ISSN 0971-0167

मत्स्य प्रौद्योगिकी समाचार
Fish Technology Newsletter

Vol. XXIV / No. 3, July - September 2013

Contents

Editorial Committee

News from the Research Front

Customised Nutritional-mix from Collagen Peptide

Fish scale and bone contain protein, mainly in the form of collagen and minerals like calcium (Ca), phosphorus (P) and magnesium (Mg) along with traces of sodium (Na) and sulphur (S). Collagen contains relatively high amounts of amino acids such as glycine, proline and hydroxyproline. Hydrolysis of collagen molecules yields peptides with bioactive, functional and sensory properties that are better than those of native proteins from which they are obtained. Bioactive collagen peptides have great potential in pharmaceutical, neutraceutical and food processing industries. Now a days, collagen peptide is being incorporated in to a wide array of products, including protein bars, cereal bars, protein drinks, smoothies etc. Apart from their nutritional benefits, collagen peptides exhibit a wide range of physiological functions including antihypertensive, antioxidative, opioid agonistic, anticancer immunomodulatory, antimicrobial, prebiotic, mineral binding, antithrombotic and hypocholesterolemic effects. Collagen peptide as a food supplement may improve low bone density in people under malnutrition and those suffering from degenerative joint diseases.

The waste generated from fish processing is around 50% of the starting material by weight, and is more costly to dispose. On an average, 30% of fish processing waste accounts for the protein collagen, which is mainly seen associated with scales, bone, skin, and connective tissue of the animals. It has been observed that collagen peptide from fish processing discards can be absorbed to blood stream much better than those

Nutritional mix prepared with collagen peptide from fish scales

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ideal bio-ceramic material could be easily fabricated and preserved and should be biocompatible and biodegradable. Since, hydroxyapatite is the basic bone mineral, it is totally biocompatible and nontoxic and becomes an integral part of the living bone tissue. However, the synthetic form of hydroxyapatite has been shown to be chemically and crystallographically similar, but not identical, to naturally occurring HAP. These materials should have high porosity (the order of hundreds of microns) to allow the development of bone within and across them. The multifunctional hydroxyapatite prepared by CIFT is multiporous and have high degree of interconnectivity. The high porosity of HAP permits the bone tissue grow into the pores of the implant once inserted.

Artificial tooth enamel

Dental caries represents the most prevalent chronic disease in both children and adults. Roughly 97% of tooth enamel and 70% of dentin comprises of hydroxyapatite. At the initial stage of dental caries, bacteria cause the damage of enamel which is scarcely being self-repaired by living organisms. Therefore, the remineralization of enamel minerals by using synthetic apatite is always suggested in dental research. The native structure of enamel is too complex to be remodeled. The synthesized apatite crystallites often have different dimensions, morphologies, and orientations from the natural ones, which result in poor adhesion and mechanical strength during the restoration. Additionally it has been documented to possess antibacterial potentials and hence is a potential candidate for pulp capping and cavity lining.

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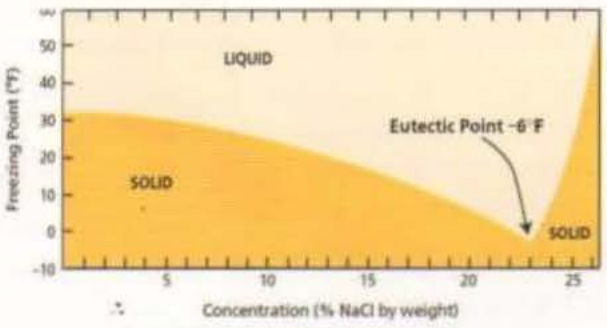
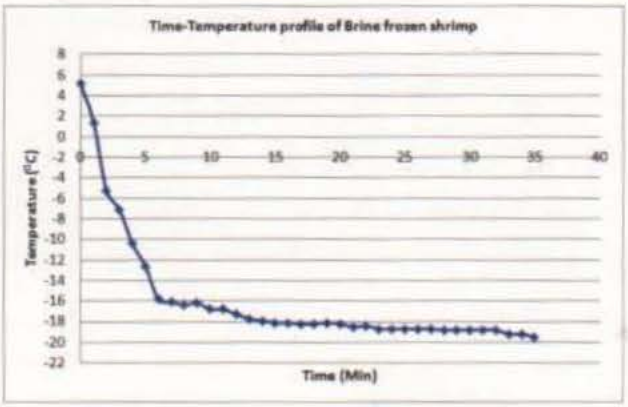
Brine Freezing Improves the Quality of Tiger shrimp (*Peneaus monodon*)

