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Analysis The Quantitative Distribution Of Total Heterotrophic Bacteria In The Fish Landing Centre Of Kadiyapatnam At Kanyakumari District

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Abstract

Human infections caused by pathogens transmitted from fish or the aquatic environment. The bacterial diseases are caused mainly due to contaminated water and sea foods The bacterial flora of marine fish, sediments and sea water has been studied all over the world Aquatic ecosystems have a diversity of microbial population particularly heterotrophic microbes. Bacterial numbers are plenty in coastal waters, reflecting a higher concentration of nutrients, which results from land runoff and other sources like sewage discharges. The objective of this study is, therefore, to quantify the levels of Total Heterotrophic Bacteria in the fish landing centre of Kadiyapatnam at Kanyakumari District.

Key words: Heterotrophic Bacteria, fish landing centre, Fish

Introduction

The abundance and distribution of total heterotrophic bacteria have a direct bearing with other forms of nutrients and different components of the environment, especially temperature, salinity, dissolved oxygen, pH and organic matter (Cabral, 2010). Marine ecosystem is being threatened by the discharge of untreated sewage and industrial effluents which ultimately affects the sustainability of living resources and public health. Heterotrophic bacterial biomass and production in coastal waters have been reported almost all parts of the world. The heterotrophic bacterial distribution, diversity and activity are controlled by various hydrobiological factors and nutrient levels present in the aquatic environment (Azam *et al*., 1983; Ducklow and Hill, 1985). Temperature and pH are Abundance and distribution of the heterotrophic bacteria in relation

to environmental parameters, such as temperature, salinity, pH, dissolved oxygen and nutrients have been well studied in other parts of the world in the marine environment (Azam *et al*., 1983; Ducklow and Hill, 1985; D'Elia, 1988).Limiting factors for the survival of bacteria in the environment (Whipple andRohovec, 1994). The Total Heterotrophic bacteria in sediment was studied by Ramya *et al*., (2013) in south west coast of Arabian Sea. Total Heterotrophic bacterial community of Kottaipattinam Coast, Palk strait, southeast coast of India was studied by Sriramkumar *et al*., (2011). The isolation and identification of heterotrophic bacteria in Cuddalore Fishing Harbour has been reported by Mahalakshmi *et al*., (2011).

MATERIAL AND METHODS

The water, sediment and fish samples were collected at monthly intervals from the study area during the study period of 2022

DESCRIPTION OF STUDY AREA

Kadiyapatnam (8.87^{o} N 77.19^{o} E) is located on the south west coast of India where, Valliyar river and Arabian Sea meets. It is guarded by many rocks with Arabian Sea in its South; Vellimalai in West; Mandaikadu in North and Muttom in East. It is about 18 km away from Nagercoil the Head quarters of Kanyakumari District. Rocky shore is the unique feature of this landing centre and the fishermen are specialized in lobster fishery, prawn fishing with cage and chank fishery by diving. The fisher folk uses several type of nets like Kacha valai, Sazha valai, Vala valai, Sanal valai, Tattu madi, Kall madi, etc

Physico-chemical parameters

Water samples collected from the experimental stations in sterilized polythene cans were transported to the laboratory in plastic containers kept in Deep freezer maintained at about 5^{o}C. Water samples were analysed for the physicochemical parameters such as temperature, pH, dissolved oxygen and salinity.

Sampling preparation for bacteriological studies

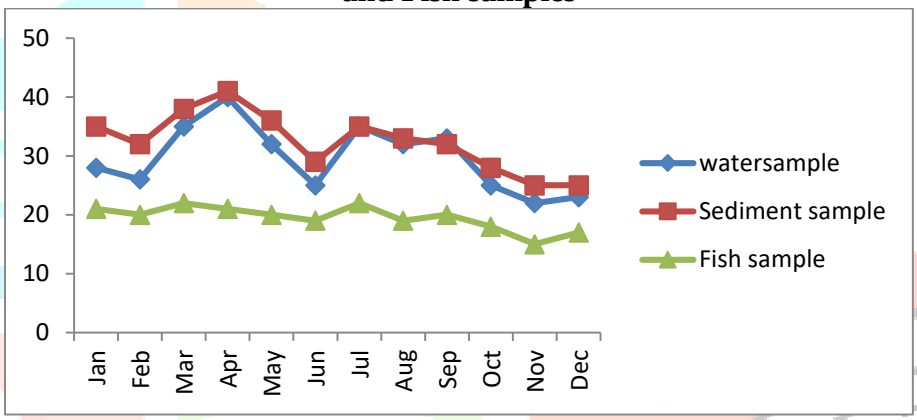
To segregate the bacterial cells occurring as clusters, the water samples were vigorously shaken for about 2 to 3 minutes and the required amount of samples were taken for analysis. Sediment diluents mixture was agitated by means of mechanical shaker for about 10 minutes prior to microbiological enumeration to segregate each bacteria. The fish samples were collected from the landing centre and transferred into a sterile bag and stored immediately into an iced condition and transferred to the laboratory. Swab out from the surface of the fish was mixed thoroughly in 20ml of buffer solution. All these samples were serially diluted for further analysis. Spread plate technique was followed employing the methods adopted by Dhevendran (1977). Bacterial colonies developed on Zobel marine agar after the incubation period was counted using a

