

18. Pilot scale demonstration of Fish and Fishery Based by-Products

Preamble:

In present research project major objectives were namely Selection and optimization of extraction of fish gelatin, Demonstration of the standardized method for preparation of gelatin, Demonstration of the already standardized method for preparation of chitin, chitosan, fish silage and fish meal and Extension of developed technology to fish processor, entrepreneurs and unemployed youth. As per the objectives by using fish waste technology were developed for i.e. extraction of fish gelatin, preparation of fish silage and fish meal and from shell fish waste used for preparation chitin and chitosan. These technologies were transfer to fisherman, unemployed youth, NGOs and SHGs through training programme organized in campus as well as off campus in Konkan coast of Maharashtra.

Objectives of the Project:

- Selection and optimization of extraction of fish gelatin.
- Demonstration of the standardized method for preparation of gelatin.
- Demonstration of the already standardized method for preparation of chitin, chitosan, fish silage and fish meal.
- Extension of developed technology to fish processor, entrepreneurs and unemployed youth

Salient Features of the Technology:

Gelatin is a water-soluble protein, commercially obtained from either cowhide or pigskin that contains collagen. Collagens get converted to gelatin by hydrolysis process. Because of its unique properties of forming gel at room temperature, gelatin is widely used in the food, pharmaceutical, and photographic industries. Several researchers have reported that fish skins & bones could be utilized to produce considerable amount of gelatin. Surimi is one of the important commodities among seafood exports from India. By the year 2016, the total production of surimi from India was 75, 000 tones (FAO, 2016). During processing of

surimi, a large amount of wastes is generated. Fish solid wastes constitute 50 to 70 % of the original raw material, depending on the method of meat extraction from the carcass. About 30 % of such waste consist of skin and bone with high collagen content. This waste has attracted the increasing attention as raw material for marketable value added product such as fish skin and bone gelatin.

Fishmeal is a highly concentrated nutritious feed ingredient produced by processing of low value fishes and trash fish which are either not suitable for human consumption or has limited consumer preference. It is mainly used as ingredient for preparation of aqua feeds, poultry feeds or animal feeds. The growing demand for aqua feed production and increased landings of low value fishes promoted the establishment of a number of fishmeal plants in the country. Oil sardines, stomatopods, silver bellies and other trash fishes are usually preferred for preparing fishmeal. The trash fishes once discarded by the trawlers are now brought to shore as they realize an economic value owing to the demand from fishmeal plants.

During processing of sea foods large amount of fish wastes and deteriorated whole fishes are daily discarded in the fish markets. Fish waste, includes frames and rests from trimming, guts, skins, fats, viscera, roes/eggs, heads, breasts, scales and deteriorated filets. A fish contain 45 % flesh, 24-27 % head, 12 % skeleton, 3 % skin, 4 % cut off and 12 % viscera including eggs, milts and liver of its total body weight. These wastes are a potential source of pollution and contamination of the environment, as they degrade rapidly in warm temperatures. If it is not appropriately stored or managed, it creates aesthetic problems and strong odors due to bacterial decomposition. On the other hand, they contain high amount of nutrients such as protein, fat and minerals which is available in low cost. So that, there is need for developing fish silage from this fishery waste and use in animal feed and aqua feed.

Chitin and Chitosan, found in the shell of crustaceans, the cuticles of insects, and the cell walls of fungi, is the second abundant biopolymer in the nature. Because chitin possesses many beneficially biological properties such as biocompatibility, biodegradability, haemostatic activity, and wound healing property, much attention has been paid to its biomedical applications. Chitosan has been used as a dietary supplement due to its effective lipid binding and hypocholesterolemic properties and as a film-forming agent. Chitin, chitosan and their derivatives can be used as an antimicrobial, emulsifying, thickening and stabilizing agent in food industry. Chitin is always made from crustaceans and therefore; crab, shrimp and prawn shells were source of chitin and chitosan. Shellfish processing waste (i.e. shrimp, crab, lobster, prawn, squid and crawfish) contain 14-35% chitin on a dry weight basis and theses source

materials for chitin are becoming a growing waste disposal problem for the fish and shellfish processing industries.

Technology Transfer:

During 2014-15 two training programmes on “Fish byproducts and their utilization” were carried out at College of Fisheries, Shirgaon, Ratnagiri and Sakhar Moholla, Grampanchayat office, Jaigadh, Ratnagiri; dated 24th to 26th September 2014 and 3rd to 5th December 2014 respectively. 20 trainees were participated in each training programme. In this training programme the trainees were trained about various aspects such as information of various fish byproducts and their utilization; extraction of gelatin from various fish skin waste preparation of Chitin and Chitosan from shell waste and preparation of fish meal and fish ensilage etc.

During 2015-16 three training programmes on “Fish byproducts and their utilization” were carried out at Gangafal Macchimar Sanstha, Agarnaral, Ratnagiri, College of Fisheries, Shirgaon, Ratnagiri and Karla Fishermen’s co-operative society, Karla, Ratnagiri; dated 15th to 17th October 2015, 21st to 23rd December 2015 and 7th to 9th March 2016 resp. 20 trainees were participated in each training programme. In this training programme the trainees were trained about various aspects such as information of various fish byproducts and their utilization; extraction of gelatin from various fish skin waste preparation of Chitin and Chitosan from shell waste and preparation of fish meal and fish ensilage etc.

During 2016-17 five training programmes on “Fish byproducts and their utilization” were carried out at Juve, Gram Vikas Mandal, Juve, Parivartan Sanstha, Chiplun; Hirakani Mahila Bachat Gat, Kalbadevi, Ratnagiri and Aadhar Seva Trust, Nevare, Ratnagiri and Fisherman co-operative Society, Rai Bhadgaon, Ratnagiri dated 26th to 28th September 2016, 24st to 26th November 2016 and 29th to 31st January 2017 and 1st to 3rd March 2017 and 21st to 23rd March 2017 respectively. 20 trainees were participated in each training programme. In this training programme the trainees were trained about various aspects such as information of various fish byproducts and their utilization; extraction and various uses of gelatin from various fish skin waste, preparation and uses of Chitin and Chitosan from shell waste and preparation of fish meal and fish ensilage etc.

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Sample Products Developed under the Project:



Fish Gealtin



Fish Meal



Fish Silage



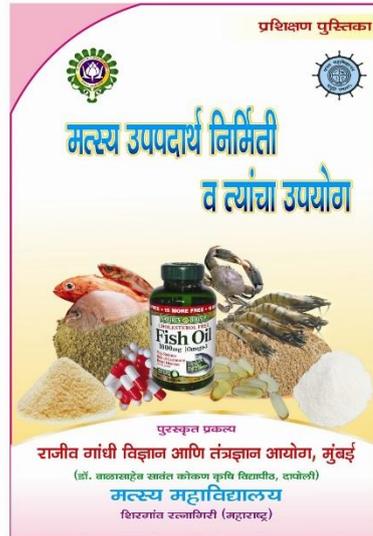
Chitin



Chitosan



E - Book



Book Published for Trainee