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Research Note

Biochemical and Microbiological Quality of Frozen Fishes Available in Tuticorin Super Markets

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Seafood has traditionally been a popular part of the diet and main supply of animal protein in many parts of the world. They are prone to contamination at various stages of handling and processing and the quality is a major concern to food processors and public health authorities.

In Tuticorin, frozen fishes are available in very few super markets. They buy frozen fishes from processing plants and keep at -18°C for sale. In the present study the biochemical and microbial quality of the frozen fishes available in the super markets were assessed. The pathogens, which are isolated from the fishes, were also tested to know their sensitivity/ resistance to common antibiotics.

The frozen fish samples of *Lethrinus* sp., *Rastrelliger* sp., *Stolephorus* sp, *Scombroides* sp, *Scomberomorus* sp. and *Caranx* sp. packed in 0.5 kg packets were randomly selected and two kg of each fish were brought to the laboratory in aseptic condition. Random tissue samples were taken for biochemical and microbial analysis. The Total Volatile Base Nitrogen (TVBN) and Trimethylamine (TMAN) were determined following the micro diffusion method of Conway (Beaty & Gibbons, 1937). Free Fatty Acid (FFA) content of the samples was estimated according to the method of Ke *et al*, (1976).

The Total Plate Count (TPC) was determined using Plate Count Agar (Hi media) medium. *Escherichia coli* was enumerated using standard Most Probable Number (MPN) Technique. *Salmonella* and *Vibrio* were enumerated as per the methods of APHA (1976). The antibiotic sensitivity of all the strains of *Salmonella* and *Vibrio* isolated from the fish samples were tested using disc-diffusion methods (Bauer *et al.*, 1996). Ten commonly used antibiotics (Hi-media) were used for the present test and their names, symbol and concentration per disc are given in Table 2.

The results of the biochemical analysis of the fish samples are presented in Fig.1. In frozen fish, bacterial action is reduced to negligible levels but oxidation of the oil, especially in oily fish, will continue during storage and will lead to a loss of eating quality (Lilabati *et al.*, 1997). The biochemical quality analysis showed higher FFA value only in *Stolephorus* sp. (0.9%) where as in other fishes it ranged between 0.17 to 0.35%).

The study showed a maximum TVBN concentration of 29.3mg/100g in *Stolephorus* sp. followed by 21.3mg/100g in *Rastrelliger* sp. The high TVBN concentrations in these

Table 1. Microbiological analysis of frozen fishes

Fishes	Total Plate Count (TPCx10^2 CFU/g)	*Salmonella* (Countx10^2 CFU/g)	*Vibrio* (Countx10^2 CFU/g)	*E. coli* (MPN/10g)
Lethrinus sp	64	2	1	11
Rastrelliger sp	65	1	1	11
Stolephorus sp	72	3	1	39
Scombroides sp	62	ND	ND	15
Scombermorus sp	59	ND	ND	ND
Caranx sp	53	2	2	9

Table 2. Antibiotic resistance patterns of Vibrio and Salmonella from frozen fishes

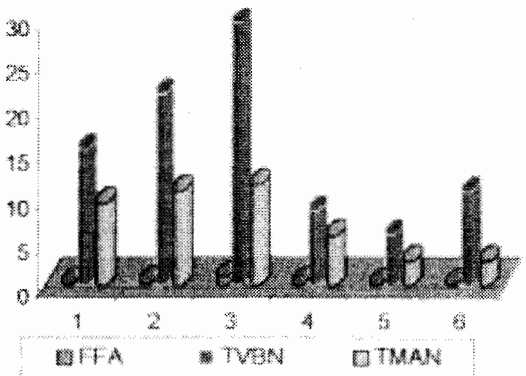
Antibiotics	Symbol	Disc content (mcg)	Inhibition Zone (diameter mm)							
			Lethrinus sp.		*Rastrelliger* sp.		*Stolephorus* sp.		*Caranx* sp	
			V	S	V	S	V	S	V	S
Neomycin	N	30	16	14	22	20	14	19	16	15
Gentamicin	G	10	20	14	22	28	12	16	14	14
Oxytetracycline	O	30	14	22	22	18	18	22	20	20
Streptomycin	S	10	20	9	28	18	8	22	18	8
Chloramphenicol	C	30	28	36	26	16	8	21	20	24
Vancomycin	Va	30	--	--	--	--	--	--	--	--
Ampicillin	A	10	--	--	--	--	--	--	--	--
Bacitracin	B	10	--	--	--	--	--	--	--	--
Penicillin - G	P	10	--	--	--	--	--	--	--	--
Erythromycin	E	15	18	--	18	22	--	--	5	16

V - Vibrio; S - Salmonella

two fishes indicate the onset of spoilage. Higher TMAN level was observed for *Stolephorus* (11.2mg/100g) followed by *Rastrelliger* (10.6mg/100g) and *Lethrinus* (9.2mg/100g). Comparatively the TMAN levels were low in the other fishes.

The results of the microbiological analysis of the frozen fishes are given in Table 1. The Total Plate Count (TPC) was high in *Stolephorus* sp. reaching up to $72x10^2$CFU/g followed by *Rastrelliger* sp. ($65x10^2$CFU/g). Pathogens present in seafood products pose a serious problem for human consumption. The presence of pathogens clearly indicates that contamination had occurred during handling and frozen storage. *E.coli* was detected in all the samples except *Scomberomorus*.

Information concerning the drug resistant pattern of the prevailing pathogenic bacteria and the appearance of new resistant characteristics is of utmost value for a proper selection of antimicrobial agent for therapeutic purposes. The antibiotic resistance tests against *Vibrio* and *Salmonella* strains showed a strong resistance to Vancomycin, Ampicillin, Bacitracin and Penicillin (Table 2). The increasing number of drug resistant bacteria in the environment may pose health hazard and so unnecessary use of antibiotics has to be checked.



1. *Lethrinus* sp., 2. *Rastrelliger* sp., 3. *Stolephorus* sp. 4. *Scombroides* sp., 5. *Scombermorus* sp., 6. *Caranx* sp.

Fig. 1. Level of FFA (%), TVBN and TMAN (mg/100 g) in frozen fishes

The present study clearly shows that the frozen fishes sold in the super markets of Tuticorin are not spoiled, but are contaminated with pathogens and the pathogens have developed a strong resistance to 4 of the strong antibiotics. Proper sanitary care will reduce the contamination and so care should be taken during processing and preservation to ensure the safety of the consumers.

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