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Development of fish soup powder from fresh water Cat fish (*Pangasianodon hypophthalmus*)

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Abstract

The present study indicated that a tasty and nutritionally rich soup can be prepared using Pangasius fish. The standardization of ingredients for soup powder indicated fish meat 50:50 (w/w), pepper powder at 2.5% of the cooked fish meat, milk powder at 8% of the cooked fish meat and tomato soup powder at 12% of cooked fish meat are the standard proportions of the ingredients for the fish soup powder. The different types of starch were used during the standardization of type of starch. It was found that among the different types of starch used namely corn flour, maida and tapioca starch during the standardization of type of starch, corn flour was the most suitable. Further, the standardization of corn flour was carried out and standardized proportion of corn flour was 25% of the cooked fish meat. The other ingredients used were salt, butter, onion, carrot, monosodium glutamate, ascorbic acid, ginger, garlic and cinnamon powder. At every stage, organoleptic evaluation of fish soup powder was carried out.

Keywords: Fish soup powder, Pangasius fish, organoleptic evaluation, value added fish products

Introduction

India has a vast potential for freshwater aquaculture. It ranks second in aquaculture production in the world, which contributes about 5% in the global fish production and 2.5% in global fish trade. The per capita availability of fish in the country has increased from 3 to 9 kg (Meenakumari, 2009). Aquaculture is a fast growing industry worldwide with an average annual growth rate of about 12 percent during the past decade (Kurup, 2009). Now Asia is leading in aquaculture with 85.8% of the total global aquaculture production. Carps are the backbone of Indian freshwater aquaculture comprising around 85% of the total freshwater production (Kurup, 2009). Nowadays, the production of pangasius is increased in India. Pangasius is an edible freshwater fish, belonging to the group of catfish and order siluriformes. Its flesh is white and of mild flavour, its price is extremely competitive. Pangasius emerged as a major culture species in the 1990's and to date, has not achieved a similar level of research focus, outside of tropical regions of South East Asia. Pangasius has devoid of scales or pin bones and are typically exported as skinless, boneless fillets. Larger fish may be cut into rounds. Yields are around 80% for gutted whole fish and 34% for boneless fillets. Flesh colour varies from

white, cream, yellow or rose pink depending on feed type, environment, and processing.

Fish and fishery products contain high quality protein and other necessary nutrients; they are low in saturated fatty acids and contain high content of unsaturated fatty acids (Pagarkar *et al.*, 2007). A well-balanced regime that includes a variety of fish and fish products can contribute to heart health and children's proper growth (Hui, 2007). For enrichment purpose non-vegetarian population also prefer freshwater fish in their diet (Sahu and Mohanty, 1999).

In the present work, an attempt was made to prepare fish soup powder from Pangasius fish. At every step standardization of ingredients was carried out. During standardization of fish soup powder, organoleptic evaluation was the only criteria considered.

Materials and methods

General method for preparation of cooked fish meat:

Fresh Pangasius fish washed thoroughly after that it was trimmed, washing and gutting. Then head was separated and gut portion was removed. It was then cooked in boiling water for 10 minutes. Meat was collected after removing skin and bones.

Standardized method for preparation of fish soup powder:

The different ingredients used in the fish soup powder were standardized after preparing the soup powder several times and organoleptic evaluation at each stage. The quantity of ingredients used in the fish soup powder is given in Table 1. For preparation of fish soup powder 1000 g of cooked fish meat was mixed and homogenized with other ingredients namely fried onion, garlic pieces, ginger, carrot, tomato powder, pepper powder, cinnamon powder, coriander, salt, additives such as mono sodium glutamate and ascorbic acid as a preservative. This homogenized paste was then made into slurry form and dried in hot air oven at 55^{o}C to 60^{o}C for 6 to 7 hours. The dried material was then powdered, sieved and packed in packaging material.

Standardization:

Standardization for different concentrations of fish meat used while preparing fish soup powder:

Three different type of fish soup powder was prepared by incorporating three different concentration of fish meat viz. 30:100 (w/w), 40:100 (w/w), 50:100 (w/w).

Standardization for type of starch to be used while preparing fish soup powder:

Three different type of fish soup powder was prepared by incorporating three different types of starches namely corn flour, tapioca and maida. Rest all ingredients were kept constant.

