Innovations in shrimp value addition: Focus on product knowledge

The following article is a part of FIFP webinars conducted on 7th November 2020 on the topic of Value addition in fishery industry' (Part 2)

Note from the Chief Editor:

Main theme of the third in the series of FIFP webinars was Value addition in fishery industry' (Part 2) conducted on 7th November 2020. In all, four presentations were made that covered prospects of value-added seafood from India; freeze drying of seafood; scope of shrimp value addition for India in the global context; and Innovations in shrimp value addition: focus on product knowledge. Smt. Anita Vidyasagar brought out the importance and need for diversification and value addition in the context of changing dietary habits of people to raise the profitability of seafood industry. She described steps in the production of various value-added products while highlighting several innovations in shrimp value addition with focus on product knowledge. Constraints in value addition and suggestions to overcome have been provided.

Introduction

Fish and shrimp in dried form comprised the major items among export of marine products from India till the end of 1960. Although negligible quantities of frozen items were exported from 1953, the export of dried marine products was overtaken by frozen items leading to a steady progress in export earnings only since 1961. The export of marine products has grown steadily over the years from 3.92 Crore Rs in 1961-62 to 46,663 Crore Rs in 2019-20. Exports aggregated to 12,89,651 MT seafood worth US $ 6.68 billion despite the market uncertainties in the aftermath of the Covid -19 pandemic outbreak. The seafood exports from the country have been on a path of exponential growth over the years. The traditional products consisted of block-frozen, dried, salted and fermented.

What is value addition?

Value addition is the most talked about word in the industry because of the increased opportunities the activity presents for earning foreign exchange. The dietary habits of people all over the world are changing fast which has resulted in demand for value-added products. There is also an increasing trend of eating away from home and this has triggered the growth of fast-food trade serving value-added products. Value addition can be defined as any form of human or mechanical process that changes entity from its original state or form in terms of its organoleptic qualities. It is one of the possible approaches to raise the profitability of seafood industry. There appears to be a good potential for India to increase its share in international trade by exporting value-added seafood products.

Types of value-added products

Individually quick-frozen products (IQF)

Radical changes have taken place in the freezing of fishery products over the years. An important improvement in freezing is the shift from conventional block-frozen to the individually quick-frozen products. IQF products fetch better price because of their ease of handling compared to block-frozen products. Examples include Shrimps- H/ON, HLSO, PD, PUD, Butterfly, Torpedo etc.

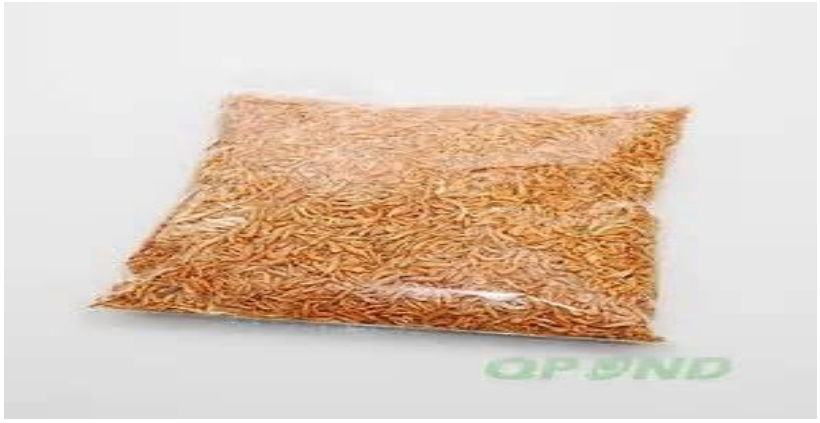
IQF H/ON

IQF HL

Accelerated freeze dried Products

Accelerated freeze drying is used for the preservation of high-value food products. In this process, the product in frozen condition is subjected to very high vacuum causing the ice crystals to sublime. Absence of shrinkage, quick rehydration up to 95%, minimum heat-induced damage are some of the advantages. Used mostly for shrimps.

