Co-funded by the
Erasmus+ Programme
of the European Union

COLLABORATIVE PROJECT DEVELOPMENT ON

ALTERNATIVES TO LIVE FISH MARKETING: FROZEN, DRYING AND COLD CHAIN MARKETING

IN ASSOCIATION WITH

NEPAL FISH PRODUCERS' AND TRADERS' ASSOCIATION, CHITWAN

Introduction of the product and technology

Fish byproducts are the products that are not generally acceptable in the market without further recycling eg. Fillets, round, eviscerated or beheaded etc. Since, there will always be loss of some parts of fish while processing, the unusable products can be recycled in some other processing chain where it is not considered discard. Deheahed and degutted parts can be processed for fish meal. Fillet is the flesh of fish been cut or sliced away from the bone by cutting lengthwise along one side of the fish.

Need of the product and technology

Fisheries and aquaculture are now been the fastest growing food producing sector. It provides employment, income, food security and nutrition to most of the people worldwide. Likewise, fish has been the part of human food since a long period of time. It is a source of high quality protein and essential fatty acids, omega-3 fatty acids-EPA, DHA and other omega-6 fatty acids. Along with the consumption of fresh fish, people have been eating the processed fish products. Since ancient time, people practiced different fish preservation techniques like preserving in snow, sun drying, fermentation, smoking etc. This led to the increase in food safety period and made people to enjoy eating the preserved fish for a longer time. With the time, new technologies and innovative ideas regarding fish processing have been developed. Processed fish products' marketing is gaining popularity in the world as the live fish spoils faster and cause health issues. Canned and processed fish products by drying, fermenting, salting, smoking and by the combined effect of these processes have been gaining the market and people are attracted towards these products. Furthermore, people these times are busy on their works and they prefer instantly available packaged and processed products. Also, the storage of the packaged fish products is easier. Thus, concerning the demand consumer in world's market, further advancement in the product/technology is important.

In Nepal, aquaculture has been growing and developing at faster rate (8.1% as per CFPCC 2018/19). The post-harvest processing technologies still lags behind. Though the traditional processing and preserving techniques have been in practice, advanced technologies like frozen and cold chain marketing of fish has still not been flourished in Nepal. If these technologies would be introduced to Nepal, then the growing aquaculture industry would drive a way farther in national development, and get positions in global market. This will also help to meet the global demand for processed fish products. These products would have longer shelf life, and the loss of fish market due to spoilage would be overcome. Thus, the need of product/technology is important in Nepal.

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Manufacturing, processing and product characteristics

Freezing is a technique of preservation, where the frozen fish thus produced have good consumer acceptance and fetch a good market price. Both small and large fish can be frozen, where the small ones are frozen as whole while the large fish are filleted into suitable size. The frozen fish can be manufactured form the below described process. Firstly, the fresh fish is taken as it contains less number of microorganisms. The process like washing, descaling, degutting and beheading to wash the outer slime, to make fish look more aesthetic, to prevent spoilage, to increase the space during storage respectively. Then again fish is washed and depending upon its size either frozen as whole or filleted. The whole fish or fillet is then pretreated with ascorbic acid and salt solution to prevent rancidity and control drip loss. Then, the whole fish or fillet is frozen using different kinds of freezers like air blast freezer, contact freezer, immersion freezer and spray freezer.

During this process, the liquid is converted into ice, as a result of which there is no any free water for the growth of micro-organisms and hence inhibit microbial growth making the food safe for ultimate consumption. For the long-term storage, the frozen product is vacuum packed and transported to a large distance without any change in its nutrient composition and quality.

Since, freezing delays spoilage and enzymatic activity, the frozen fish are totally safe for human consumption, with high nutrient retainment of vitamins, minerals etc. In the context of aquaculture, this development of post harvesting technology will be a great venture for all the farmers and involved institutions, through the low cost incurred, low mortality and increased number of fish during transportation.

In Nepal, the dried fish with mild smoky flavor is equally preferred. Here in drying the water is removed which inhibits the microbial activity, decreases water activity and prevents the growth of spoilage bacteria. The fish small in size can be dried as whole fish after descaling, degutting. In the manufacturing process of dried fish, the fish can be dried either by sun or solar drier. In case of sun drying, no reliability of solar and even has chance of containing various contaminants. While in solar drier, the fish is dried up to certain point by solar system and then subjected in sun drying. The dried fish when subjected to kiln, gives smoky flavor and aroma and this ethnic smoky flavor is preferred by Nepalese community. Both production of frozen fish and dried fish through the proper development of post-harvest technology could be a great venture leading to the product diversification, and profit maximization of farmers.

