



# FISH AND SEA FOOD PROCESSING: 35

## BY-PRODUCT UTILIZATION FROM FISH AND SEA FOOD

□ TECH. OF MEAT, POULTRY , FISH AND SEAFOOD PRODUCTS:

**(Module No. 35)**

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# Introduction: (By-Product Utilization: FISH AND SEA FOOD)

- Fish waste is a great source of minerals, proteins and fat. Potential utilization of waste fish scraps from 5 marine species:
  1. White croaker
  2. Horse mackerel
  3. Flying fish
  4. Club mackerel
  5. Sardine
- To produce fish protein hydrolysate by enzymic treatment was investigated by and indicated that fish protein hydrolysate could be used as a cryoprotectant to suppress the denaturation of proteins of lizard fish surimi during frozen storage.

# Fish Waste Utilization

- ❑ Collagens containing yellow tail fish bone and swine skin wastes were used as raw materials for production of protein hydrolysates and peptides.
- ❑ Fish Protein hydrolysates could be of potential use as food ingredients.
- ❑ Enzymes and bioactive peptides obtained from fish waste or by-catch and used for fish silage, fish feed or fish sauce production.
- ❑ Auto-hydrolysis of waste fish viscera to produce peptone hydrolysates and their use in microbiological media to support growth and bacteriocin production by lactic acid bacteria have been reported
- ❑ Alternative uses of fish processing waste, like utilization of fish mince, applications of fish gelatin, fish as a source of nutraceutical ingredients, fishmeal production, the possible use of fish and protein concentrate as a food source.

# Fish Protein Isolate

- Fish protein isolate (FPI) is fish protein which has been purified to a protein content of at least 90% of the dry material.
- Surimi as FPI as the Surimi process includes purification of the fish protein mass.
- The term FPI is however in general used for pure fish muscular proteins which have been produced by pH-shift process.
- This method is thought to be more efficient for complex raw material such as whole fish and rest raw materials than the Surimi process.

# FPI

- The overall process concept is simple and includes the following steps: **solubilisation** of the muscular proteins (pH raised with alkali or lowered with acid), **separation** (density difference) and **precipitation**.
- The pH shift methods involve solubilising muscle proteins by subjecting diluted, finely homogenized fish meat to either very low pH (~2.5-3) or a very high pH (~10.8-11.2) at low temperature.
- Solids such as bones, scales, neutral fat and disrupted cellular lipid membranes are then removed by centrifugation and the soluble protein is precipitated by adjusting the pH to the isoelectric point of the myofibrillar proteins to give a protein isolate.



**A frozen block of fish  
protein isolate**

# Utilization of Fish Protein Isolate

- Fortification of fish fillet by multi-needle injection of fish proteins, static soaking, or vacuum tumbling have been reported.
- Fish protein injection is believed to enhance the yield and improve the frozen stability of fish fillet.
- There are indications that FPI give higher cooking yield and microbiologically more stable products than products with injected fish mince.
- Fish protein may form a protein film and act as fat blocker Emulsion based fish products are processed by mixing fish protein (surimi/minced fish) with different ingredients such as vegetable proteins, starches, wheat flour, spices etc. and forming fish paste into intended product shapes.

# Future Reading

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