ACCELERATED FREEZE DRIED SHRIMP



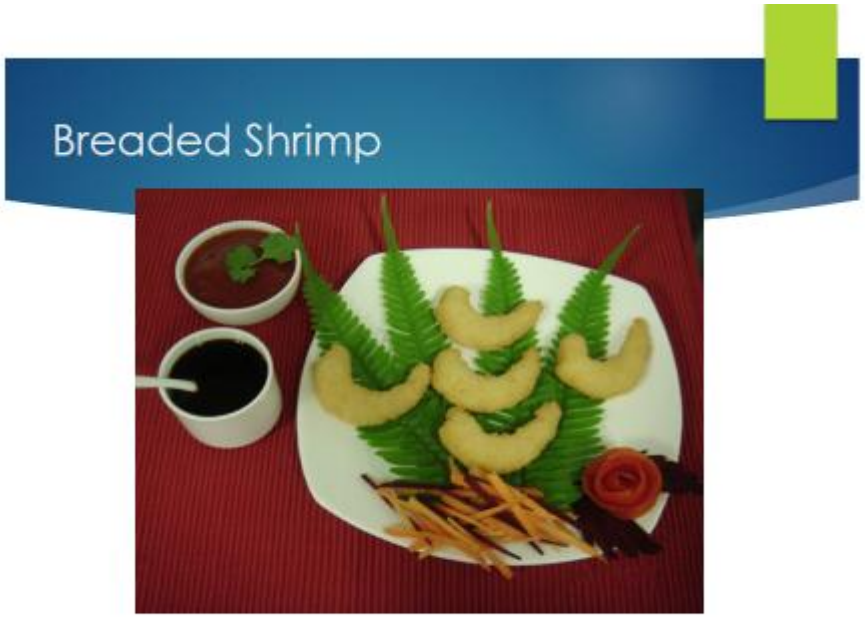
Coated products

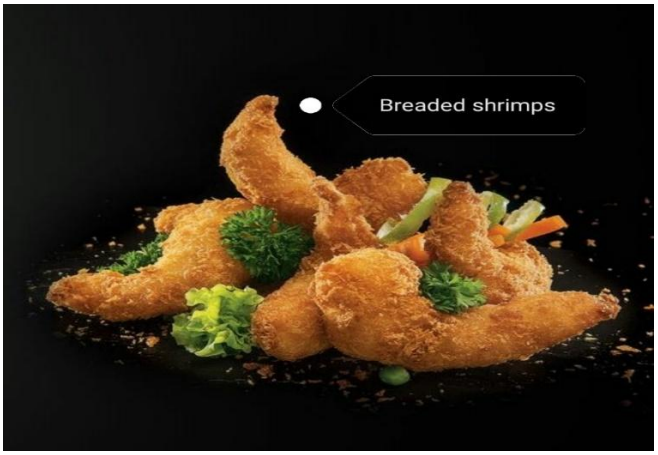
Battered and breaded products processed from shrimps, fishes and squids are the most prominent among the group of value-added products. Buyer specifications like type of shrimp, choice of additives, ingredients, bread crumbs, breading percentage etc play a crucial role in deciding the production process. Production of battered / breaded products involves several stages that include pre-processing; treatment with additives (STPP or NP1); pre-dusting; battering; breading; pre-frying (optional); freezing; and packing/ Storage.

Pre-processing is done according to buyer specifications. Treatment with additives is done with STPP/NP1 that helps to increase yields and better adhesion. Pre-dusting is mainly done to remove moisture from shrimps to increase pick-up and for better adhesion. Battering provides a base for the bread crumbs to stick on. Products receive one or two coatings of batter followed by bread crumbs thereby increasing the bulk and reducing cost elements. Pick-up can be increased by adjusting the consistency of batter or by repeating the coating process.

For breading, product is passed through a bed of bread crumbs and the pick-up can be increased by repeating the coating process. Single breading or double breading depends on specifications. Bread crumbs used can be of different colours including white, orange, yellow and gold in either natural or artificial colours. Texture can vary from light and crispy, to hard and crunchy. The crumbs can be fine (1-2 mm) or coarse (10-20 mm) in length. Toasted crumbs provide a range of colours and highlights in the end product. Their crispy texture makes them well suited to low-fat, oven products. Panko crumbs are made from crust less white bread that is processed into flakes and then dried. These bread crumbs have a dryer and flakier consistency than regular bread crumbs, and as a result absorb less oil. It is available in both milled and block form, either fresh or frozen. 'Panko' provides an even higher quality alternative to JSBC (Japanese Style Bread Crumbs) and has very special eating characteristics. Panko produces lighter and crunchier tasting fried food. The choice of crumbs depends on buyer specifications.

