

FISHERY BYPRODUCT

Fish Meals from Fish Byproducts

High Quality Protein and
Oil

Approximate Composition

- Protein 65-70%
- Fat 8-12%
- Ash 9-17%
- Water 6-10%



Pollock Meal

Pictures by S. Sethi

- **Fish meal** – chennai, mumbai, orissa & west bengal coast.
- Species- sardines, mackerels, ribbon fish, shark
- It is clean dried tissue of unrecompensed fish. The big sized fishes are cut into pieces while the small ones are treated as a whole.
- The process of manufacture involves the boiling of fish in sufficient water in large pots to extract oil.

- The cooked mass is then pressed in canvass or coir bags in screw presses to remove water.
- The resulting cake is then dried in sun. The solid mass is packed and marketed.
- Waste products of fish are utilized for preparing feed for poultry, pigs and cattle. It is particularly useful for chicken and other young animals as it contains amino acids, proteins in a readily digestible state.

- small quantities of iron, calcium and phosphorus and traces of vitamins A, D, B and K.
- It is therefore, a valuable source of food materials.
- High quality fish meal is used on animal farms to supplement the daily diet, while the low grade variety is used as manure in plantations of coffee, tea and tobacco.
- It is estimated that India produces each year about 1.5 lakh pounds of fish meal.

- **Fish Flour:**
- Fish flour is the fine. superior quality of fish meal.
- It is prepared on a large scale by the solvent extraction method.
- Fish flour is used for human consumption.
- It is rich in protein content and poor in fatty acid ingredient.
- It can be mixed with wheat flour a maize flour (10% fish flour and 90% wheat flour).
- It is used as an enriching component in bread, biscuits, cakes, sweets, soups and gruels.
- it is also a good source of the proteins for skin and infants ice-cream: pharmaceuticals due to its high nutritive value



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- (c) Liver Oil:
- Fish liver oil is important because it has high medicinal value and was known even in olden times.
- It is one of the natural sources of vitamin A, D and C. The fishes used to extract liver oil are cods, halibuts, tunas, sharks and rays.
- Cod liver oil is being used to cure rickets, tuberculosis and xerophthalmia.
- Fish liver oil has the following composition:

