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Fishery By-products: A Current and Optimistic Technique of Commerce

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Abstract

Now-a-days the matter of fish waste has concerned considerable attention to the food producers, processors, retailers, and consumers, because the waste from fish generated during a huge amount from the fish processing industries, retail markets and also from the by-catch at the fishing harbour. Non-utilization of those waste products not only cause negative externalities to society but also causes environmental pollution and ecological onus. To secure from pollution and to scale back waste, it's now become important to possess a comprehensive understanding about the recycle and/or conversion of those fish wastes into useful products of higher nutritive value and betterment of human society. To secure from pollution and to scale back waste, it's now become important to possess a comprehensive understanding about the recycle and/or conversion of those fish wastes into useful products for betterment of human society.

Introduction

Fish is a highly perishable food material due to its moisture and nutrient contents, and spoilable begins as soon as fish dies; it's the results of a series of complicated chemical reactions happening during a dead fish, mainly by enzymes and bacteria. India's marine fish production has now crossed a million tone marks. Of this, Trash fishes constitute more than 40%. These are either thrown back into the sea immediately after their catch or utilized wholly or partly as manure. If this fraction is used in the preparation of many usable by-products, it would certainly augment our foreign exchange earnings. The modern fish processing industry in our country is almost of four decades old. One of the important by products of economic value is organic, produced mainly from underutilized fish species and by-catch fishes.

Shark Fins

The market value of the fins depends on their color, size, variety, and quality. Counting on the standard and quantity of rays present within the fins they are mainly classified into 2 varieties, generally considered to as black and white. Black fins usually fetch a lower cost than white fins. The translucent cartilaginous rods embedded within the fins of shark are the fin rays utilized in the preparation of shark fin soup. These fin-rays are often extracted from both freshly cut also as dried fins. The latter are soaked in water which is acidified with ethanoic acid with pH 2.5 to five for 2-3 days while freshly cut fins require less soaking time. The softened fins are then treated with hot 10% ethanoic acid at 60 °C for an hour depending upon their size. The rays are separated manually, washed well and dried within the sun. The dried rays which may have a moisture level of 5-8% are stored in

polyethylene bags. The shark fin soup is taken into account as a delicacy in countries like China, Philippines, etc.

Chitison

Chitosan is the deacetylation product of chitin. The left outs of prawns before their freezing within the processing factories, like their head and shell wastes are now used mainly as manure or as a source material for the preparation of feeds. From these wastes, chitosan, a valuable product is obtained by deproteinisation, deminerlisation and deacetylisation. In deproteinisation, the prawn wastes are first washed and heated with 3% caustic soda solution for one hour so as to get rid of the crude protein content of those wastes. Subsequently, it's wasted well and transferred to a vessel containing 5% acid which removes the mineral content of the wastes during a period of about half-hour. This process is understood as demineralization. The product obtained is chitin which contains 60% moisture. The chitin is then subjected to deacetylistaion. During this process, the chitin is wasted well and heated with 40% caustic soda solution for about one and half hours. Then the product is washed well, sun dried and pulverized. The resulting chitosan is packed in polyethylene bags and stored at ambient temperatures. Chitosan is now a day's used as a valuable coagulant aid in the treatment of sewage.

Fish Oils

Fish oil is 2 types *viz.* fish body oil and fish liver oil. In India fish body oil is especially prepared from the oil sardines belonging to the species oil sardine and fish liver oil from shark, skate, tuna, ray, etc. The efficiency of extraction is more with the alkali digestion method. The fresh or preserved liver are washed and weighed. Then the associated structures of livers like gall bladder and veins are removed and washed again. Subsequently livers are dig pieces to which sufficient quantity of water is added and mixture is digested at 40-45 °C till all the solids of the liver are liquefied. The digestion is additionally continued with 1-2% caustic soda at 40 to 90 °C. The pH is adjusted to eight to 9 with HCl or H₂SO₄ solution with constant stirring. To the cooled emulsion 3 volumes saline water are added. Afterwards, it's centrifuged and washed in warm water. The separated oil is mixed with about 5 to 10% anhydrous sodium sulfate and is left undisturbed overnight. Finally, the merchandise is filtered and stored in suitable airtight containers. Fish body oils are utilized in the manufacture of detergents, rubber, lubricants, printing links, leather and cosmetics.

Fish Meal

Fish meal may be a nutritious feed supplement consisting mainly of proteins, minerals and vitamins. Trash fishes like leiognathids, lesser sardines and anchovies and fish wastes are commonly used for the assembly of organic

through wet reduction process. During this process, the aforesaid source is ground and cooked. This is able to facilitate coagulation of protein and release of water and oil. Afterwards pressing is completed to separate water and oil. The liquid portion is understood as press liquor which is skilled a screen to get rid of solid particles of fish. Afterwards these particles are returned to the press cake. After drying the press cake, its' ground well and packed in polyethylene lined gunny bags. Protein in fish meal is usually around 65%. Moisture, fat and ash content vary at 6-10%, 5-10% and 12-33% respectively. Fish meal is additionally a crucial source for minerals like calcium, phosphorus, copper, zinc, manganese, iodine and selenium. Hence fish meal is taken into account to be a valuable constituent of fish and poultry feeds.

