Quality of Certain Ready-to-Eat Fish Products of the Domestic Trade

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Quality of 181 samples of ready-to-eat fish products comprising fried fish, fish curry and fish/prawn pickles collected from Cochin and Calicut were studied. Salmonella was absent in all the samples. V. cholerae was tested in the samples collected at Cochin and was absent in all the cases. Coliforms, E. coli, faecal streptococci and coagulase-positive staphylococci were present in some of the samples studied. The study indicated the necessity to improve the sanitary and hygienic conditions of the hotels engaged in the preparation of these products. The study further indicated that fried fish and fish curry shall not be served after 6 hours of their preparation. Added care is to be exercised in the selection of shrimps and fish for the preparation of pickles.

In India, considerable amount of work has been done on the quality of fish and shellfish of the export trade. Studies carried out upto 1974 have been reviewed by Mathen (1974). Later studies on the subject are those of Varma et al. (1982) and Thomas & Varma (1982). With regard to fishery products of the domestic trade, sufficient information is available on the quality of dried fishes (Pillai et al. 1956; Srinivasan & Joseph, 1966; Srinivasan et al, 1967; Mathen, 1970, Valsan et al. 1982; Joseph et al. 1983). On the other hand, publications on the quality of fresh and frozen fishery products in the retail outlets in India are meagre (Anon, 1979; Iyer et al. 1982; Sanjeev et al. 1982) and practically no information is available on the quality of ready-to-eat fish items. The main objective of the present study is, therefore, to study the quality of some of the products like fried fish, fish curry and fish pickles collected from the consumer outlets at Cochin and Calicut.

Materials and Methods

During the course of this study, 181 samples as per details given below were studied.

	Cochin	Calicut
Fried fish	47	41
Fish curry	44	39
Fish/prawn pickles	10	Nil
Total	101	80
Grand total	18	31

Fish curry and fried fish (each weighing about 500 g) were collected in sterile stainless steel containers from 34 different hotels situated in 5 different localities at Cochin and from 15 hotels at Calicut. Fish pickles packed in sealed glass bottles (300 g each) were purchased from the retail shops at Cochin. The samples except pickles were collected within one hour of their preparation and the analysis started within 1 h of collection of the samples. From each of the samples, 10 g were asceptically taken for the determination of total bacterial count, faecal streptococci, E. coli and Staph. aureus. Twentyfive grams of each of the samples were separately taken for the detection of Salmonella and V. cholerae. In the case of fish curry and fish pickles, the oily layer floating on the surface was removed before drawing the samples.

Total bacterial count at 37°C, faecal streptococci, E. coli and coagulase-positive

staphylococci were determined as per Indian Standard Specifications for frozen prawns (IS:2237-1971). Salmonella and V. chloerae were detected as per methods recommended by the AOAC, (1975) and IS (5887 Part-IV-All the media were 1977) respectively. compounded in the laboratory as per the formulae and procedure detailed by Speck (1976). Incubation temperature was 37°C in all the cases. Counts on TG agar and KF agar were taken after 48 h whereas those on T7 agar and BP medium were taken after 24 h. Bacto dehydrated coagulase plasma was used to test the characteristic colonies grown on BP medium. Total volatile nitrogen (TVN) was determined as per Conway (1947). The taste of the product was judged by a panel of 4 experienced staff members of the Institute on

a 10 point hedonic scale. Samples with score less than 5 are considered below average.

In order to study the quality changes in the fried fish and fish curry on storage at room temperature, 6 fried fish and 4 curry samples were separately collected. These samples were kept at room temperature for 12 h and their quality was studied at frequent intervals.

Results and Discussion

The quality of the samples collected from Cochin and Calicut are given in Table 1. The quality changes in the product on storage at room temperature are shown in Tables 2 and 3.

Table 1. Quality of ready-to-eat fish products collected from Cochin and Calicut areas

Quality factors		Cochin			Calicut		
Incidence of coliforms	· %	Fried fish 13	Fish curry 17	Fish pickles 0	Fried fish 20	Fish curry 26	
Incidence of E. coli	%	.0	5	0	0	0	
Incidence of faecal streptococci	%	25	22	10	34	38	
Incidence of coagulase-	0.7	_	2	•	2	0	
positive staphylococci	%	6	2	0	2	0	
Incidence of salmonella	%.	0	0	0	0	0	
Incidence of V. cholerae	%	0	0	0	ND	ND	
% samples having TVN							
more than 20 mg	%	36	6	50	8 6	93	
Taste above average	%	56	64	20	39	26	
Taste average	%	25	19	10	49	56	
Taste below average	%	19	17	70	12	18	
Total bacterial count at 37°C less than 1000/g	%	55	65	65	41	82	
-do- between 1000 and 5000/g	%	15	20	10	24	13	
-do- between 5001 and 10,000/g	%	15	5	10	8	3	
-do- between 10,001 and 50,000/g	%	10	5	5	17	2	
-do- more than 50,000/g	%	5	5	10	10	0	
ND – not done							