Standardization for concentration of corn flour to be used while preparing fish soup powder:

Three different types of fish soup powder were prepared by incorporating three different concentrations of corn flour viz**.** 15%, 20% and 25% of total cooked fish meat. Rest all ingredients were kept constant.

Standardization for concentration of black pepper powder to be used while preparing fish soup powder:

Three different types of fish soup powder were prepared by incorporating three different concentrations of black pepper powder viz. 1.5%, 2.5% and 3.5% of total cooked fish meat. Rest all ingredients were kept constant.

Standardization for concentration of milk powder to be used while preparing fish soup powder:

Three different types of fish soup powder were prepared by incorporating three different concentrations of milk powder viz. 8%, 12% and 16% of total cooked fish meat. Rest all ingredients were kept constant.

Standardization for concentration of tomato powder to be used while preparing fish soup powder:

Three different types of fish soup powder was prepared by incorporating three different concentrations of tomato powder viz. 10%, 12% and 15% of total cooked fish meat. Rest all ingredients were kept constant.

Organoleptic evaluation:

Various sensory characteristics such as appearance, colour, taste, consistency, odour and overall acceptability were evaluated during the standardization by a group of ten trained panelists using a ten point hedonic scale.

Table 1: Standardized ingredients for the preparation of fish soup powder.

Sr. No.	Ingredients	Quantity (g.)
1	Fish meat	1000
2	Corn flour	250
3	Black Pepper powder	25
4	Tomato powder	120
5	Milk powder	80
6	Salt	67
7	Sugar	16
8	Chopped onion	399
9	Garlic	8
10	Ginger	19
11	Coriander	13
12	Carrot	53
13	Butter	133
14	Ascorbic acid	1
15	Mono sodium glutamate	7
16	CMC	2

Method for preparation of fish soup from fish soup powder:

5 gram of fish soup powder was taken in the luke-warm water for making paste. This paste was added into 200 ml boiling water. Soup was ready for consumption after addition of MSG, soya sauce and red chilli sauce (as per taste).

Results and discussion

Proximate composition of fresh Pangasius fish:

The moisture, crude protein, fat and ash content were 73.29%, 12.03% 13.47% and 1.21% respectively. The results for proximate composition of Pangasius meat were similar with slight variation to that reported by Begum *et al.* (2012). They observed moisture 78.29, crude protein 12.78, fat 16.55 and ash 1.78 in Pangasius meat.

Standardization of fish meat for the preparation of fish soup powder:

The soups having fish meat concentrations 30:70 (w/w), 40:60 (w/w) and 50:50 (w/w) were subjected to organoleptic analysis by panelists. The soups having 50:50 (w/w) fish meat scored 8.5 points whereas the soup having 30:70 (w/w) fish meat and 40:60 (w/w) fish meat scored 7.9 and 7.9 points respectively for overall acceptability. Thus, among the three concentrations, fish meat having concentration 50:50 (w/w) fish meat scored highest points in overall acceptability criteria. According to panellists, the soup prepared with 50:50 (w/w) fish meat concentrations was most appropriate and yielded the required good taste.

Working in the similar direction Rehman *et al.*, (2012) prepared soup powder from Silver carp (*Hypophthalmichthys molitrix*) with 10% (w/w) fish meat.

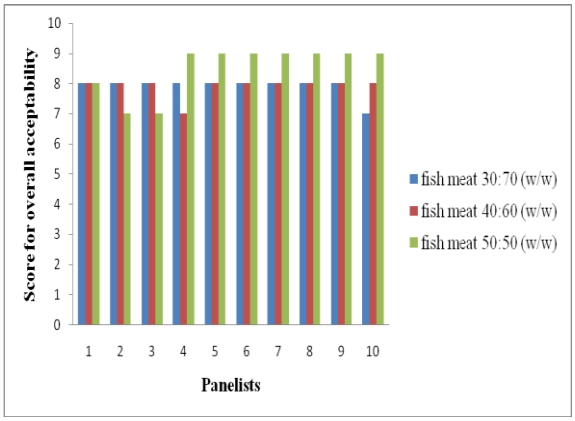

Fig. 1: Organoleptic evaluation of fish soup powder prepared by using three different concentrations fish meat on overall acceptability criteria

Note: F-cal. > F-crit. All treatments given are significantly different at P < 0.05

Standardization of starch type for the preparation of fish soup powder:

The results of organoleptic analysis revealed that among the three soup powders i.e. the soup powder prepared with corn flour, tapioca starch and maida, the soup having corn flour as a source of starch scored 8.6 points whereas the soup having tapioca and maida starch scored 7.8 for overall acceptability. This was due to poor consistency of soup i.e. the powder was not mixing properly into the water.

