

addition of 3-6% squilla protein powder. Squilla powder wafers were well accepted by the sensory panelists as it imparted an acceptable shrimp flavor to wafers. Addition of squilla powder did not affect the expansion characteristics of wafers after frying.



### Squilla protein hydrolysates

Protein hydrolysates are composed of peptides having bioactive properties. Protein hydrolysates were prepared from Squilla using different proteases which had 69.69 to 82.80 % of protein content. The yield of hydrolysates varied from 4.46 to 6.53%. Squilla protein hydrolysate exhibited excellent *in-vitro* antioxidant activities



and the fish nuggets incorporated with 1% squilla protein hydrolysate had better sensory quality and oxidative stability showing that it can be used as a potential antioxidant in food.

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## Value addition of SQUILLA



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## Value addition of Squilla

Squilla is an unconventional resource, contributing to major components of shrimp by-catch and is often discarded at sea. Meat of squilla species contains 13 - 15% protein, however, the utilization of Squilla species is limited to the preparation of squilla meal, silage and manure apart from chitosan production.



Higher moisture content (80-85%), hygroscopic characteristics of its protein and the difficulties in collecting the meat are the major constraints for the production of value added products from squilla sp. Nevertheless, considering the depletion of commercially important fish resources day by day, it is high time to explore this underutilized resource for developing commercially significant food products. In this context, ICAR- Central Institute of Fishery Technology, Visakhapatnam Research Centre has developed few novel products from squilla species which are abundantly caught in the shrimp trawlers of Andhra coast.

## Innovative products developed from Squilla

### Squilla protein powder

A simple technology for preparing protein powder from squilla was developed by foam mat drying technique. Mince from squilla was collected by hot blanching method.



The mince was dried by foam mat drying technique using maltodextrin /Gum acacia as foam stabilizers. The foam mat drying process yielded nearly 15% squilla protein powder from raw material.

The squilla protein powder had 66% protein and has good foaming, emulsion and antioxidant properties. Solubility of the protein powder in water was excellent, indicating its promising applications as a protein source or/as shrimp flavouring agent in food formulations.

### Nuggets incorporated with squilla protein powder

Fresh water fishes like pangasius and pacu have more fat deposits which give an unpleasant fatty odour to the meat. In order to mask the fatty odour, squilla protein powder was added to pacu mince for preparing nuggets.



Sensory evaluation of battered and breaded nuggets revealed that SPP can be added up to 5% to increase the fishy/shrimp flavor in the product.

### Noodles incorporated with squilla protein powder

Even though noodles are a popular fast food dish, its nutritional value is poor in terms of proteins, vitamins and minerals. In order to improve the nutritional quality of noodles, squilla protein powder can be used as a protein and flavor rich ingredient. Addition of SPP increased the protein content of noodles by 6%. Cooking time of noodles varied from 4.36 min for control noodle to 5.5 min in 5% SPP added noodles. Studies proven that up to 2.5% SPP can be used as a flavor enhancer in noodles.



### Squilla wafers

Wafers are an inevitable component in traditional Indian meals. Different varieties of wafers with different ingredients and colors are available in the market. Wafers were prepared with the