Cost, return and profit estimate

An amount that has to be paid or spent to buy or produce fish by-product is production cost. Suppose, fish production from fingerling stage is carried out for the period of 1 year and the produced half ton fish is needed to be transported from Chitwan to Kathmandu, then the total cost incurred during this process includes

Particulars
Fingerlings: 40,000/-
Transportation: 5000/-
Cold storage: 6000/-
Labour: 20,000/-

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Miscellaneous: 10,000/-
Total estimated cost: 81,000/-
Return is the money made or lost on an investment over some period of time. During the transportation of live fish, some fish may die due to the lack of oxygen and bumpy road which can be used for making different value added fish product along with the live fish.

Particulars
Value of a live fish: 300/kg
Price of value added product (pickle, smoked fish): 500/-
Total return from live fish: 80,000/-
Total return from value added product: 1,10,000/-

Total profit = Total cost – total return
= 190000 – 81000
= 109000/-

Social, environmental, technological and legal aspects of the product and technology development

Social aspects:
The proposed project is committed to the following social aspects:-
Employment opportunities will be provided to the people of Nepal.
Eradicate the nutritional deficiency occurring in people.
Safe working environment.
Use of child labour will be prohibited.

Environmental aspects:
The proposed project helps to protect and maintain the environment balance through utilization of the surplus fish supply during the season which reduces the burden from the natural environment during off season.

Technological aspects:
The production of fish by products in Nepal is technically suitable. Even if technologies and machinery is needed to be brought but Nepal has all the infrastructure for proper working of those technologies and machinery is present.

Legal aspects
There are no legal constraints present in Nepal for the technology development and its working.

Incubation, production and testing of the product and technology
The technology will be at first developed at small scale using locally available resources for sustainable production in long run. Then, will be tested for the shelf life by storing the products and determining deterioration date. The product must be acceptable by consumer and should be as per their taste for this sample product will be distributed and review will be collected from the potential few consumers for better developing of the taste of product. The product certification will be done for its quality assurance and hygienic condition. After testing its organoleptic

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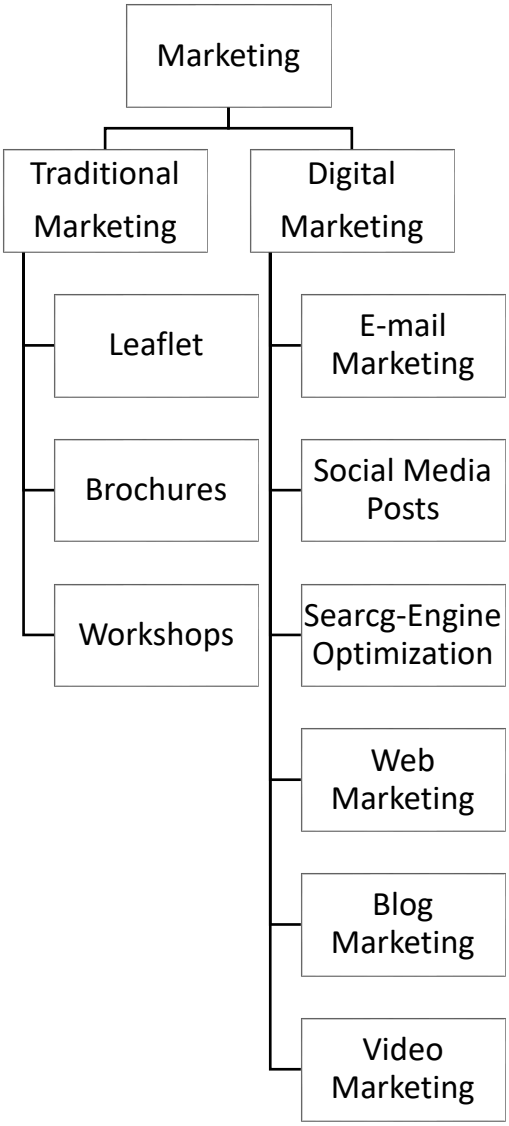
characteristics, storage life and nutritional quality by potential consumers food technologist and food nutritionist respectively and being ensured of its quality we will go on mass production. Branding advertisement will be done accordingly.

Marketing strategy of the product and technology generated



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