt in 1 : 3 proportion. First the salt is filled in the gut region of the fish and stacked, on the following day further addition of salt is done since the salt settles down at the bottom. Finally the process is repeated to ensure the proper filling up of salt and left undisturbed for 7 - 10 days allowing the liquor to flow off. This method is mostly followed in eastern parts of our country. In western parts the gut is removed and the salt is applied in one lot and they are arranged in bamboo baskets. The fishes preserve in wet salting process are to be consumed before the rain sets in and the fishes are marketed without drying.

# Mixed salting

In this process, simultaneous use of salt and brine is followed. The salting process is continued till the concentration of salt in the surrounding medium equalizes with the concentration of salt in the fish tissue. The salting process may affect the shape, structure and the mechanical features of muscle tissue

# Pit curing

It is another process employed in south and south east of our country. In this process the fish treated with salt are buried in pits lined with leaves. After 2-3 days they are removed and marketed directly.

- 5.2
  - i) Introduction to refrigeration : Types & properties of refrigerants
  - ii) Types of freezers:
    - a. Brine
    - b. Air blast
    - c. Tunnel
    - d. Contact plate
    - e. Cryo-quick
    - f. IQF: Individual Quick Freezing
  - iii) Freezing Procedures :
    - a) PUD (Peeled & Un-deveined)
    - b) DV (Deveined)

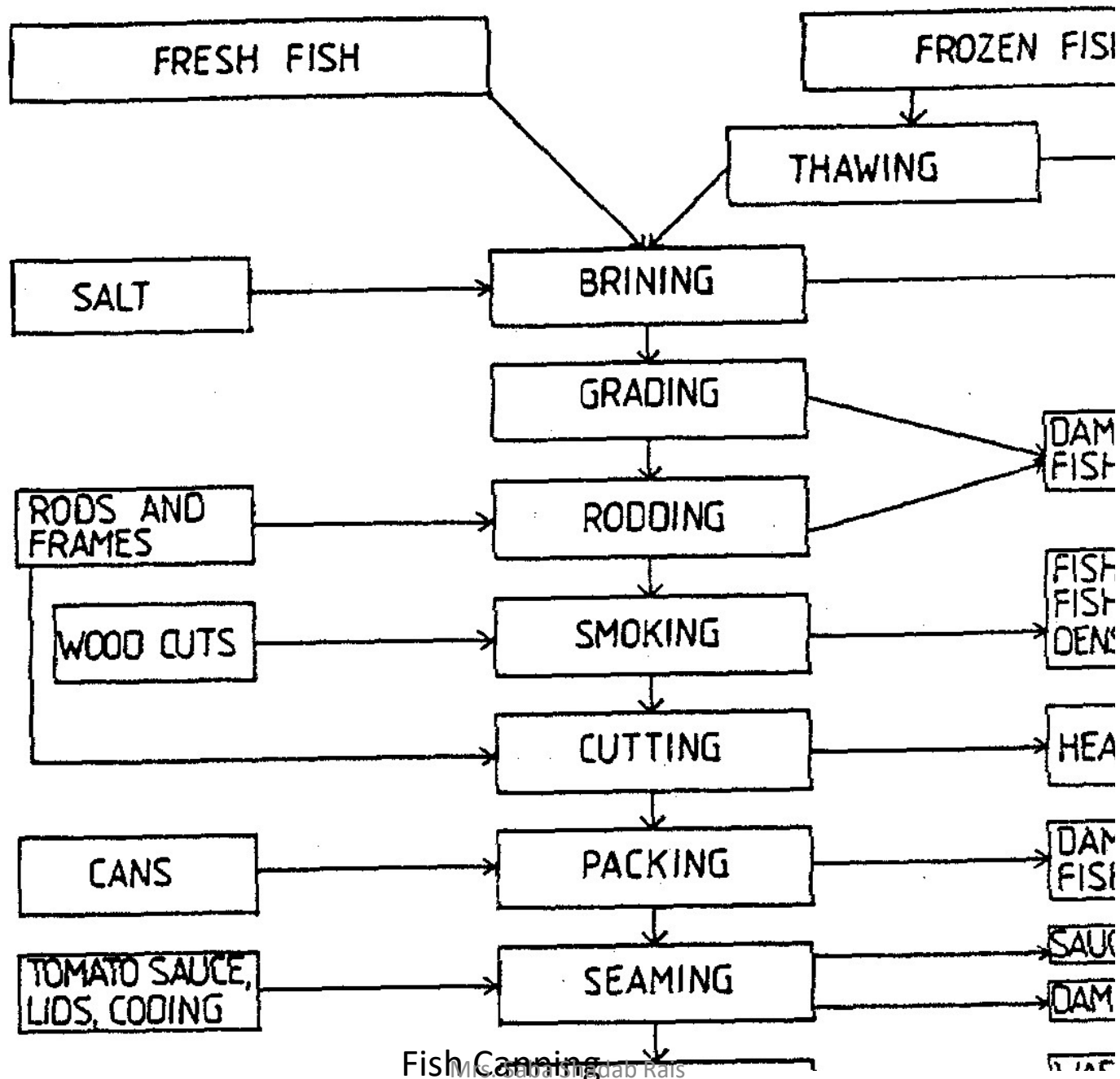
- 5.3 Principle & steps involved in can reform & canning of fish and shrimp in various media

# Canning

Canning is a method of preservation in which spoilage can be averted by killing micro-organisms through heat. It is generally well known that food carries micro-organisms which cause spoilage if left unchecked. These micro-organisms are to be eliminated and the entry of other is restricted. The canning process involves pre-treatment of fish, preparation of can, filling and closure of the can, technique of heating the filled cans to kill micro-organisms without damage to fish, finally cooling, cleaning and storage of the product. The raw material should be processed properly since it contains most dangerous *Clostridium botulinum* which should be destroyed. This is found in protein rich food such as fish which has pH 6- 7 and is nonacidic. There are some other heat resistant bacteria like *Clostridium sporogenes* which can be eliminated at a temperature of 5

- 6 times more than *Clostridium botulinum*. It needs a temperature of 120°C for 4 minutes or at 115°C for 10 minutes to kill them in large numbers.





Fish Canning

## 5.4 Equipment and utensils used in seafood processing

Below are some of the utensils and equipment used in food (fish) processing:

1. Weighing scales - used to weigh fish and meat.
2. Measuring spoons - used to measure the right amount of substance like sugar or salt.
3. Measuring cups - used to measure liquid substances.
4. Knives - used to cut fish or meat
5. Scissors - used to trim fish's fins
6. Oil drum - serves as container for salted fish
7. Bakol - used in transporting smoked fish
8. Tongs - picking and getting food
9. Chopping board - this is where ingredients are cut same as the fish and meat.