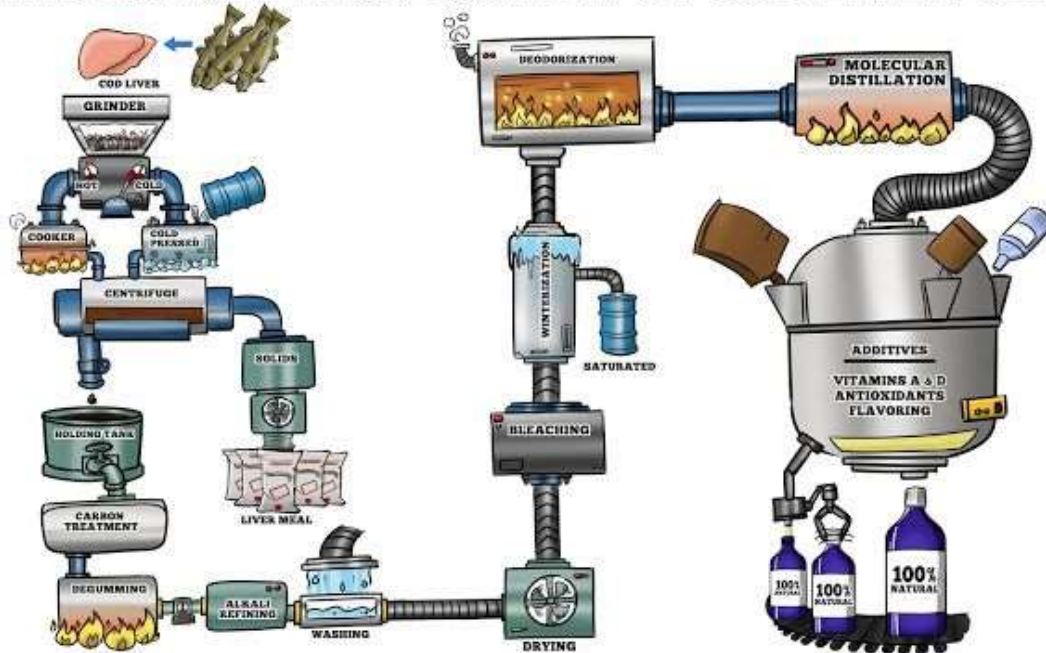
Fats	55-75%
Proteins	5-10%
Water	20-36%

 A and D Since, the liver oil content is vitamin A and D but varies from fish to fish and from Vitamins season to season.

- Cod liver is rich in fats but poor in vitamin A contents (about 1000-3000 I U. per gram) while the shark liver have the highest fat and highest vitamin A (15000 10,00,000 IU. per gram).
- When the fish is dead, the enzymes present in the liver start their action on the proteinaceous matter and fats are broken down into fatty acids and glycerine. The oil becomes darker in colour due to oxidation. Therefore, to obtain goodquality oil, the processing of liver must be done soon after the fish is caught.

- Oil is extracted from liver by different methods.
- **Boiling Method:**
- Liver is cut into small pieces and boiled (at 85-90°C) with sufficient amount of water.
- Then the oil is skimmed off from the water surface when oil comes up to surface of water and collected into metallic vessels.
- This is the cheapest extracting method.
- This method is used for extracting liver oil from fishes such as Cods and Oil sardines, which have high oil content.

INDUSTRIAL PRODUCTION OF COD LIVER OIL



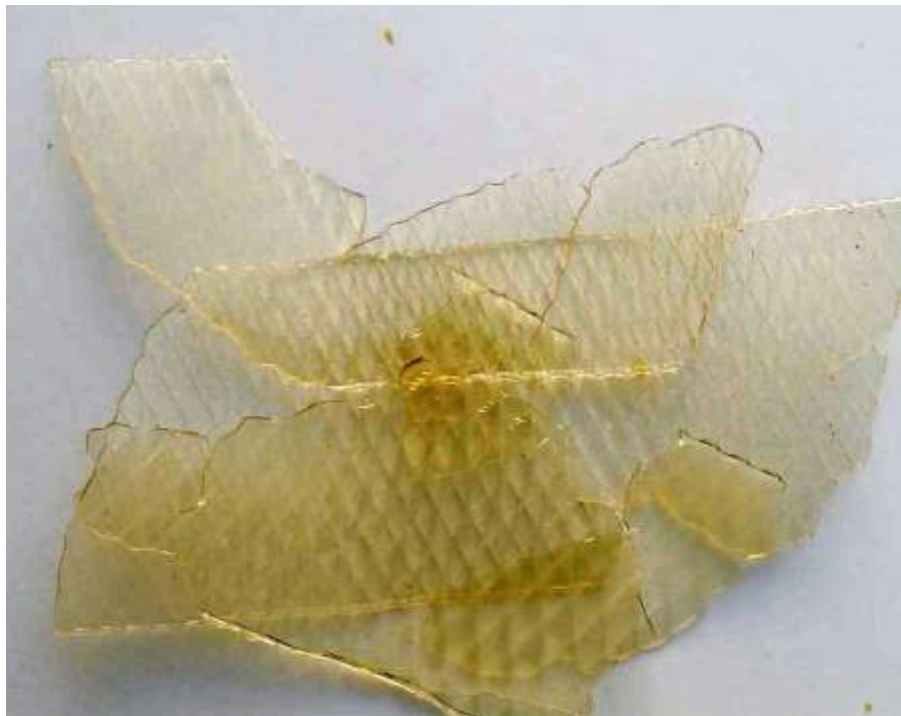
- **Steaming Method:**
- The fresh liver lobes are heated with steam under pressure, using steam kettle with automatic safety valve to control pressure. (i.e. 2 kg/sq. at pressure).
- The temperature of the steam is maintained between 85 to 90°C. The oil, thus liberated, is drawn off to the vessel through pipe and the liver residue is diverted to a centrifuge for further processing. This is a continuous process and yields good quality oil.