Maida was used as a source of starch while preparing fish soup powder from kilimin (*Synagris spp.*), jew fishes (*Otolithes spp.*) and silver bellies (*Leiognathus spp.*). (Venugopalan and James, 1969). However these researchers didn't mention any problem in the consistency of soup.

The organoleptic evaluation revealed that the soup containing corn flour starch scored highest points in overall acceptability compared to the soup containing these two starches individually. Hence, corn flour was chosen as a source of starch in present study.

Standardization of corn flour concentration for the preparation of fish soup powder:

The soups having corn flour concentrations of 15%, 20% and 25% of cooked fish meat were subjected to organoleptic analysis by panelists. The soups having 25% corn flour scored 8.3 points whereas the soup having 15% corn flour and 20% corn flour scored 7.2 and 7.4 points respectively for overall acceptability. Thus, among the three concentrations fish meat having concentration 25% corn flour scored highest points in overall acceptability criteria. The panelists remarked that the soup containing 25% corn flour was thicker and better in texture. Hence the highest concentration of starch i.e. 25% of cooked fish meat was chosen as an ideal concentration.

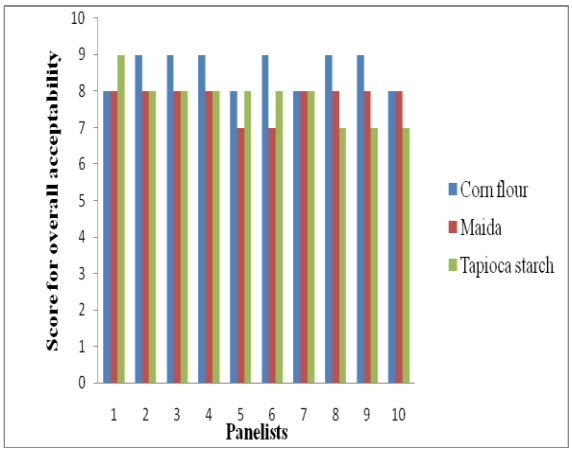

Fig. 2: Organoleptic evaluation of fish soup powder prepared by using three different types of starches on overall acceptability criteria.

Note: F-cal. > F-crit. All treatments given are significantly different at P < 0.05.

Working in the same line, Venugopalan and James (1969) prepared fish soup mix with 18.6% maida starch. Gopakumar *et al.* (1974) prepared fish soup powder with 25% tapioca starch and Shenoy *et al.* (1987) prepared fish soup powder with 30% tapioca starch of dressed fish meat.

Warang *et al.*, (2005) prepared soup powder of croaker fish with 25% starch which was made from 1:1 proportion of tapioca and corn flour.

Yadav (2008) prepared seaweed soup powder of *Sargassum tenerrimum* in which 14% corn flour was used.

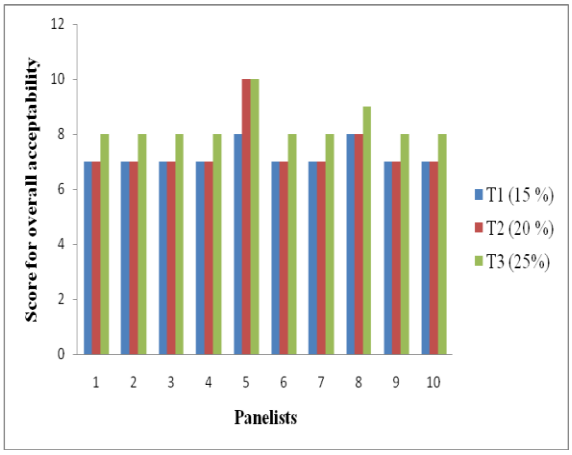

Fig. 3: Organoleptic evaluation of fish soup powder prepared by using different concentration of corn flour on overall acceptability criteria

Note: F-cal. > F-crit. All treatments given are significantly different at P < 0.05.