Fish Glue

Thick and firm skins of certain fishes are generally suitable for the preparation of glue due to their good collagen content. However, low fat content of skins is desirable for the preparation of quality glue. The skin is washed and soaked in freshwater to get rid of salt or dirty substances. After soaking, they're dig pieces and transferred to lime liquor which help to open the fibre bundles. After washing, the limed skin pieces are bated to get rid of lime. Afterwards, it's cooked in steam cooker and little amount of ethanoic acid which acts as a catalytic agent is added to hasten the hydrolysis. Then the glue liquor is drawn and evaporated until the liquid contains 50-55% solids. Afterwards, it's cooled below 15 °C during a cooling box for 12 to 18 hours to coagulate. The coagulated jelly type glue is further subjected to drier. Any of the antiseptics like boric acid, 2-hydroxybenzoic acid or carboxylic acid is added to liquid glue so as to conserve the product from spoilage. It's used for fixing wood, paper and leather. It's also utilized in book binding and labelling.

Fish Protein Concentrate (FPC)

It is a colourless and odourless power with highly concentrated animal protein and minerals. It's also referred to as fish flour, or edible fish meal. In its preparation, the minced meat is cooked with an equal volume of 0.5% ethanoic acid and is allowed to settle. The oil which floats on the surface is removed. The slurry is filtered through canvas bags and it's pressed. The pressed cake is treated first with ethanol to get rid of both moisture and odour then with azeotropic mixture of hexane and ethanol. The treated mixture is subsequently filtered, pressed and dried under vacuum. Finally it's pulverized, packed and called as FPC.

Fish Sauce

Fish sauce is derived from a combination of fish and salt (3:1) fermented in wooden vats or cement tanks. Generally trash fishes and cannery wastes like head, viscera, fins, etc., might be utilized in its preparation. After

the fermentation period or about six months, the supernatant liquid i.e., fish sauce is decanted and used for human consumption. The colour of fish sauce varies from straw yellow to amber counting on the species and period of fermentation and its protein content has been found to be varying from 10 to 15 mg. It an easy process and involves low capital for its production. Fish sauce, a preferable food item of the people of south East Asian Countries could also be used as a condiment in rice dishes and vegetables.

Important Fish By-Products

Isinglass

It is a high collagen formed from air bladders of catfish, carps, eels, polynemids, sciaenids, sea bass, etc. The bladders are first far away from the chosen fish and blood and adhering fat materials are scraped off. They're then cut open and washed thoroughly in running water. Then, the outer black membrane is removed by scraping. Subsequently, the bladders are cut into pieces and are dried in a man-made drier or in sun and stored in suitable containers. Isinglass, so prepared is employed for clarifying beverages like wine, beer and vinegar. Isinglass also reduces 2 to 0.05% of the suspended solids in beer and increases filtration rate from 3000 to 11,000 litres. It also can be used as an adhesive base and in confectionary product, Indian ink and as an efficient adhesive for glass, pottery and leather.

Ensilage

It is prepared by converting the whole trash fish or its offal into animal feed by chemical methods. The product is of over organic because the vitamins aren't affected during the process of making ensilage and are free from fish odour. The fresh raw materials are minced and placed inside a suitable acid resistant container. The meat is acidified first with 3% formic acid or a mix of vitriol (50%) and acid (85%) so as to take care of a pH of about 3. The container is roofed and is left for 3-4 days. The mixture should even be stirred daily to cause quick liquefaction. After liquefaction, oil removal is also necessary, if fish with high oil is used.

Pearl Essence

Guanine is found in the epidermal layer and on the scales of most of the pelagic fishes. These crystalline guanines are suspended with a suitable solvent within the manufacture process, and after that the product obtained is named as pearl essence. The scales are collected from pelagic fish like sardines, mackerels, ribbon fishes and are preserved in 10-15% common salt solution until they're processed. The scales are soaked in gasoline in order to distinguish pearl essence from protein and water. The pearl essence is further transferred into gasoline, where it floats on the surface. The separated pearl essence is then filtered to get the fine particles of essence. It's used for photography, book covers, textiles, jewellery boxes.



Figure 1: Shark Fin Soup



Figure 2: Chitosan from shrimp shell waste



Figure 3: Fish Oil



Figure 4: Fish Meal



Figure 5: Fish glue

Conclusion

The fisheries waste obtained from the retail market and also from the fish processing industries have a huge organic load of pollutants and cause the pollution leading to formation of harsh environment to the surrounding atmosphere. So that, there is a way to reuse these fishery



Figure 6: Fish protein concentrate

by-products into valued compounds, so that it could be an efficient source of income generation.

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