

Studies on Dried/Smoked Barracuda

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Physical, chemical and organoleptic characteristics of dried and smoked barracuda (*Sphyraena* spp.) during storage at ambient temperature are reported. Initial increase in total volatile basic nitrogen (TVBN) content after drying as well as smoking did not have any significant effect on the organoleptic qualities of the products. Smoking was found effective in delaying the onset of fungal attack and also in improving the organoleptic qualities.

Barracuda (*Sphyraena* spp.) is a significant fishery along the Indian coast. Annually around 3800 tonnes of this fish are landed in India (MPEDA, 1985). The fish is mostly consumed fresh in the coastal area. A small percentage is converted to dry salted products by the traditional methods. In the fresh condition, the flavour of this fish is not relished by all. Hence attempts have been made to prepare dried/smoked products from barracuda.

This paper reports results of the study on the method of preparation, quality and shelf-life of dried as well as smoked products from barracuda.

Materials and Methods

Fresh barracuda (*Sphyraena* spp., average length 27 cm, average weight 120 g) caught by the research vessel FORV Sagar Sampada was frozen immediately after catch in the blast freezer onboard at -40°C and kept in the cold storage of the vessel at -18°C . On reaching the shore the fish was transported to the laboratory. It was then thawed, split open from the back, washed and salted in saturated brine. After keeping overnight, in brine the fish was dried in sun for a day. The semidried fish was divided into two lots. One lot was further dried in the sun to a moisture content of about 40% and the other lot was smoked in a conventional type vertical smoke kiln for 5 h at about 45°C . Both the samples were packed in 200 gauge polythene bags and stored at ambient temperature. Samples were drawn at intervals from both the lots and analysed for physical, chemical and organoleptic characteristics.

Moisture, fat, ash and sodium chloride were determined by AOAC (1975) methods. Total volatile basic nitrogen (TVBN) was determined by the method of Conway. (1947) and pH by the method of CIDA/FAO/CECAP (1977). The water activity was measured by equilibrating the samples in an enclosed container and measuring the relative humidity (RH) using the relative humidity system of M/s Weather Measure Corporation, California. RH/100 was taken as water activity of the sample. For assessing the organoleptic quality a 10 point hedonic scale (10 being very good, 1 being bad and 4 being just unacceptable taking into consideration the change in odour, texture and flavour of the fish) was used.

Results and Discussion

Chemical composition of fresh frozen barracuda meat is given in Table 1. The physical observation, chemical characteristics and organoleptic ratings of dried and smoked barracuda during storage at ambient temperature are given in Table 2 and Table 3 respectively. The yield of dried as well as smoked barracuda was about 50% on the basis of whole fish. An increase in TVBN content was noticed after drying and after smoking probably due to the elevation of temperature and the subsequent microbiological and biochemical changes in the fish muscle during drying/smoking. But this is not reflected in the organoleptic qualities of dried/smoked samples. This confirms the findings of Balachandran *et al.* (1987). The unpleasant flavour normally exhibited by the fresh fish was absent in the dried/smoked fish. In the case of dry cured fish the TVBN

Table 1. *Chemical composition of barracuda meat*

Moisture %	75.5
Protein %	21.00
Fat % (DWB)	4.60
Ash % (DWB)	1.323
TVBN mg/100 g	8.400

DWB = Dry weight basis

value showed a gradual increase during storage at ambient temperature whereas in smoked fish it showed a decreasing trend up to the 9th week and then it started increasing gradually. The pH of the smoked fish was lower than that of the dried fish which can be presumed to be due to the effect of phenolic/acidic constituents deposited on the fish muscle during smoking. After 9 weeks, fungal growth was observed on the dried sample and was hence discarded. In

Table 2. *Physical observations, chemical characteristics and organoleptic ratings of dried barracuda*

Weeks of storage	Physical observation	Moisture %	Chloride % (DWB)	TVBN mg/100g	pH	Water activity	Organoleptic score
0	Creamy-yellowish colour	38.53	16.37	57.4	6.20	0.73	9
5	Slight brown colour	38.94	—	70.0	6.16	—	8
9	Intense brown colour and incidence of fungus	37.74	—	77.0	5.97	—	7

DWB = Dry weight basis

Table 3. *Physical observations, chemical characteristics and organoleptic rating of smoked barracuda*

Weeks of storage	Physical observation	Moisture %	Chloride % (DWB)	TVBN mg/100g	pH	Water activity	Organoleptic score
0	Golden yellow to brown colour	38.12	15.32	70.0	5.96	0.73	9
5	"	39.86	—	53.2	5.95	—	8
9	"	39.78	—	43.4	5.60	—	8
11	"	38.57	—	61.6	5.60	—	7
13	Intense brown colour	37.61	—	69.0	5.50	—	6
15	"	37.59	—	112.0	5.50	—	5
19	Dark brown colour and incidence of fungus	38.17	—	126.0	5.50	—	5

DWB = Dry weight basis

smoked fish intensification of the brown colour was noticed by 13th week and incidence of fungus by the 19th week. The delay in the onset of fungal attack in smoked fish can be attributed to the antifungal action of the smoke constituents deposited on fish. Both dried and smoked samples were organoleptically acceptable even when they were discarded because of fungal attack. In general, smoking not only improved the organoleptic qualities of the fish but it also extended its shelf life by delaying the onset of fungal attack.

The authors are thankful to Shri M. R. Nair, Director, Central Institute of Fisheries Technology, Cochin for the permission to publish the paper.

References

- AOAC (1975) *Official Methods of Analysis*, 12th edn. Association of Official Analytical Chemists. Washington D.C.
- Balachandran, K. K., Joseph, A. C., Surendran, P. K. & Prabhu, P. V. (1987) Paper presented in the seminar on "Diversification of Post-harvest Technology for Low Cost Fish" held at Cochin on 10-11 March, 1987 by Society of Fisheries Technologists (India)
- Conway, E. J. (1947) *Microdiffusion Analysis and Volumetric Error* 5th edn. p. 199, Crossby Lockwood and Sons, London
- CIDA/FAO/CECAP (1977) *A Collection of Analytical Methods and Testing Procedures for the Assessment of Fish and Shellfish Quality*, p. 10, FAO, Rome
- MPEDA (1985) *Statistics of Marine Products Exports*. Marine Products Export Development Authority, Cochin.