

Fish protein isolate as an ingredient in pasta product

Jeyakumari A.*, George Ninan, Binsi P.K. and Laly S.J.

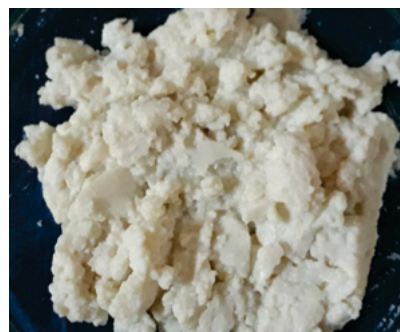
ICAR-Central Institute of Fisheries Technology, Kochi

**jeyal31@gmail.com*

Fish protein is the cheapest among animal proteins. Though highly nutritious, it is one of the most perishable food items. Hence, the processing and preservation of fish play a major role in maintaining its quality. There is increasing consumer demand for high-quality, minimally processed, additive-free sea foods. Tilapia, *Oreochromis niloticus*, one of the emerging freshwater species, is most productive and gaining commercial importance in the domestic as well as export market. Generally, it is in whole or steak form. Moreover, the development of mince-based products from tilapia is limited due to the presence of pin bones. Fish protein isolate (FPI) is prepared from fish meat and discards different kinds of raw materials by the pH-shift technology. Fish protein isolate is a concentrated source of complete muscle protein (i.e., myosin and actin). FPI can be used as an ingredient for the production of value-added and ready-to-eat products based on minced fish or surimi.

In the present study, fish protein isolate was prepared from Tilapia meat using alkali solubilization method and its impact on pasta products was evaluated. Briefly, proteins of the muscle tissue are first solubilized at alkali pH near 10.5 and centrifuged. Then, the top lipid layer and sedimentation (insoluble impurities such as bones and skin) at the bottom were discarded. The middle layer of protein solution is collected and precipitated by adjusting the pH to a value near the isoelectric point (5.5) Then it was centrifuged and the precipitate was collected as protein isolate (Kristinsson *et al.*, 2005) was used for preparation

of pasta product after neutralization. Wheat flour and refined wheat flour was used as base material. Fish protein isolate was incorporated in to base mix at 5%, 10% and 15% concentration for pasta preparation. Pasta products prepared using pasta maker (Dolly, Italy). After the extrusion process, pasta was subjected to drying at 60°C for 2hr and packed. Pasta prepared without incorporation of fish protein isolate was kept as control. Biochemical and microbiological quality of fish pasta were evaluated up to 5 months.



Tilapia fish mince & Isolate

*Tilapia*

Fresh Tilapia fish mince had $80.15 \pm 0.15\%$ moisture, $17.25 \pm 0.20\%$ protein, $0.65 \pm 0.15\%$ fat and $1.05 \pm 0.02\%$ fat. Isolate prepared from fish mince had 75.95% moisture, 17.73% protein 0.35 fat and 1.02%. Proximate composition and color

*Fish protein Isolate incorporated pasta*

value of pasta product is given in Table 1. Highest protein content (14.58%) and L^* value (60.23 ± 0.45) was observed for 15% FPI incorporated sample.

Table 1. Proximate composition and color value of pasta product

Sample	Moisture (%)	Protein (%)	Fat (%)	Ash (%)	L^*	a^*	b^*
Control	9.75 ± 0.25	10.55 ± 0.10	0.35 ± 0.01	0.94 ± 0.02	44.5 ± 0.50	0.07 ± 0.01	11.04 ± 0.40
5% FPI	10.13 ± 0.15	12.79 ± 0.25	0.35 ± 0.03	1.02 ± 0.03	56.76 ± 0.45	-1.22 ± 0.02	10.05 ± 0.12
10% FPI	11.01 ± 0.20	13.45 ± 0.15	0.40 ± 0.04	0.99 ± 0.02	58.65 ± 0.60	-1.34 ± 0.05	8.08 ± 0.25
15% FPI	11.25 ± 0.15	14.58 ± 0.32	0.40 ± 0.02	0.98 ± 0.02	60.23 ± 0.45	-1.23 ± 0.04	8.40 ± 0.35

Biochemical analysis revealed that TVB-N, TBA values showed increased trend and were within the acceptable limit during storage. PV value reached 20.8% during third month in 15% FPI incorporated sample. Other sample had a PV values within the limit of 20meq.O₂/kg up to four month. Microbial quality revealed that total plate count in all sample was within acceptable level (5log cfu/g) for four month of storage. Sensory analysis revealed that

incorporation of fish protein isolate up to 10% was comparable with control.

It can be concluded that fish protein isolate can be utilized for development of protein rich value-added product. Storage stability study of pasta stored at ambient conditions revealed its shelf stability up to four months without any quality loss.

References:

- Reza T, Sarah K. B, Kristen E. M, Jacek J.2012. *Functional food products made from fish protein isolate recovered with isoelectric solubilization/precipitation. LWT- Food Science and Technology*, 48 : 89-95
- Reza T , Kristen E. , Jacek J.2014. *Fish protein isolate: Development of functional foods with nutraceutical ingredients. Journal of functional foods*, 1-11.