

INFLUENCE OF FAT CONTENT ON THE QUALITY AND SHELF LIFE OF CURED SARDINES

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The paper presents results of studies on the effect of seasonal variations in the fat content on the quality and shelf life of dry cured, pickle cured and smoke cured oil sardines. The merits and defects of each method of curing during different seasons are discussed.

INTRODUCTION

Oil sardine (*Sardinella longiceps*) is the single largest fishery of India. But surprisingly modern methods of processing and preservation are not employed at present for utilizing this major fishery. In the coastal and nearby areas, the fish is consumed as fresh fish. But bulk of the landings is converted to cured products by traditional methods. The quality of these products is often deplorably poor. Considering the volume of cured products prepared from oil sardine, improvement of the quality of these products becomes an important problem.

Oil sardine exhibits a remarkable seasonal variation in fat content, recording a maximum during November-January and minimum during June-August (Vasavan, Gangadharan and Padmanabhan, 1960; Gopakumar, 1965). Any attempt

for the improvement of curing methods for this fish should, therefore take into consideration the effect of this variation in fat content on the quality and shelf life of the final cured products. This paper reports results of such a study.

MATERIALS AND METHODS

Fresh oil sardine was procured in prime condition from the local landing centre. The fish after cleaning, dressing and washing, were divided into three lots. The first lot was dry cured, second lot pickled and the third smoke cured. No special preservative was used for curing. Samples were taken every month to study the effect of seasonal variations in the fat content on the quality and shelf life of the cured products.

For dry curing, the cleaned dressed fish were salted with refined salt (salt :

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TABLE I

ANALYTICAL CHARACTERISTICS OF THE FRESH AND CURED FISH

Month	Fat % DWB	*Sample	Moisture %	ANALYTICAL CHARACTERISTICS			Storage life in weeks
				Total nitrogen (% DWB)	Chlorides as NaCl (% DWB)	TVN (mg. % DWB)	
January	35.15	1	68.25	9.91	0.985	18.12	—
		2	45.98	7.15	23.39	25.14	6
		3	30.92	7.36	9.15	21.67	7
		4	53.00	6.14	30.15	15.05	5
February	33.33	1	68.5	9.79	0.952	25.15	—
		2	44.15	7.95	22.95	30.42	7
		3	30.55	7.51	10.54	29.78	6
		4	53.15	6.754	31.05	20.10	5
March	30.30	1	68.5	9.981	0.93	27.58	—
		2	43.75	7.43	25.23	55.10	8
		3	30.25	7.63	11.75	47.19	8
		4	53.25	6.998	31.38	29.90	5
April	25.4	1	70.25	9.08	0.983	30.85	—
		2	40.50	8.94	27.90	44.19	8
		3	28.15	9.01	13.39	38.54	6
		4	52.25	7.66	33.12	25.12 Above	5
May	29.5	1	71.25	8.935	1.021	21.19	—
		2	41.50	7.513	26.80	36.21	8
		3	28.75	7.52	12.81	31.54	10
		4	53.50	6.005	31.12	20.04	6
June	26.40	1	75.5	9.96	1.009	24.5	—
		2	40.95	7.89	26.43	37.69	8
		3	20.35	9.61	12.18	36.14	9
		4	54.75	7.13	33.60	23.63	5

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July	27.0	1	71.50	10.01	0.98	36.60	—
		2	14.15	7.97	25.75	33.60	8
		3	29.95	9.05	12.53	28.10	9
		4	52.25	6.975	32.57	19.70	5
August	20.8	1	72.46	9.96	0.991	27.10	—
		2	39.26	7.38	30.14	31.50	11
		3	25.75	7.51	15.31	26.75	11
		4	50.25	5.666	35.25	19.70	7
September	27.9	1	70.50	9.18	0.98	24.37	—
		2	41.25	7.25	25.94	32.81	8
		3	29.50	7.57	12.75	40.80	10
		4	51.50	6.98	32.08	30.80 Above	6
October	26.25	1	69.75	10.16	0.98	22.67 Above	—
		2	40.95	7.54	26.07	32.93	8
		3	28.90	7.35	12.80	33.12	9
		4	53.50	6.53	33.36	16.93 Above	6
November	36.8	1	67.25	9.08	0.879	24.5	—
		2	45.25	6.85	22.50	38.70	6
		3	32.15	5.15	9.02	32.05	6
		4	54.25	5.05	26.10	25.03	4
December	36.8	1	67.25	9.68	1.084	23.5	—
		2	45.15	7.025	21.18	30.50	5
		3	32.64	6.81	8.75	30.42	6
		4	55.25	5.94	27.14	20.18	4

fish 1:4), kept for 24 hours and then dried in the sun, as done commercially. For pickling the fish after thorough salting was left in tightly closed glass jars overnight. After this, sufficient saturated brine was added to keep the fish immersed. For preparing smoke cured products, the method reported by Muralidharan and Valsan (1976) was followed, except that no preservative was added to the dipping brine.

The fresh fish as well as the cured products prepared were analysed for moisture, total nitrogen and sodium chloride according to the method of A.O.A.C. (1955). Total volatile nitrogen was determined by the method of Conway (1947) using trichloroacetic acid extract.

RESULTS AND DISCUSSION

Table I gives the analytical characteristics of the fresh and cured fish as well as the shelf life of the cured products prepared during each month.

It can be seen that, in general, products prepared out of fish with low fat had better shelf life compared to those prepared from fatty fish.

In the case of dry cured products, samples prepared from fish with low fat content (20.8%) stored well, upto 11 weeks. With increasing fat content drying becomes more difficult and penetration of salt into the muscle is reduced, as shown by the moisture and chloride values given in Table I. Further, drying of fish of high fat content resulted in the oil oozing out making the product discoloured and unattractive. Dry cured products prepared from fatty fish, are prone to early attack of fungus. High fat favoured early onset

of discolouration and rancidity also. It is thus clear, that for a good quality dry cured product, the fat content in the raw material should be minimum. But, this being the monsoon time, climate is not favourable for sun drying. However from August to November and again from March to June, when fat content is medium, good quality dry cured products can be prepared from oil sardine. During this period climate is also favourable for sun drying.

Smoke curing is found to be a good method of preservation almost throughout the year. But in this case also the products prepared out of lean fish had a comparatively better shelf life due to reasons mentioned in the case of dry cured products. Smoke curing is, however, yet to gain popularity among our fish curers. If properly prepared in a scientific way (Muralidharan and Valsan, 1976), smoked products from oil sardine can have a very good market.

Pickled products, in general had shorter shelf life compared to dry cured and smoked products. But the method has an advantage in that the development of rancidity is minimum. Because of this, the trade preferentially adopts this method of curing. In the absence of any special preservative, pickled products are easily attacked by muggots, molds and fungi. During November-January, when fat is high, pickling is a good method of preservation for oil sardine, compared to dry curing. However, in view of its shorter shelf life a suitable preservative like sodium benzoate is to be used in pickling to enhance the storage life. This is not practiced by the trade, at present, resulting in early spoilage of the fish.

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