SUMMARY OF FINDINGS

The present study investigated the extent of pollution in terms of bacteriological and physicochemical parameters in a fresh water stream, at Kothamangalam municipality in Kerala, India. The Kuroor Stream is a natural drinking water source of the Kothamangalam municipality in Ernakulam District of Kerala. It joins to river Muvattupuzha and forms a major drinking water source. The stream is highly polluted due to the inflow of solid and liquid waste (SLW) and is found to be non potable. The study involves the analysis of water samples from different locations of Kuroor stream where major source of water contamination is affected, including the highly populated municipality area. Physicochemical parameters analysed were pH, temperature, conductivity, total dissolved solids (TDS), dissolved oxygen (DO) and biochemical oxygen demand (BOD). The microbiological parameters viz., total heterotrophic bacteria, Total coliforms, faecal coliforms and antibiotic sensitivity pattern were also assessed. Detection of pathogenic bacteria was also carried out. Statistical analysis of the data showed that there were significant differences ($p < 0.05$) among the physicochemical and microbiological parameters of the waters samples from different sites and during different sampling time.

The analysis showed that the physicochemical variations viz., DO and BOD were lower than the permissible limits for drinking water source. THB of the water samples were also high. Total and faecal coliform indices showed that the water is not suitable for human consumption. About 50 isolates were characterized morphologically, physiologically and biochemically. Antibiotic sensitivity test was also carried out for the isolates. Of the 50 bacteria isolated, 18 were resistant and 32 were sensitive to various tested antibiotics. The strains showed high resistance against neomycin, streptomycin, tobramycin, ciprofloxacin, and gentamycin and showed sensitivity to penicillin, erythromycin and vancomycin. Antibiotic resistance among bacteria is a worldwide problem. Hemolytic assay showed that most of them are pathogens. The biochemical characterization has shown that the pathogenic strains belong to *Salmonella* sp. and *Vibrio* sp. In addition to the above, it was observed from this study that the Kuroor stream water is contaminated with fecal coliforms especially *E.coli* and many other bacteria like *Proteus* sp., *Enterobacter* sp., *Klebsiella* sp., *Serratia* sp., *Bacillus* sp., *Staphylococcus* sp., *Pseudomonas* sp., and *Aeromonas* sp. Selected pathogenic organisms were subjected to strain identification by means of 16s rDNA – PCR amplification and further sequencing. The molecular characterization confirms the the presence of pathogenic *Salmonella* and *Vibrio* in the Kuroor stream. The study shows the hygienic and conservation importance of a public drinking water source.