Standardization of black pepper powder concentration for the preparation of fish soup powder:

The soups having black pepper concentrations of 1.5%, 2.5% and 3.5% of cooked fish meat were subjected to organoleptic analysis by panelists. The soup having 2.5% black pepper scored 8.5 points whereas the soup having 1.5% black pepper and 3.5% black pepper scored 7.6 and 7.1 points respectively for overall acceptability. Thus, among the three concentrations fish meat having concentration 2.5% black pepper scored highest points in overall acceptability criteria. According to panelists, the soup prepared with 2.5% concentration was most appropriate and yielded the required spicy taste.

Working in the similar direction, Venugopalan and James (1969) used 1% pepper powder while preparing fish soup mix. Gopakumar *et al.*, (1974) prepared fish soup powder using 1.5% pepper powder concentration and Shenoy *et al.*, (1987) prepared fish soup powder using 2.5% pepper powder of dressed fish meat. Warang *et al.*, (2005) used 3.5% pepper powder of total cooked fish meat.

While preparing fish soup powder, different researchers have used different quantities of pepper powder. This may be in consideration with the taste of local people.

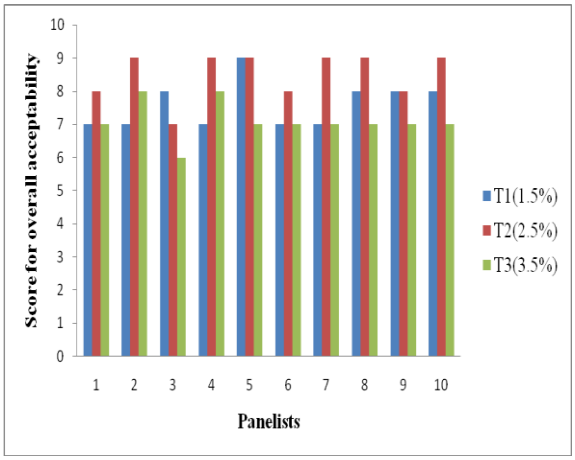

Fig. 4: Organoleptic evaluation of fish soup powder prepared by using different concentration of black pepper powder on overall acceptability

Note: F-cal. > F-crit. All treatments given are significantly different at P < 0.05.

Standardization of milk powder concentration for the preparation of fish soup powder:

The soups having milk powder concentrations of 8%, 12% and 16% of were subjected to organoleptic analysis by panelists. The soups having 8% milk powder scored 8.7 points whereas the soup having 12% milk powder and 16% milk powder scored 7.9 and 7.0 points respectively for overall acceptability. Thus, among the three concentrations fish meat having concentration 8% milk powder scored highest points in overall acceptability criteria.

Among the three concentrations used namely 8%, 12% and 16% of milk powder of cooked fish meat, the concentration of 8% milk powder scored highest points in overall

acceptability criteria. According to panellists, the soup prepared with 8% concentration was most appropriate and yielded the required good taste.

Working in the similar direction, Shenoy *et al.*, (1987) prepared fish soup powder using 12.5% milk powder of dressed fish meat. Warang *et al.*, (2005) used 12.5% milk powder of total cooked fish meat.

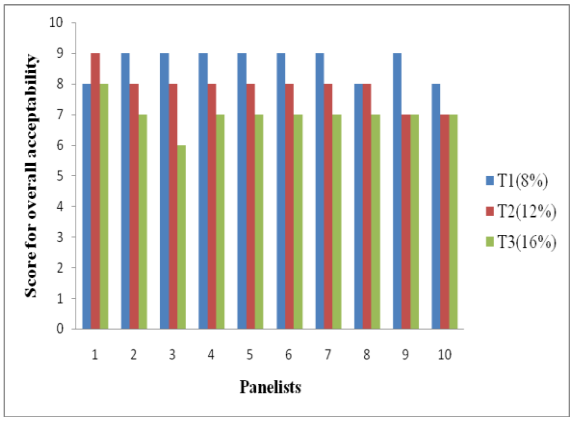

Fig. 5: Organoleptic evaluation of fish soup powder prepared by using different concentrations of milk powder depending on overall acceptability criteria

Note: F-cal. > F-crit. All treatments given are significantly different at P < 0.05.