Table 2. Quality of fish fry during storage at room temperature

Experiment-6	Taste score	∞ .	∞	7	7	4	
Experin	TVN mg %	23.7	24.7	27.2	29.1	30.7	
	TBC/g	069	2.19x	1.0x 104	1.1x 105	4.4x	
Experiment-5	Taste	∞	8	∞	7	5	
Experir	TVN mg %		1			1	
	TBC/g	357	2.9x	5.6x 103	8.5x	5.5x 104	
4.	Taste	7	7	7	9	4	
Experiment-4	NAL with the work with the wor	9.5	14.3	18.6	19.6	25.6	
EX	TBC/g	3.2x 103	3.4x	7.1x 104	1.7x 105	3.9x 106	
nt-3	Taste	∞	7	٢	9	マ	
Experiment-3	NVI mg %	14.2	18.7	19.2	21.3	23.5	
闰	TBC/g	1.18x 103	2.17x	5.88x 103	4.1x 104	4.0x 106	-
t2	Taste score		S .	ς.	4	4	
Experimen	TVN mg %	14.9	18.2	21.5	22.0	25.1	
Ex	TBC/g TVN mg %	315	3.7x	4.2x 104	2.8x 105	3.8x 105	1 37°C
1	Taste	7	9	9	5	4	sount at
Experiment-1	TBC/g TVN mg%	21.2	27.2	27.3	30.5	31.5	cterial (
Expe	TBC/g	3.2x 103	4.78x	4.9x 103	5.1x 105	7.15x 105	total ba
	Hours at room tempe- rature	0	8	9	6	12	TBC = total bacterial count at 37°C

Table 3. Quality of fish curry during storage at room temperature

	Taste score	7	_	10	7	0
Experiment-4	∏ Sc.	•		۷,	. ,	
	TVN mg %			•	17.9	- '
	TBC/g	2.2 x 105	5.3×10^{5}	2.1×10^{6}	2.6×10^{7}	4.0×10^{7}
	Taste score	00	00	3	7	0
Experiment-3	TVN mg %	7.1	9.5	11.5	11.8	19.8
Experin	TBC/g	4.1×10^{5}	4.4 x 106	1.5×10^{6}	1.1×10^7	2.1×107
Experiment-2	Taste	7	<u>_</u>	S	7	0
	TVN mg %	20.9	21.0	24.6	26.8	26.9
	TBC/g	4.8 x 104	2.92×10^{6}	9.89 x 10 ⁶	8.5 x 10 ⁶	1.9×10^7
Experiment-1	Taste score	%	8	7	'n	7
	TVN mg%	15.6	20.1	25.9	35.2	35.8
	TBC/g	5.4 x 104	1.47×10^{6}	6.37×10^{6}	2.27 x 10 ⁶	4.2 x 106
Hours at	room temperature	0	3	9	6	12

TBC = total bacterial count at 37°C

The salient observations are:-

- 1. All the samples tested both at Cochin and Calicut were free from Salmonella. The samples analysed at Cochin were also free from V. cholerae (This organism was not tested in the samples studied at Calicut).
- 2. The percentage incidence of coliforms and faecal streptococci was comparatively more in the samples tested at Calicut than those studied at Cochin.
- 3. Five percent of the curry samples tested at Cochin contained *E. coli* but this organism was absent in all the samples analysed at Calicut.
- 4. Incidence of coagulase-positive staphylococci was more in the samples studied at Cochin compared to those at Calicut.
- 5. TVN was usually more in fried fish compared to curry.
- 6. In general, the curry samples were better than the fried samples in all respects except for the presence of *E. coli* in the curry samples tested at Cochin.
- 7. About 70% of the prawn/fish pickles tested were below average in taste. Another major defect in the prawn pickles was its powdery nature. The solid fish pieces in the fish pickles were hard to chew.

The isolation of faecal streptococci, coliforms and E. coli in the cooked fishery products has great public health significance. The incidence of these organisms may be due to inadequate heat treatment or postprocess recontamination. But, on tasting, the products were found to be adequately cooked and, therefore, the incidence of these organisms in the products studied definitely indicate contamination cooking. The organisms would have originated from the utensils or from the foodhandlers. As the primary habitat of coastaphylococci is gulase-positive human beings, the incidence of this organism, in some of the products tested, would have been from the workers handling the food material. The results indicate the necessity for improving the sanitary conditions of the hotels. Further, added care is required in the selection of fish and shrimps for the preparation of pickles.

On keeping at room temperature, fried fishes were found to have better keeping qualities compared to that of the curry samples. The fried fish had acceptable taste upto 9 h but the total bacterial count was more than 1 lakh in most cases. The curry samples, on the other hand, had acceptable taste only upto 6 h. The better keeping quality of the fried fish samples may be due to the comparatively low moisture content in these products. The total bacterial count of the curry samples included in the study is unusually high. From Table 1 and 2, it is clear that 85% and 95% of the curry samples, usually collected from Cochin and Calicut respectively have total bacterial load less than 5000/g only. The results of the present study caution that the fish curry and fried fish prepared in hotels shall not be served after 6 h of their preparation.

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