colony counter. The bacterial population was expressed as number of colony forming units (CFU) per ml for water and per mg for soil and fish samples. The total Heterotrophic bacterial populations in water, sediment and fish samples The results were tabulated and analysed.

Result

The THB count was minimum in November and maximum in April The THB ranged from 19 x10^4 CFU/mlto 36 x10^4 CFU/ml The maximum monthly average of THB was observed(27.5 ± 5.31 x10^4 CFU/ml) .The THB of sediment sample was high in April and May and low in October or November and December during the study period The THB ranged from 25 x10^4CFU/mgto 36 x10^4CFU/mg The monthly average THB count was maximum (32.41 ±4.98 x10^4CFU/mg).

(Fig 1.1) Monthly distribution of Total Heterotrophic Bacterial (THB) population in Water, Sediment and Fish samples



(Table 1.1) Monthly average (Mean ± SD) fluctuation of water quality parameters

Water Temperature (^{o}C)	29.10± 1.47
pH	7.45 ± 0.25
Dissolved Oxygen (mg/l)	3.61 ± 0.23
Salinity (PSU)	33.52 ± 1.86

(Table 1.2) Monthly average (Mean ± SD) Total Heterotrophic bacteria in Water, Sediment and Fish samples

Samples	Station II
Water (x10^4CFU/ml)	27.5 ± 5.31
Sediment (x10^4CFU/mg)	32.41 ± 4.98
Fish (x10^2CFU/mg)	19.5 ± 2.06

The THB counts for the fish samples in the selected experimental station was The monthly average of THB count was maximum in March and July (22 CFU/mgx10^2) and minimum in November (15 CFU/mgx10^2). The THB level correlated with the basic physicochemical parameters

(Table 1.3) Correlation coefficient of physical factors with THB

Rainfall	Temperature	pH	Dissolved Oxygen	Salinity
-0.532	0.728**	0.286	-0.564	0.515
-0.532	0.623*	0.547	0.238	0.705*
-0.547	0.734**	0.460	-0.658*	0.217

** Correlation is significant at the 0.01 level * Correlation is significant at the 0.05 level

Discussion

The microbial status of the marine environment is a key factor in establishing a healthy marine environment for recreation and production of seafood. The bacterial contamination in fish landing centres is caused by surrounding environment.

The quantitative study of total heterotrophic bacteria in tthe landing centres of Kadiyapatnam indicating that the bacterial counts in water and fish samples were much lesser than in sediment which was reported by earlier workers too (Sung *et al*., 2001 and Abraham *et al*., 2002). Various factors such as the physico-chemical parameters influenced the distribution of THB (Alavndi, 1990). Temperature is a factor which influences bacterial population (Rault *et al*., 2011).

In the present study, a suitable temperature range of 27 to 32.5^{o}C was recorded in sampling station, which may be responsible for an increase in bacterial population during nonmonsoon periods. Govindarajan R.K *et al*., (2012) reported that THB was positively correlated with temperature and organic matter and it was negatively correlated with dissolved oxygen as in the present study. A negative correlation could be recorded between the rainfall and the THB A significant positive correlation also existed between the temperature and pH with THB

It can be concluded that the abundance of THB in the landing centres is significantly influenced by the hydrographical factors of the environment and also the discharge of untreated sewage and industrial effluents. Indiscriminate discharge of untreated municipal and industrial wastes should be prevented by enforcing policies to prevent the environment.

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