

Studies on Frozen Storage of Ghol (*Pseudosciaena diacanthus*)

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Investigations were carried out on the frozen storage of ghol (*Pseudosciaena diacanthus*) in the form of fillets. The results indicated that ghol fillets stored at -18°C remained in a highly acceptable condition upto 20 weeks. However, after this stage, the acceptability steeply declined.

Pseudosciaena diacanthus forms an important fishery of the Bombay coast. Rao (1963) states that at Bombay, *Pseudosciaena diacanthus*, locally called 'ghol', ranks first in off-shore sciaenid fishery forming 5 to 8% of the total trawl catch. Unlike most other sciaenids, ghol grows to an unusually large size and is esteemed as a table fish. The size of the adult fish ranges between 28 to 108 cm and weigh 1 to 12 kg. Published literature does not indicate any scientific data on the freezing and storage characteristics of ghol fillets. In view of the good export potential of frozen ghol fillets, a detailed study was carried out and results presented in this paper.

Materials and Methods

Fresh ghol weighing about 8 to 10 kg were procured from local landings at Bombay. In the laboratory they were thoroughly washed, skinned and filleted. Fillets (average thickness 5 cm, weight 200 to 250 g) were then washed with potable water, drained for 10 min, individually wrapped in polythene film, quick frozen in contact plate freezer at -40°C and then stored in a deep freezer maintained at -18°C for 24 weeks. Analysis of fillets was carried out at regular intervals of four weeks.

Moisture, total nitrogen and non-protein nitrogen were estimated by the AOAC (1960) procedure, free fatty acid by the method of Dyer & Morton (1956), total

volatile nitrogen by Conway & Byrene (1933) while α -amino nitrogen was estimated by Pope & Stevens (1939) and thiobarbituric acid value was measured according to Tarladgis *et al.* (1960). Total plate count was determined by IS: 2237 (1971) procedure. The physical characteristics like colour, texture and odour were recorded immediately after thawing. For the assessment of organoleptic quality, thawed material was cooked in 2.5% solution of sodium chloride for 10 min.

Results and Discussion

The usual commercial method of dressing and filleting of the fish was followed throughout the investigation. A number of such repeated experiments indicated that the net yield of fillets ranged between 45 to 50% of the whole fish.

The results of analysis of frozen fillets are presented in Tables 1 & 2. The moisture content of the frozen and stored fillets decreased from 78.28 to 76.5% during the 24 weeks storage. This loss in moisture may be attributed to loss by way of drip as well as dehydration. Total nitrogen values decreased from 3.407 to 3.18% and non-protein nitrogen from 0.348 to 0.253%. However, total volatile nitrogen values showed a gradual increasing trend from an initial level of 13.5 to 16.6 mg/100g. Shenoy & James (1974) have recorded similar observations with respect to sardine and Kamasastri *et al.* (1967) with respect to pomfrets. The initial α -amino nitrogen content of the fish was found to be 12.10

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Table 1. *Effect of frozen storage on chemical and bacterial composition of ghol fillets*

	Storage period in weeks						
	Initial	4	8	12	16	20	24
Moisture %	78.28	78.32	78.09	77.81	76.95	76.80	76.50
Total nitrogen %	3.407	3.440	3.190	3.404	3.380	3.230	3.180
Non-protein nitrogen %	0.348	0.321	0.313	0.314	0.315	0.314	0.253
Total volatile nitrogen mg/100g	13.50	14.10	15.00	15.10	15.40	15.60	16.60
α -Amino nitrogen mg/100g	12.10	10.63	14.28	12.69	10.92	9.80	9.20
Free fatty acid (% oleic acid)	1.90	2.81	2.93	3.41	3.72	4.77	6.79
Thiobarbituric acid value (micromoles malonaldehyde/ kg flesh)	1.50	2.00	2.50	3.00	3.75	6.00	13.25
Total plate count/g	1.90×10^6	1.17×10^3	1.28×10^3	1.28×10^3	1.87×10^3	4.87×10^3	1.4×10^3

Table 2. *Physical and organoleptic quality of thawed and cooked fillets*

		Storage period in weeks					
	Initial	4	8	12	16	20	24
Thawed fillets							
Colour	Very good	Good	Good	Good	Fair	Fair, slightly discoloured	Poor, pronounced discoloration
Texture	Firm	Firm	Firm	Firm	Slightly spongy	Slightly spongy	Spongy
Odour	Very good	Good	Good	Fair	Fair	Fair, slight rancid odour	Poor, high rancid odour
Cooked fillets							
Texture	Firm, dry	Firm, dry	Firm	Firm but slightly crumbly	Slightly spongy	Slightly spongy	Tough and spongy
Flavour	Very good	Good	Good	Fair	Fair	Fair, no perceptible rancid flavour	Poor, rancid flavour

mg/100g. This value is relatively low compared to the values estimated by Velankar & Govindan (1958) in the case of most other marine fishes. During the storage period,

the values slightly declined to 9.20 mg/100g. Free fatty acid values of the fillets increased from 1.90 to 6.79%. This increase appeared to be closely related to the increase in the

degree of sponginess of the fillets observed during the organoleptic assessment of the stored product. This corroborates with the findings of Kamasastri *et al.* (1967) with reference to silver pomfrets and Shenoy (1976) with reference to seer fillets. The increase in thiobarbituric acid value was gradual and steady and reached a level of 6 by the end of 20 weeks. After this stage, the increase was abrupt and reached a maximum of 13 during the next weeks of storage. This observation is substantially corroborated with the organoleptic observations. Total bacterial count recorded a marked fall from an initial level of 1.90×10^5 to 1.17×10^3 within a period of four weeks. After this, the values remained more or less steady.

Taking the biochemical, bacteriological and organoleptic parameters into consideration, it may be assessed that ghol fillets remained in acceptable condition upto a period of 20 weeks in frozen storage. After this, the acceptability steeply declined.

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