- **Floatation Method :**
- Liver pieces are crushed to a pulp and dehydrated with salt like sodium sulphate for few days to remove moisture. The dehydrated mass is extracted with a organic solvent like ethylene-di-chloride. Oil is obtained by distilling the solvent. It is a costly process.

- **Alkali Enzyme Method:**
- The liver is ground and treated with caustic soda (1-2 %) or with Sodium carbonate 2-5 with constant stirring for about an hour. The pulp is subsequently passed through centrifugal machine where the oil separates.

- Ising Glass:
- Ising glass is a pure gelatinous substance produced from the air bladder (swim bladder of certain fishes viz. perches, scianids and polynemids (i.e. sturgeons, carps, at fishes, cod, hake, drums, flat fishes etc.).
- The air bladder is removed from the fish, wash to clear blood and the outermost layer is scraped off. The inner layer is cut open, washed in cold water and beaten on a piece of wood till flattened, dried in the sun and marketed

- Ising glass is used chiefly for the clearing of wines and beers (i.e. A little paste of Ising glass is added to wine to settle down all suspended matter within a few hours and the liquor is perfectly transparent), and also for making jellies.
- It also helps in the preparation of cementing substance.
- The Russian Ising glass is supposed to be the best quality. It is marketed as leaf, 'pipe' and cake form.
- In India, the best Ising glass are obtained from perches and Indian salmon.



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- **Fish Manure:** Fish manure is used in many places and is becoming more popular due to its high value.
- Three kinds of manure are produced from fishes:
- (a) Fish Manure.
- B - Prawn Manure.
- (c) Fish Guano.
- **Fish manure:** It is prepared by drying fish in the sun on the sea beach. When is abundant supply of fish or spoiled fish brought to the shore which are unfit for consumption are simply spread on the beach and dried.
- The dried fish mixed ash forms an ideal manure. Fish manure contains 5-7% nitrogen and phosphate.
- fishes which are mainly used to prepare manure are mackerels, sardine and etc.

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- **Prawn manure-** is 5-6 % nitrogen, 3-4% phosphate and some lime.
- **Fish guano:** Fish guano is prepared from sardines on the Malabar coast.
- Fishes are cooked and pressed for oil in fish oil factories. The solid matter left forms the Fish guano.
- It contains 8-10% nitrogen and phosphates along with calcium. It is also fish cake.
- Fish guano mixed up with the soil and it is utilized by the plants quickly.
- The powder form of fish manure is also known as fertilizer, which is rich in protein, nitrogen contents along with calcium and phosphorus.



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- **Fish Fin Soup:** Shark fins have been a fancy for preparing 'Fin soup'. All the fins (except caudal fin) are cut near the root, washed in sea water, dusted with a mixture of wood ashes and lime, and dried in the sun or smoked.
- The cured product is crisp and brittle.
- Sharks, previously considered unwanted by-catch are increasingly directly targeted for their fins; e.g. *Rhincodon* sp. (Basking shark) is caught and discarded as valueless but now-a-days is specifically targeted for its fins.
- Fin soup cost about US \$ 100 dollars Hong Kong restaurants

Shark fin soup



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- **Ladies Purse:**

- In recent years the skin of the larger fishes, such as sharks and rays, are tanned and marketed as ornamental leather.
- Shark leather has a characteristic grain of pleasing appearance.
- It is pliable, durable and employed in the manufacture of ladies purse, hand bags, shoes, wallets and tobacco pouches.
- The skin of cod, salmon, halibut fishes are also tanned and made into leather.

- They have attractive surface designs and can be dyed to any desired colour
- For tanning, the skins are detached from the flesh and soaked in brine for 24 hours. Soaked skins are drained, salted and soaked again in salt solution containing 10% hydrochloric acid.
- After draining the surface is scraped with a sharp knife to remove denticles.
- They are then limed and tanned in the usual manner.

salmon



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THANK YOU

