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ORIGINAL RESEARCH ARTICLE

Isolation and Identification of Bacteria from Lake Water in and Around Ranipet Area, Vellore District

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ABSTRACT

One of the greatest concerns for the water consumers with respect to the quality of drinking water is contamination with pathogenic microorganisms. Certain microorganisms, including various bacteria, viruses, and parasites, are well-known water contaminants, of which several may lead to waterborne disease and epidemics. The aim of the present study the prevalence of bacterial contaminants from lake water in and around Ranipet, Vellore District and associated risk factors. The collected samples were processed for bacterial isolation using the nutrient agar, mac conkey agar, blood agar and EMB agar. The conventional methods of swabbing and streaking were used. Pure colonies of isolates organisms were identified and characterized using standard microbiological technique. The bacteria were isolated from water samples yielded 16 isolates representing 6 different types of bacterial species viz., *E.coli, K. pneumoniae, Vibrio cholerae Proteus Sp, Pseuodomonas aeromonas and S.aureus.* From this study it was concluded that the water is commonly contaminated with microbes and this contamination may be playing a role in the transmission of potentially harmful organisms.

Key words: Contamination, microorganisms, lake water, Ranipet.

INTRODUCTION

Water a vital nutrient in chemical metabolism which plays an important role in the digestion, absorption of food, transportation of nutrients in the body and elimination of waste products via urine. Physical, chemical and microbiological qualities of drinking water have a fundamental importance in chemical industry (Jafari *et al.*, 2006). The role of water in spreading communicable diseases is much evident due to combined source of water i.e. drinkers. Contaminated water with faecal coliform severely affects the performance of humans. *Salmonella, Camphylobacter* spp, *Staphylococcus aureus, Pseudomonas aeruginosa, Clostridium botulinum, Vibrio cholerae* and *Escherichia coli* are the main human pathogens responsible for water contamination (He *et al.*, 2007). Water quality used for chemical industry and health is one of the most significant segments in health management.

Numerous human diseases having bath in rivers, lakes, ponds and coastal sea waters in the area of river and sewage inflow, swimming pools are associated with the presence of opportunistic pathogens from *Pseudomonas Sps, aeromonas, Staphylococcus* and other microorganisms groups, being able to generate infections by contact with skin, mucous membrane, nosopharyngeal cavity, respiratory ducts, eyes, ears and urogenital passages. Pyogenic infection of injuries, meningitis, urinary system, respiratory system, inflammation of the middle ear and eyes are typical diseases caused by contaminated water where *P. aeruginosa* are found (Pellet *et al*., 1983; Wheater 1979).

Wound infections, peritonitis, meningitis, endocarditis, septicemia, corneal ulcers, nosocomial infections, urinary tract infections, gastroenteritis of people who bathe and/or use water in other ways are caused by *Aeromona shydrophila*. Infections of skin, nosopharyngeal cavity, eyes, outer ear among bathing people could be caused by recreational waters polluted by *S.aureus*. All the above mentioned species of bacteria survive in water longer than classical indicators of sanitary state and they are not connected with faecal contamination present in water. *P.aeruginosa* and *Aeromonas hydrophila* occur in water and bottom sediments of river,

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estuaries (Wiiliams and Larock, 1985), sea coastal waters in the zone of pollutants effluent from the land, sewages, soil, fish, food (Pin *et al*., 1997), drinking water. In the present investigation on isolation and identification of various types of bacteria from lake in and around Ranipet area was carried out.

Materials and methods

The Ranipet, Sipcot industrial complex was established during the year 1973. The phase I and phase II industrial complex contain petrochemicals, ceramics, bulk drugs, pharmaceuticals , heavy Engineering foundary, chemicals, tanneries and miscellaneous industries.The Ranipet Town is located at 12.56° Northern latitude and 79.20° Eastern longitude; it is geographically 25 Km away in North East of Vellore, the district Headquarters of Vellore District.

Sample collection

Samples were collected from different parts of BHEL, Ranipet, Vellore District, Tamilnadu, India during March 2012. The samples were collected from the different habitats like lake water and sediment soil at the depth of 10-25 cm. Samples were collected in sterilized plastic bags/bottles and brought to the Zoology Research Laboratory, Thiruvalluvar University, Vellore District, T.N, India, and stored in a refrigerator at 4°C till further processing.

Isolation of bacterial species from water samples

By using inoculation needle, the samples were streaked for the growth of isolated colonies on nutrient agar. Then the plates were incubated at 37 °C for 24 hrs for bacteria. After 24 hrs the colonies grown on the plates were examined for their morphology and the same type of colonies was used for grams staining.

Characterization of Bacterial species

The isolated bacterial culture further identified and then characterized by using standard Microbiology methods.

RESULTS

The water samples were collected from Karai and Puliyandangal Lake and were processed to identify the microorganisms present. The results were tabulated in (**Table 1**).The results for microscopic examination such as staining; motility test and cultural characters, colony morphology, Biochemical characters for samples are shown in the (**Table 2**).

Table 1: Morphological and cultural characteristics of the organisms isolated from lake water samples

S. No	Samples	Gram's Staining	Motility	Nutrient Agar
1	Karai lake	G +ve rod	Non motile	White rhizoidal
		G+ve cocci	Non motile	Golden yellow
		G -ve rod	motile	Mucoid
		G -ve rod	Motile	Large transparent
2	Puliyandangal lake	G+ve cocci	Non Motile	Golden yellow
		G+ve cocci	Non motile	Yellow
		G-ve rod	Motile	Mucoid
		G- ve rod	Motile	Mucoid

Table 2: Biochemical characteristics of the isolated organisms from lake water samples

S. No	Indole	Methyl Red	Voges Proskauer	Citrate utilization	Coagulase	Catalase	Oxidase	Identified organisms
1	+	-	-	-	-	+	-	*E.coli*
2	-	-	+	+	-	+	-	*K.pneumoniae*
3	+	+	+	-	-	-	+	*V. cholerae*
4	-	+	-	+	-	+	-	*Proteus sp*
5	-	+	+	-	+	+	+	*P. aeromonas*
6	+	-	+	+	+	+	+	*S. aureas*

DISCUSSION

This study has clearly indicated that the lake area is highly contaminated by bacteria. The bacteria isolated in this study are known to present in all sorts of environment of human involvement, majority of them are human as well as animal pathogen. The water analyzed in this study has clearly shown that they are loaded with indicator organisms which are the indication of feacal pollution and thus the human interference.

The bacteria predominant in lake are largely derived from water courses. Basically the bacteria are responsible for the degradation of organic and inorganic compounds. They derive their nutritional requirement from the compounds presented to them in the waste water**.** They are able to synthesize their enzymes, metabolic intermediates, structural proteins, lipids and nucleic acids from carbon compound in the food, together with other elements. The energy from oxidizing either organic compounds (chemoorganotrophic metabolism), or organic compounds (chemolithotrophic metabolism), such as reduced sulfur or nitrogen compounds. They use the energy for their bodily functions, reproduction and growth.

Many researchers found that gram-negative bacteria constituted the most genera bacteria isolated from lake water (Pic, 1995; Forster1997). The results of this study also indicated that gram-negative *E.coli* bacteria constituted the majority of bacteria in the lake water. In conclusion, the water of the lake at Ranipet is subjected to fecal

pollution and monitoring of microbial quality of water is must to control the spreading of pathogens transmitted by contaminated water. This study has strongly suggesting that the microbiological standard of lake water must be developed to a large extent to confirm the health standard.

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