Pre-frying is an optional step. Certain products are pre-fried at 182^{o} C in sunflower oil before freezing. This gives the crumbs a golden-brown colour and has good appeal when stocked in supermarket shelves. This however is not an RTE product and the product has to be fried before consumption. Product is frozen at -40^{o} C in spiral freezers. Blast freezers are not advisable as the coatings may fly off due to the heavy blast of air. Coated products are very susceptible to temperature fluctuations, so it is advisable to store and transport at temperatures below -18^{o} C, preferably -22^{o} C. Raw breaded shrimp, Raw butterfly shrimp, Torpedo shrimp etc are few examples.

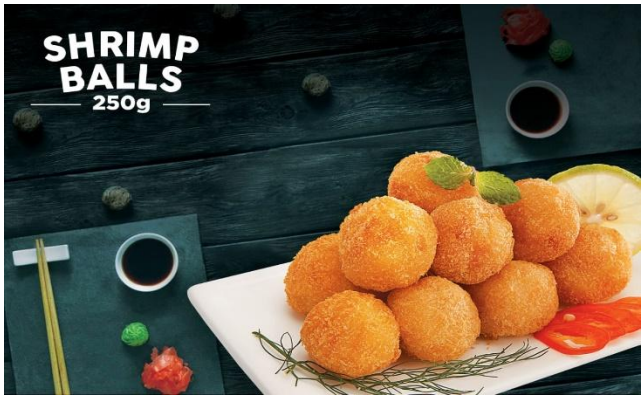




Formed Products

Steps in the production of formed products consists of pre-processing; treatment with additives (STPP/NP1); blending/ mixing in Unimixer; portioning/ forming; pre-dusting; battering; breading; pre-frying (optional); freezing; and packing/ storage; Some examples are Burger pattis, Shrimp balls, Shrimp nuggets, Shrimp cutlets etc.

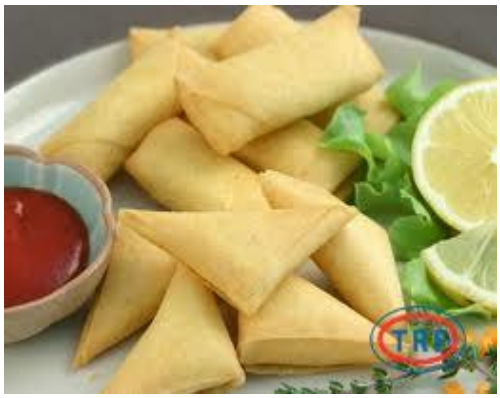
Shrimp burger



Pastry products

Whole shrimps/fish, vegetables and spices are mixed together and wrapped in pastry sheets/ leaves to give it an elongated appearance. Most important among pastry products are Spring roll and Samosa.

SHRIMP SAMOSA

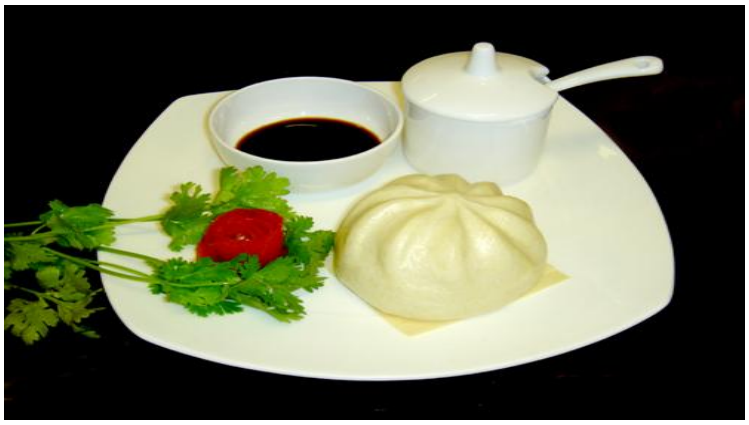


SHRIMP SPRING ROLL

Dumplings

Dumplings are cooked balls of dough. They are based on flour, potatoes, and may include vegetables, meat, fish, shrimps etc. They may be cooked by boiling, steaming, simmering, frying or baking. They may have a filling, or there may be other ingredients mixed into the dough. Dumplings may be sweet or savory. They can be eaten by themselves, in soups or stews with gravy or in any other way. Dimsum and Gyoza are popular examples.