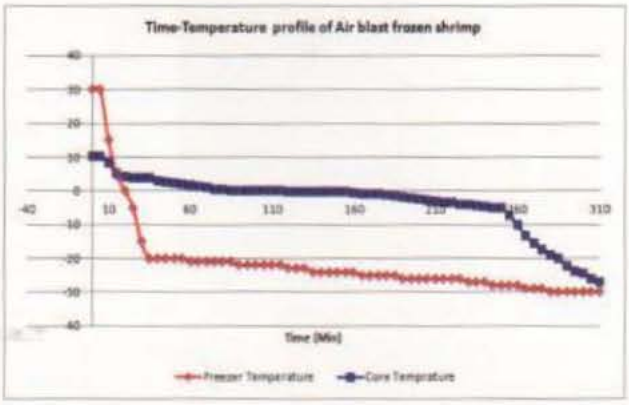
Shrimps are most sought after seafood products due to its their unique taste and culinary properties. They decompose quickly due to various factors like enzymatic and microbiological activities. The highest shrimp quality can be obtained in the shrimp preserved immediately after harvesting. Freezing is one of the best methods to retain sensory and nutritional quality of the food. In the processing plants, it is frozen either in block by glazing with water and freezing in an air-blast freezer, plate freezer or individually frozen (IQF). Although freezing is an effective method of preserving foods for longer duration, some deterioration in quality occurs during storage. The extent of quality loss depends on many factors, including the rate of freezing and thawing, storage temperature, temperature fluctuations, freeze-thaw abuse during storage, transportation, retail display and consumption. For any food, rapid freezing is recommended to prevent the formation of large ice crystals that can damage cells which degrade the quality by allowing loss of moisture during the frozen storage and upon thawing. Cryogenic freezing method like brine freezing will be useful in reducing the freezing time and maintaining better quality of fishery products compared to conventional air blast freezing.

Use of salt brine for preserving fishery products are known from centuries. However, the use of salt brine for refrigerant has not been widely adopted. It promises a bright future as this can be used to freeze fishery products rapidly maintaining its texture and sensory quality. The freezing point of water can be lowered predictably with given salt concentration. An optimum temperature of -21 °C can be reached with brine solution at 23.3% (w/v) of salt concentration, which is known as eutectic point. Any concentration above or below will result in higher



Freezing point of salt brine solution





Time-Temperature profile of brine and air blast frozen Tiger shrimp

Fresh and brine frozen Tiger shrimp

temperatures. A comparative study was conducted at CIFT to investigate the effect of air blast freezing and brine freezing methods on the quality changes of Tiger shrimp (*Peneaus monodon*).

Freshly harvested Tiger shrimps (L = 16 ± 2cm, w= 50 ± 3g each) were frozen by blast freezing (2 kg each) at -30 °C. For brine freezing, shrimps were passed over the conveyor belt for brine solution treatment prepared by mixing food grade sodium chloride (21%), sugar (5.3%) and water (73.7%) in the brine mixing tank. Upon freezing, the shrimps were frozen stored maintaining a temperature of -18 °C. Freezing time was significantly less for brine frozen shrimps (35 min.) compared to air blast frozen shrimps (5 h). Freezing loss and thawing loss was higher for air blast frozen shrimp (2.24 and 0.86% respectively) compared to brine frozen samples (1.84 and 0.38% respectively). Total mesophilic and total psychrotrophic counts of brine frozen shrimps were lower than air blast frozen shrimps. Brine freezing also lowered total enterobacteriaceae counts. Salt content (NaCl) of brine frozen shrimp was higher (1.62%) compared to air blast frozen sample (0.38%). Peroxide value was observed higher for brine frozen samples whereas free fatty acids and TBA value was higher for blast frozen prawn. The results indicated that brine freezing reduces the freezing time considerably and improves the microbial quality of shrimp whereas salt content and lipid oxidation was more compared to air blast frozen samples. Sensorily, samples frozen using brine was rated better. The brine freezing treatment has led to an increase in NaCl content in the white muscle. This increased salt content could be responsible for the higher lipid oxidation and the lower lipid hydrolysis development. NaCl has been reported to act as pro-oxidant by enhancement of the pro-oxidant effect of chelatable iron ions widely present in fish muscle. Since long shelf-life time is highly essential for commercializing brine freezing method for fishery products, the employment of other protective treatments such as glazing, vacuum packaging, modified atmosphere packaging and natural antioxidant application can be used as hurdle to prevent or to inhibit lipid oxidation and to retain sensory and nutritional properties.

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Faecal Indicators in Water Samples of Navi Mumbai Local Fish Markets

Faecal indicators are the microorganisms that normally exist in the intestine of warm blooded animals and the presence of these microorganisms in water indicates that the water sources are contaminated with faecal materials. In Navi Mumbai local fish retail markets, fishes are handled unhygienically and the water used for cleaning of fishes