

Studies on Canning *Psenopsis cyanea*

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Suitability of *Psenopsis cyanea*, a deep sea fish caught on board FORV Sagar Sampada from a depth of 350 m off Cochin for processing into canned product was studied. The fish having high fat content around 52% (DWB) and white attractive meat renders itself well for canning yielding a product good in organoleptic characteristics. However to have a presentable appearance to the product the fish has to be skinned prior to canning. Gentle agitation of *P. cyanea* in 0.25 % aqueous solution of lactic acid at ambient temperature for 15 min followed by thorough washing yields skinless fish. Fish suffers around 8% (DWB) fat loss during skinning. Fish canned in natural style and in brine have better organoleptic characteristics initially. On storage they develop slight rancidity. Fish canned in oil maintains the characteristics over a longer period.

The cruises of FORV Sagar Sampada have thrown light on many species of fish that may be commercially available from deeper waters. Exploitation of such fish necessitates simultaneous identification and development of suitable processing technology for their economic utilization. One such species of fish identified as needing development of appropriate technology is *Psenopsis cyanea*. This is a fatty fish which occurs in small shoals irregularly distributed off the east and west coasts of India. Perigreen *et al.* (1988) studied the freezing characteristics of *P. cyanea* and reported a limited shelf life of 28–32 weeks at $-22 \pm 1^\circ\text{C}$. Being a fish high in fat content like sardine *P. cyanea* may yield a more stable product when canned. No previous work has been reported on the canning characteristics of this fish. The present investigations were, therefore, undertaken to assess the suitability of *P. cyanea* for canning and also to work out the detailed processing requirements.

Materials and Methods

P. cyanea was collected on board FORV Sagar Sampada from a depth of 350 m off Cochin. Immediately after catch the fish was washed well, packed in polythene bags in lots of 1 kg each and quick frozen at -40°C . The frozen fish stored at -23°C on board the vessel was brought to the laboratory in a week's time and used for the studies.

The frozen fish was thawed in the bags in running water at room temperature, dressed and used for canning. Meat separated from thawed fish was analysed for moisture, fat, protein and ash as per the AOAC (1975) methods. Skinning was done by gently agitating the fish in an aqueous solution of lactic acid at room temperature for 15 minutes. Afterwards the fish was thoroughly washed to remove the acid. Natural style canned fish was made as per the method suggested by Unnikrishnan Nair *et al.* (1974). The dressed fish was cold blanched in a solution containing 15% sodium chloride, 1% alum and 1% citric acid for 15 min. The fish after draining well was packed 250 g each in 7½ Oz SR lacquered cans, exhausted for 10 min in flowing steam, sealed and heat processed for 60 min in steam at 1.00 kg/cm^2 pressure. For canning in oil or brine, the process reported by Madhavan *et al.* (1970) was adopted with slight modification. The fish after cold brining in a 15% solution of sodium chloride was filled in cans and pre-cooked in steam at 0.35 kg/cm^2 pressure for 40 min keeping the cans inverted over a grid.

Table 1. Proximate composition of the meat of *P. cyanea*

Moisture, %	62.3
Fat (DWB), %	51.6
Crude protein	
(TN x 6.25), %	16.72
Ash, %	0.82

Table 2. *Observations on different types of packs of P. cyanea during storage*

Type of pack	Natural pack			Brine pack			Oil pack			
Storage period months	3	6	9	3	6	9	3	6	9	12
Overall appearance	Very good	Slight cloudy brine on top	Turbid brine	Very good	Good	Brine turns turbid	Good	Good	Good	Good
Colour of meat	White	White	White	White	White	White	White	White	White	White
Flavour	Natural fish flavour	Slightly rancid	Slightly rancid	Good	Good	Slightly rancid	Good	Good	Good	Good
Texture	Firm & soft	Firm & soft	Soft	Firm & soft	Firm & soft	Slightly soft	Firm & soft	Firm & soft	Firm & soft	Firm & soft
Can interior	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good

After adding hot refined groundnut oil or 2.5% sodium chloride solution the cans were exhausted, seamed and heat processed in steam at 1 kg/cm² pressure for one hour.

Results and Discussion

P. cyanea used in the studies had average weight 50 g and length 16 cm. In contrast to its dark grey colour of skin the fish has white meat rich in fat and has a palatable taste on cooking. The proximate composition of the meat is given in Table 1.

Canning of *P. cyanea* in natural style yielded a product very good in organoleptic characteristics. The overall appearance was not good on account of the dark colour. Further, slight detachment of the dark coloured skin was noticed. Extent of separation of skin was found to increase with storage. The loose fragments of skin became admixed with the contents presenting a bad appearance. Therefore it was necessary to skin the fish prior to canning.

Vijayan *et al.* (1985) reported a method of peeling mackerel fillets involving a process of steaming dressed mackerel under pressure followed by cooling to room temperature and scraping off the skin. This was reported as an improvement over the lye-peeling method of Saralaya *et al.* (1975). Finding both methods not quite good for *P. cyanea* an easier method was worked out involving treatment with lactic acid. Dressed *P. cyanea* was gently agitated in aqueous solutions of lactic acid of varying concentrations for different periods. By treatment in 0.25% solution for 15 min followed by thorough washing in running water the skin could be peeled off remarkably well. Side by side with removal of skin the fish suffered loss of 7–8% (DWB) fat also.

The skinned fish was canned in different styles – natural pack, in brine and in oil. The canned samples were stored at ambient temperature. Samples were drawn at regular intervals and tested for quality evaluation. The results are summarised in Table 2.

Initially fish in natural and brine packs had very good organoleptic characteristics particularly with respect to flavour. However on storage for 6 and 9 months respectively

they developed slight rancid odour besides the brine turning cloudy. The texture also became slightly softened in both cases. However, the can interior remained unaffected. As regards the fish in oil pack all these characteristics remained unaltered for a year upto which period observations were made.

Being a fish very high in fat content there is some possibility of autoxidation of fat in can leading to the rancid flavour. The fish being skinned have the meat exposed which in contact with brine may lead to precipitation of protein thus leading to the cloudy nature of the brine observed in natural and brine packs. However this possibility is obviated in oil pack where the drip in oil is maintained below 5%. On the basis of the above observations it can be concluded that of the different methods tried, canning in oil is more suited for *P. cyanea*.

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