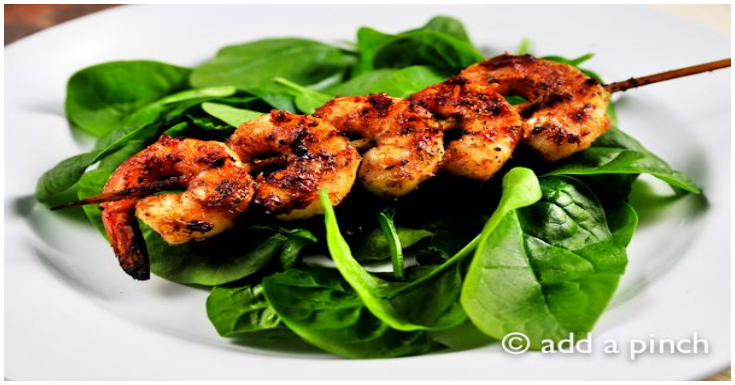
SHRIMP PAO



DIMSUM

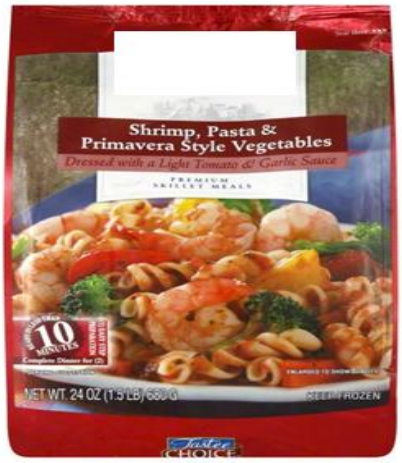
Marinated products

Marination is the process of soaking foods in a seasoned, often acidic, liquid before cooking. The liquid in question, the 'marinade', can be either acidic (made with ingredients such as vinegar, lemon juice or wine) or enzymatic (made with ingredients such as pineapple, papaya or kiwi fruit). In addition to these ingredients, a marinade often contains oils, herbs and spices to further flavor the food items. Ex: Spicy Marinated Shrimps



Ready meal kits

Convenience food or tertiary processed food is commercially prepared food designed for ease of consumption. Convenience food is ready to eat or ready to cook processed food that requires minimum preparation before eating- just cut open the packet, heat it, preferably in a microwave and eat it.



Skewered shrimp

Skewers are long pieces of wood or metal used for holding pieces of food, typically meat, together during cooking. Bamboo stick is then pierced in such a way that 4-5 shrimps are arranged in a skewer in an inverted " U" shape. It is then packed in thermoformed trays under vacuum and frozen at -40°C.

In the case of single shrimp skewer, shrimp is washed in chilled water containing 5 ppm chlorine, beheaded, deveined, peeled and again washed in chilled water. Bamboo stick is then pierced into the meat from head portion to tail. It is then packed in thermoformed trays under vacuum and frozen at -40°C.

Shrimp skewers

Retort pouching

One such value-added product developed at CIFT is fish curry/shrimp curry processed in flexible retortable pouches. The flexible pouches are manufactured indigenously employing the configuration of a three-ply laminated material: polyester /aluminum foil/cast poly propylene. Fish/shrimp curry in retortable pouch is heat sealed and subjected to retort sterilization at 121 ^{0}C for a specified time. The product can be kept in room temperature more than one year in acceptable condition.

The above list is not exhaustive. Newer products are being developed since people have understood the need for diversification and value addition. However, value addition has few constraints such as high investment cost; high cost of production; lack of good infrastructure; ignorance of new technology; lack of market study; and lack of knowledgeable personnel.

Conclusion

In this age of the' time starved 'consumer, value addition plays a very important role. There is huge demand for Convenience/ ready to eat foods with more and more ladies venturing out for work. Unfortunately, we are not able to tap the potential because of various constraints, the major one being the high cost of specialised machinery and lack of skilled workers. Incentivization for export of value-added products would attract more entrepreneurs to this sector.

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Ms Anita Vidyasagar worked in the Quality Assurance division in the seafood sector for more than 30 years. She was greatly responsible for the implementation of system standards like HACCP/ BRC/ IFS/ MSC COC/ ISO 22000:2015 etc in the organisations she associated with. She is an approved FOSTAC trainer, regularly training Anganwady and Kudumbhasree workers on GMP's and GHP's. At present, runs her own consultancy services.