



Principles and Preparation of fish paste products

1. Minced meat technology
2. Surimi production
 - selection of raw materials
 - Manufacturing of surimi
 - Role of cryoprotectants
 - Grading of surimi

Minced Meat Technology

- Technique emerged for utilization
 - Under utilized
 - Undersized
 - Low cost fish



Minced Fish :

The flesh separated

from the fish in a comminuted form free from scales, bones, fins and skin. Locally known as 'Kheema'.

Production of mince is a technology that assumes importance when applied value to it.

- Smaller fish unmarketable as whole can
- be used as a mince.



- **Raw materials :**

- **1. Commercially imp fishes:**

- Cod. Hakes, haddocks, pollocks,
- Flat fishes, Perches, Mackerel, Sardine, Tuna etc.



- **2. Underutilized fishes**

- Mullet, Baracoid, Lizard fish, Pony fish, Big eye, blue whittings, menhaden, lantern fish, big eye, Antarctic krill etc.

- **3. By-catch**
- Anchovies, Croakers, Ribbon fish, Thread fin bream, Caranx, silver belly, horse mackerel, jew fish, red snapper, white bait etc.
- Freshwater fishes (common carp, mullet, tilapia etc.) have been used but not preferred due to high bone content.
- Fish sps of low fat & high meat content considered suitable for mince preparation.

Advantages:

- > Offers utilization of those fishes which are otherwise discarded.
- > Efficient utilization of every portion of the catch.
- > Assorted size, shape & variety of fish sps are lost & results a uniform product.
- > It conceals identity of original fish from which it is made.
- > Ready material for preparation many highly acceptable ready-to-eat fish products.

Disadvantage:

- Mince often contains small pieces of bones, scales and skin
- It cannot be kept unprocessed for long time as it is susceptible for microbial contamination.
- Can get contaminated if handling practice is not good.
- Susceptible to microbial, enzymatic & oxidative breakdown.

Production of fish mince

- The most of the fish used are by catch from shrimp trawling.
- Fillets are passed through mincer in small scale operation
- When raw material is available in large quantities meat bone separators are used.
- Filleting waste – 50% of meat
- Mechanical device for separating flesh is necessary.
- Yield varies with type of fish sps.

- **Fish Deboning** :
- **Fish deboner/Meat picking machine**
- This machine separates the flesh, guts from harder parts like bones, scales and fins.
- Meat separated from
- whole/gutted fish.
- Adjustable belt and
- perforated drum
- rotating in opposite
- direction between
- which fish is passed.



- Pressing action of rubber belt – meat separates from bones.
- The tension on the belt and the size of perforation on the drum decide the yield and quality of mince.
- The lower the perforation the mince obtained is of fine size and good in colour but loss is high.
- If perforation is larger, yields better but needs refining.
- The yield is more by meat/bone separator compared to hand or machine filleting and mincing the fish.
- Recover flesh from head, belly & also from bone frame.

- **Mincing operation :**

- Reducing size for proper
- Mixing with additives.

