

Quality of Cured Fish from Tamilnadu Coast

K. GEORGE JOSEPH, V. MURALEEDHARAN, N. KALAIMANI and
T. S. UNNIKRISHNAN NAIR

Calicut Research Centre of Central Institute of Fisheries Technology, Calicut - 673 005

Results of studies of chemical, bacteriological and organoleptic quality of cured fish collected from four major curing centres along the Tamilnadu coast are reported. Only 32.43% of the samples had moisture level below 35%, 0.9% had salt 25% and above. None of the samples showed acid insoluble ash below 1.5%. The main defects were unhygienic processing, inadequate salting, use of poor quality salt and incomplete drying. Recommendations for improvement of quality are given.

Fish curing is a very prosperous industry along the Tamilnadu coast, because of the abundance of catch and availability of salt. A considerable quantity of the catch is processed into cured products on the methods of curing in India. Joseph & Srinivasan (1967) investigated the fish curing practices at Kanniyakumari. A survey of the salt-cured ash produced in the Kanniyakumari District was conducted by Srinivasan & Joseph (1966). This paper reports the quality of cured fish from the Tamilnadu coast in the method of preparation, and suggests recommendations for improvement.

Materials and Methods

A total of 333 samples were collected from four major centres, namely, Madras, Nagapattinam, Tuticorin and Kanniyakumari. The samples were brought to the laboratory in screw cap glass bottles and analysed within ten days. Moisture, salt, acid insoluble ash and total volatile nitrogen were determined according to the methods of AOAC (1980). Bacteriological characteristics were determined as per methods described by George Joseph & Muraleedharan (1983). The samples were stored under laboratory conditions for observation.

Results and Discussion

The samples comprised mainly of dry salted and sun dried products. Wet cured samples reported by Srinivasan & Joseph (1966) were not available. The method of processing was similar in all the centres.

Dressing the fish was done on the floor itself and not on clean tables. Proper washing of the dressed fish was not found to be done since most of the curing sheds were without good running water. Proper waste disposal facilities also were not available. The ratio of salt to fish, was 1:5 and the salting time varied from 12 to 24 h. Salting was done in cement tanks with the fish and salt laid in alternate layers. The best curing yard was seen in Tuticorin with hygienic salting tanks and concrete floor for drying fish. Coir mats are used for spreading fish on the floor. Salted fish are sorted and graded before drying. In Madras no such grading is done and the fish are laid out over coir mats spread on the sand. Sun drying at Nagapattinam and Kanniyakumari was to be done under most unhygienic conditions.

Table 1 presents the results of chemical and bacteriological analysis and the organoleptic score of the samples. The different ranges of moisture, salt and ash with corresponding percentages of samples grouped into that range are given in Table 2. Compared to ISI specifications (1966, 1976) only 32.43% of the samples are within the limits of moisture, 0.9% within that of salt and none in the case of acid insoluble ash. Average for moisture, salt and acid insoluble ash of the whole lot of samples are 35.54% and 13.97% and 7.72% respectively.

Samples from Tuticorin had an average moisture of 29.45% while the remaining had 37.07%. Tuticorin samples had 17.18% salt

Table 1. Chemical and bacteriological quality and organoleptic rating of the cured fish

Sample	No. of samples analysed	*Moisture %	*NaCl % DWB	Acid* insoluble ash %	*TVN mg/100g DWB	*SPC/g	No. of samples with 'red'	Score
Sardine (a)	33	39.24	17.76	6.98	90.81	1.228 x 10 ⁴	11	1
(b)	22	36.01	18.38	5.94	94.09	1.644 x 10 ³	22	3
White bait (a)	24	38.72	3.36	9.59	72.69	2.230 x 10 ⁵	Nil	2
(c)	24	25.23	2.84	8.52	46.47	8.934 x 10 ⁴	"	2
(d)	10	17.21	3.05	9.78	38.11	4.638 x 10 ⁶	"	2
Silverbelly (a)	27	41.04	13.74	5.36	89.57	1.264 x 10 ⁴	7	2
(b)	17	27.76	11.14	4.44	68.19	5.859 x 10 ³	17	3
(c)	18	38.82	2.53	5.65	89.47	8.867 x 10 ⁶	Nil	3
Sole (a)	24	37.95	17.69	6.98	104.05	2.987 x 10 ³	16	1
(c)	22	22.69	21.02	4.59	82.08	1.422 x 10 ⁵	Nil	2
Ribbon fish (a)	31	40.30	19.54	10.37	73.88	2.011 x 10 ³	Nil	1
(b)	6	35.01	15.82	15.79	96.88	2.077 x 10 ³	6	3
(d) split whole	8	36.85	16.78	14.97	78.40	2.823 x 10 ³	Nil	2
	9	37.31	12.81	5.05	58.91	2.001 x 10 ⁶	Nil	2
Catfish (a)	15	41.71	22.91	12.30	83.60	3.485 x 10 ⁶	Nil	2
(d)	10	42.34	20.77	11.74	73.51	3.319 x 10 ³	10	2

*Average values; (a) - Madras; (b) - Tuticorin; (c) - Nagapattinam; (d) - Kanniyakumari; o = poor; 1 = poor-fair; 2 = fair; 3 = fair-good; 4 = good; 5 = very good

Table 2. Range of moisture, salt and acid insoluble ash of the samples with corresponding average values

	Moisture %			Salt % DWB			Acid insoluble ash % DWB		
	Below 35	Between 35-40	Above 40	Below 25	Between 20-25	Above 25	Below 1.5	Between 1.5-5	Above 5
Percentage of samples in the range	32.43	36.34	31.38	81.38	17.72	0.9	Nil	18.32	81.68
Average	26.50	27.94	42.00	12.24	21.35	25.68	—	4.17	8.25

whereas the others only 17.24% on an average. Acid insoluble ash was 5.98% against 8.16% for the rest. These samples got the highest organoleptic score. Acid insoluble ash of the whole lot varied from 2.26% to 16.86% with an average 7.72% which is above the limit. The sun dried white baits showed variation from 2.26% to 13.14%, the average being 8.34%. This too is above limit (IS:2883, 1976).

TVN values were low ranging from 20.86 to 112.5 mg% and showed regular increase with moisture. 55.26% of the samples had standard plate count below 10,000; 25.23% above 10,000 but below 1 lakh and the rest above 1 lakh. The highest count (9.527×10^7) was observed in a silverbelly sample from Nagapattinam whereas the lowest (1.019×10^2) was in a sample of sole from Tuticorin. *Escherichia coli*, faecal streptococci, coagulase positive staphylococci and cliforms were not encountered in any of the samples. The degree of spoilage could not be followed by SPC only since samples with lower and higher organoleptic score had low SPC (Table 1). The low salt and high moisture content coincide with increase in SPC.

33.33% of the samples was contaminated with 'red' halophiles. All these samples were spoiled within 15 days of storage. 'Red' attack was prominent in samples with low SPC. The sun-dried samples were free from 'red'. Initially the samples from Tuticorin were organoleptically rated high, but they developed "red" during storage. This points to the use of poor quality salt.

65.63% of the samples collected from Nagapattinam and 61.43% of the samples from Kanniyakumari were infested with insects and became a powdery mass during storage.

Provisions should be made to encourage curers to use only high quantity salt (IS: 594, 1962). The attack of halophiles can be controlled only by using good salt. Salting time has to be enhanced so that salt penetration is sufficient. Many samples were also not dried adequately. Strict sanitary conditions in all stages of processing should be enforced so that only hygienic products are prepared.

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