

Occurrence of Enteropathogenic, Kanagawa-positive Strains of *Vibrio parahaemolyticus* in Fresh Finfish and Shellfish*

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Kanagawa phenomenon of 225 strains of *Vibrio parahaemolyticus* isolated from fresh finfish and shellfish of marine and brackish water origin and their environments was studied. 20.56% of the isolates from different parts of finfish, 22.9% of the isolates from shellfish, 33.33% of the isolates from mud samples and 12.5% of the isolates from water samples were found Kanagawa-positive. Among isolates from different parts of finfish, 16.41% of the isolates from surface tissues, 19.05% of the isolates from gills and 36.84% of the isolates from the gut were Kanagawa-positive. All the strains of *V. parahaemolyticus* isolated from cooked, shucked clams were Kanagawa-negative and 50% of the isolates from mussels were Kanagawa-positive.

Key words : Kanagawa-positive *Vibrio parahaemolyticus*, fish, shellfish

Earlier days it was thought that all strains of *Vibrio parahaemolyticus*, regardless of their source might be enteropathogenic for man. Kato *et al.* (1965) found that vibrio strains isolated from diarrhoeal stools gave a haemolytic reaction on autoclaved brain heart infusion agar containing 5% human blood, 3% sodium chloride and 0.001% crystal violet, whereas the strains isolated from marine sources were non-haemolytic. This medium was modified by Wagatsuma (1968) to give more clear-cut haemolysis by *V. parahaemolyticus* and the test was named "Kanagawa reaction". The studies of Sakazaki *et al.* (1968) have shown that Kanagawa reaction and enteropathogenicity are related and his findings were confirmed by many Japanese workers (Sakazaki, 1973). An interesting feature of the organism is that most of the strains

isolated from human sources are Kanagawa-positive, whereas the majority of strains occurring in the natural environment are Kanagawa-negative. Even though sufficient information is available about the occurrence of *V. parahaemolyticus* in fish and aquatic environments of India and abroad, the information regarding the occurrence of Kanagawa-positive strains of *V. parahaemolyticus* is scarce. So the present study was taken up to find out the occurrence of Kanagawa-positive strains of *V. parahaemolyticus* in and around Cochin.

Two hundred and twentyfive strains of *V. parahaemolyticus* were isolated from market samples of fresh finfish (*Rastrelliger kanagurta*, *Sardinella longiceps*, *Anchoviella* sp., *Leiognathus* sp., *Lactarius lactarius*, *Nemipterus japonicus*, *Pampus argenteus*, *Oreochromis mossambicus*, *Mugil cephalus*,

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Eetroplus suratensis) and shellfish (*Penaeus indicus*, *Penaeus monodon*, *Metapenaeus affinis*, *Parapenaeopsis styliifera*, *Scylla serrata*, *Crassostrea* sp., *Mytilus viridis*) of marine and brackishwater origin, cooked-shucked clams (*Villorita* sp.), water and mud samples collected from places in and around Cochin (Sanjeev, 1990). The method described in Bacteriological Analytical Manual (Anon, 1969) was used for the isolation of *V. parahaemolyticus*. Kanagawa test was performed on Wagatsuma agar (ICMSF, 1978). Clear transparent zones around the colonies indicated a positive test.

Table 1. Kanagawa phenomenon of *Vibrio parahaemolyticus* isolated from different sources

Source	No. of strains tested	No. of strains found positive	% positive
Finfish			
Skin and muscle	67	11	16.41
Gills	21	4	19.05
Gut	19	7	36.84
Total from finfish	107	22	20.56
Shellfish			
Prawn	51	11	21.57
Oyster (<i>Crassostrea</i> sp.)	21	6	28.57
Crab (<i>Scylla serrata</i>)	11	2	18.18
Cooked, shucked clams (<i>Villorita</i> sp.)	7	0	-
Mussel (<i>Mytilus viridis</i>)	6	3	50.00
Total from shellfish	96	22	22.92
Water	16	2	12.50
Mud	6	2	33.33
Total	225	48	21.33

Kanagawa phenomenon of 225 strains of *V. parahaemolyticus* isolated from different sources are given in Table 1. In general 21.33% of the 225 strains of *V. parahaemolyticus* isolated from finfish and shellfish of marine and brackishwater

origin and their environments were found Kanagawa-positive.

Sakazaki *et al.* (1968) reported that 96.5% of the *V. parahaemolyticus* strains isolated from human patients were Kanagawa-positive, while only 1% of the isolates from environment were Kanagawa-positive. Other investigators have also reported similar observations (Sutton, 1974; Leistner & Hechelmann, 1974; Bockemuhl & Triemer, 1974; Thomson & Vanderzant, 1976; Spite *et al.*, 1978). Ayrs & Barrow (1978) found no Kanagawa-positive strains out of 1484 isolates obtained from British coastal waters. In Asia, Quadri & Zuberi (1977) were the first to report a very high percentage of Kanagawa-positive isolates (52.5%) from fish and shellfish samples of Karachi. The present findings are in agreement with that of Karunasagar & Mohankumar (1980). Bandekar *et al.* (1982) noticed 12% Kanagawa-positive strains among isolates from shrimp in Bombay, while Lall *et al.* (1979) reported 11.5% positive isolates from Port Blair. In Calcutta, a Kanagawa-positive strain of *V. parahaemolyticus* was isolated by De *et al.* (1977).

Studies of Karunasagar (1987) have shown that Kanagawa-positive *V. parahaemolyticus* strains in the environment are not derived from faecal contamination and are probably autochthonous flora of the estuaries just as their Kanagawa-negative counterparts. The widespread distribution of Kanagawa-positive strains of *V. parahaemolyticus* in market samples of fish, shellfish and its environments stresses the need for hygienic handling of sea foods at every stage.

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