Standardization of tomato powder concentration for the preparation of fish soup powder:

The soups having tomato powder concentrations of 10%, 12% and 15% of were subjected to organoleptic analysis by panelists. The soups having 12% tomato powder scored 8.7 points whereas the soup having 10% tomato powder and 15% tomato powder scored 7.7 and 6.9 points respectively for overall acceptability. Thus, among the three concentrations fish meat having concentration, 12% tomato powder scored highest points in overall acceptability criteria.

According to panellists, the soup prepared with 12% concentration was most appropriate and yielded the required good taste.

Working in the similar direction Wartha (2012) prepared fish soup powder using 12% milk powder of cooked fish meat.

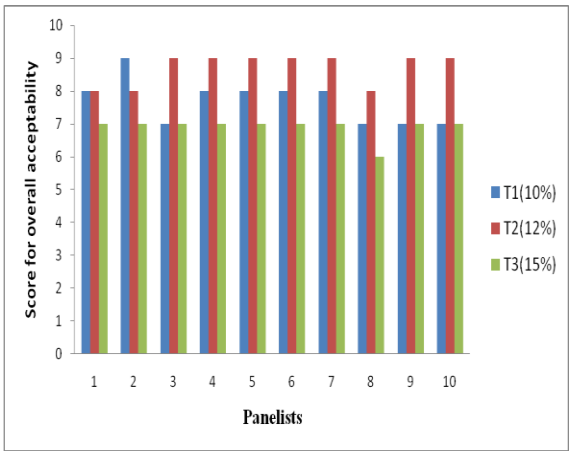

Fig. 6: Organoleptic evaluation of fish soup powder prepared by using different concentrations of tomato powder depending on overall acceptability criteria.

Note: F-cal. > F-crit. All treatments given are significantly different at P < 0.05.

Proximate composition of fish soup powder prepared by adopting standardized method of fish soup powder preparation:

There is an increasing demand of ready to eat products all over the world. However, the consumers are very much conscious about two things. Firstly the product should have nutritional value and secondly it should be free from pathogenic bacteria.

In the present work, the fish soup powder contained 48.20% crude protein, 25.23% carbohydrate, 10.77% moisture, 9.71% fat, 5.93% ash and crude fibre 0.16%. So the product is rich in nutrients.

Gopakumar (1973) attempted preparation of fish soup powder using trash fishes and reported lower protein content (21-28%). Similarly Shenoy *et al.*, (1987) prepared fish soup powder using miscellaneous fishes and reported lower protein values (21-25%). In both these cases the higher protein values

may be due to the use of multiple fish species for preparation of fish soup powder.

Warang *et al*., (2005) reported that the croaker fish soup powder contained 21.125% crude protein, 7.5% fat, 20.05% ash and 43.518% carbohydrate.

Yadav (2008) studied on seaweed soup powder prepared from dried powder of *Sargassum tenerrimum* and other ingredients which found to contain 19.55% protein, 1.003% fat, 6.71% ash, 11.33% crude fibre and 50.95% carbohydrate.

Wartha (2012) studied on soup powder prepared from the minced meat of Tilapia fish which found to contain 17.59 % protein, 12.65 % fat, 49.80 % carbohydrate, 11.33% crude fibre, 18.22% ash and 1.74% moisture.

In the present study, when the fat values of fish and fish soup powder were considered, we found significant increase from 9.71% to 13.47%. The reason behind increase in fat content in fish soup powder might be the use of butter while onion frying.

Also, in the present work, the fat content in the soup powder was found to be 9.71%. This value is similar to the value reported by Gopakumar (1973) and Shenoy *et al*., (1987) i.e. 12% -15% and higher than the one reported by Warang *et al*., (2005) i.e. 7.5%.

In the present work, moisture content of fish soup powder was higer i.e. 10.77% as compare to the moisture content of fish soup powder made by Shenoy *et al*., (1987) i.e. 5 to 6%, Warang *et al*., (2005) i.e. 7.807% and Yadav (2008) i.e. 9.01%.

Conclusion

The present studies indicated that a tasty and nutritionally rich soup can be prepared using pangasius fish. The standardization of ingredients for soup powder indicated that the ingredients namely fish meat (50:50 w/w), corn flour (25%), pepper powder (2.5%), milk powder (8%) and tomato powder (12%) of the fish meat are the standard proportions of the ingredients for the fish soup powder. Organoleptic evaluation of fish soup powder was carried out at every stage of standardization.

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