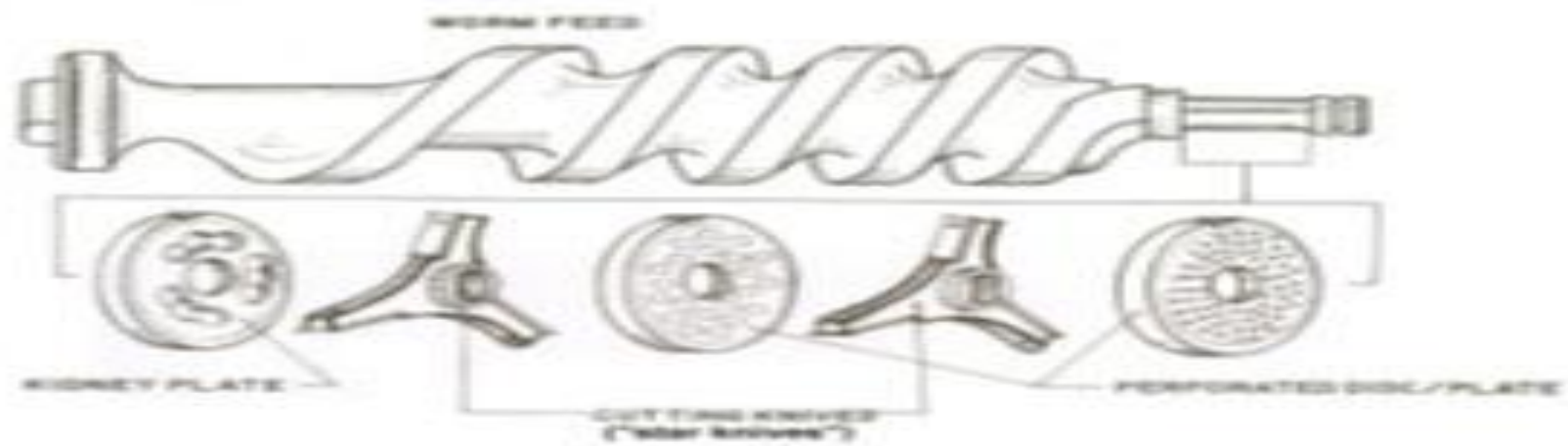
- **Meat mincer :**

- Helical metal shaft &
- Cylindrical tube.
- Dia of Shaft decreasing from inner to outer.
- Outer end – metal blade. Then perforated discs.
- Big dia of disc – prevent heat generation .
- Small dia – remove inedible parts.
- Capacity 100 Kg/hr.



- Packing in polythene bag.
- Freezing at -40°C
- Cold storing at -18 to -20°C in deep freezer.
- **For best quality mince:**
 - Use only single species
 - Freshness of raw material is important.
 - Mince contains enzymes, lipid, haeme pigments which affect shelf stability.
 - In storage undergoes protein denaturation by cross-linking with formaldehyde formed from TMAO.
 - Higher in dark fleshed fish.

- ❖ Texture degradation by enzyme proteolysis.
- ❖ Extreme fat degradation
- ❖ Denaturation of protein as a result of intimate mixing of components during mechanical separation of meat.
- ❖ Bone content
- ❖ Color & appearance : mince darker than original
- ❖ Contamination of melanoid pigments.
- ❖ Despite all these mince meat preferred for production of diff value added products utilizing by-catch & low valued fishes.



- **Additives to increase shelf life & functional quality :**

- **1. Cryoprotectants :**

- hexose (glucose, fructose), disaccharide (sorbitol & glycerol), amino acid (sod glutamate, sod aspartate), phosphate (pyrophosphate & tri poly phosphate).

- **2. Functionality enhancer :**

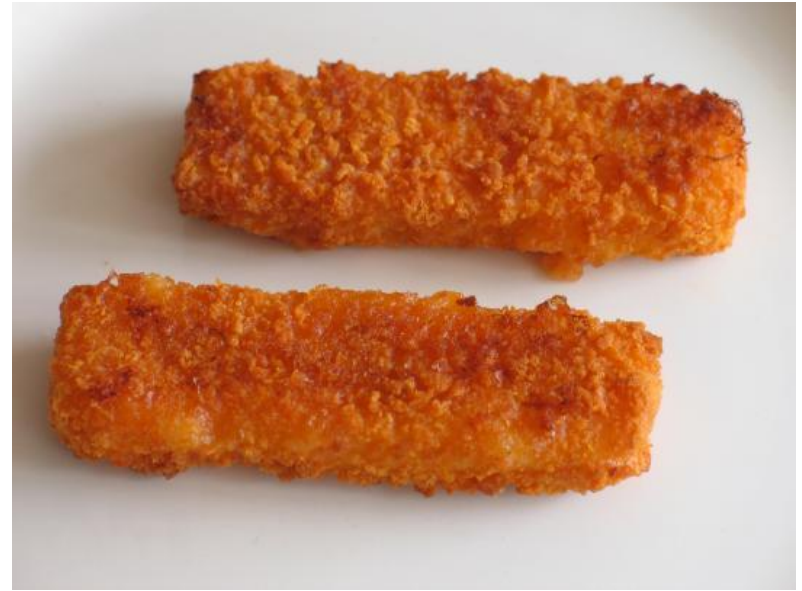
- Sod chloride, polyphosphate, hydrocolloid (alginate, carrageenan, CMC etc.), proteins (casein, gluten, egg albumin), carbohydrate (starch, sugar) & fats.
- Salt increases adhesiveness, STPP enhances functionality of protein,

- Hydrocolloids –water binding & gel forming ability.
- **3. Antioxidants :**
- BHA, BHT, EDTA, astaxanthin in shrimp flesh etc.
- Glazing with water & packaging in O₂ impermeable film minimize this.
- **4. Color & flavor stabilizers :**
- Hydrogen peroxide as bleach in mince.
- Milk, gum, soy-curd, polyphosphate – whitening effect.
- Antioxidants stabilize color & flavor.
- Spices -- to add characteristic color & flavor.

Minced based products:

Application in processing convenience foods like :

Fish finger:



Fish Cutlet:



Fish Burgers :



Salted fish cake :



Fish Ball.



Fish Nuggets.

