

The nutrient composition of the powders revealed 75-80% protein, 0.8-1.78% fat, 12.8-17.9% ash content with a moisture content of below 10% and a water activity value of 0.53. The protein quality was high and rich in all essential amino acids. Also, it contains a high mineral content that encompasses all essential minerals like Ca, K, Mg, P, Cu and Se, with a very high content of Ca and Phosphorus.

The functional characteristics of the protein powder extracted by cold methods were superior compared with that by hot method. A higher solubility in water was observed in T4 (78.13%) sample which was enhanced by the addition of ginger extract during the process of extractions. Both water absorption capacity and oil absorption capacity were higher in cold extracted samples. The powders observed a whiter ( $L^*71.71 - 75.45$ ) and less hygroscopic nature (0.2-0.28%). The bulk density (0.71) and tapped density (0.85) were higher for hot extracted samples. Hence the Carrs index value and Hausner ratio which indicates the cohesiveness of the powder was low

(1.25) in hot extracted sample. The cohesiveness of powders determines their consistency and flow properties. Lower the cohesiveness, better the flowability and the hot extracted powders showed better flow properties. Both powders showed less oxidation indices value and have a good sensory acceptance.

The difference in the properties can be made use in formulating different food products such as extruded snacks, nutrient mixes, smoothies, pasta, noodles, cookies, ice-creams etc. which in turn enhances nutritional and functional value of the product. The utilization of this unconventional fish species has been one of the most important challenges in recent years. Developing functional FPP can be a viable option through which convenience, novelty and marketability can be added for a commercially low valued fish. FPP could also possibly be used as a functional ingredient for many formulated/ready-to-eat products having good functionality, stability and sensory quality.

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## Effect of house hold pressure cooking on shrimp allergic protein, tropomyosin

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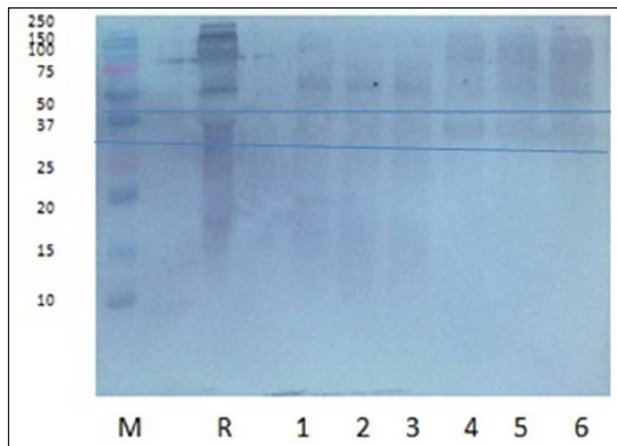
Seafood associated food allergy, particularly due to shrimp consumption, is showing an increasing trend in recent times. Allergic or hypersensitivity reactions are inappropriate responses of the immune system to a normally harmless substance. Seafood allergy comes under type I immediate hypersensitivity reaction, mediated through immunoglobulin E (IgE). Tropomyosin, a

major shrimp allergen, is a myofibrillar protein with molecular weight ranging from 34 to 38 kDa and linked with regulation of muscle contraction along with actin and myosin. It is a heat stable protein which can elicit allergenicity in sensitive individuals through the binding of IgE specific epitopes (Motoyama et al., 2006).

Flower tail shrimp (*Metapenaeus dobsoni*) is

a locally preferred shrimp variety in India. The major allergen identified in *M. dobsoni* is tropomyosin of 37 kDa (Laly et al., 2019). Food processing can effectively alter the allergenicity of foods. The stability of food allergen depends upon processing condition, type of food and allergen content (Cabanillas and Novak, 2019). During food processing IgE binding epitope of allergen can get modified. Sometime new epitopes known as “neoallergen” may be formed impacting the allergenicity. Pressure cooking is a common culinary method followed in households. The combined effect of pressure and temperature during pressure cooking can alter the allergenicity of shrimp allergen. A study was carried out to evaluate the efficacy of pressure cooking on shrimp allergenicity in *M. dobsoni*. The extract of *M. dobsoni* in phosphate buffered saline (PBS) and peeled shrimps of *M. dobsoni* were subjected to pressure cooking at 5, 10 and 20 minutes duration. The changes in IgE binding ability of allergic proteins were evaluated by SDS PAGE and immunoblotting using pooled sera of shrimp sensitive individuals.

All the treatments in extract form showed a decrease in IgE binding ability, while the peeled shrimps showed an increase in IgE activity. In the SDS PAGE profile of all the pressured cooked *M. dobsoni* extracts, the tropomyosin band was observed to be absent. But in the pressure cooked *M. dobsoni* in peeled form, the tropomyosin band was retained at all time durations. Similarly, in the case of immunoblotting analysis, tropomyosin band was not observed in the pressure-cooked extracts, while it was showing immunogenicity in peeled shrimps after pressure cooking (Fig.1) demonstrating the stability of the tropomyosin in



**Fig.1 Immunoblotting analysis of pressure cooked extracts and peeled shrimps. M - Marker; R - Raw extract; 1 - Extract (5 minutes); 2 - Extract (10 minutes); 3 - Extract (20 minutes); 4 - Peeled shrimp (5 minutes); 5 - Peeled shrimp (10 minutes); 6 - Peeled shrimp (20 minutes).**

tissue. As the allergenicity is effectively reduced in pressure cooked shrimp extracts, it can be further utilized as a hypoallergenic material for seasoning purpose.

## References

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