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Occurrence of pathogenic bacteria and water quality of the surface water in the Kelani river basin, Sri Lanka

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The occurrence and spread of infectious diseases in human population is a major problem around the world and water is a common element in the ecology of many pathogens. Today, in many developed and developing countries, waterborne diseases still pose a major risk in drinking waters, recreational waters, source waters for agriculture and aquaculture, as well as to aquatic ecosystems and biodiversity. *Salmonella* spp., *Shigella* spp., and *Campylobacter* spp. are commonly cause bacteria for waterborne diseases in worldwide through water sources and surface runoff represents the greatest contamination risk for surface water systems. Kelani river basin is the second largest catchment area and it is the main water source for the Colombo district. Nearly 25 percent of total population lives within the basin and several different industries are also located for production of food and beverages. Therefore, this study is focused to detect the presence of pathogenic bacterial contamination in the surface water of the Kelani river basin. Fourteen physico-chemical (pH, TDS, nitrate, nitrite, electrical conductivity, salinity, hardness, COD, DO, BOD, phosphate) and microbial parameters (*Shigella* spp., *Salmonella* spp., *Campylobacter* spp., total coliform and fecal coliform) were analyzed followed by standards protocols for forty five surface water sampling locations in the river basin. Lowest pH value was recorded from Amthirigala (5.50) and all most all the sampling locations showed high COD values (12.81-402.90 mg/L). High BOD values were detected in meandering zone (2.54 - 11.24 mg/L) compare to the head and transitional zones. The conductivity, TDS, salinity and hardness values showed an increasing tendency towards downstream of the river basin and ranged between 24.80-28800.00 $\mu\text{s/cm}$, 18.16-18693.40 mg/L, 12.12-13910.64 mg/L and 9.33-383.33 mg/L respectively. Total phosphate, nitrate and nitrite were detected between 8.07- 336.63 $\mu\text{g/L}$, 0.13-7.89 mg/L and 0.45-3.23 $\mu\text{g/L}$. The Kelani river basin was contaminated with total and fecal coliform bacteria (colony count-200<) and recorded values were greater than the SLS guideline values. 15 samples were positive for *Salmonella* spp., 03 sampling locations were positive for *Campylobacter* spp. and *Shigella* spp. was not recorded during the study period. The results strongly suggested taking actions to develop proper management strategies to safeguard the surface water of the river basin.

Keywords: Kelani river basin, surface water, physico-chemical parameters, *Shigella* spp. *Salmonella* spp. and *Campylobacter* spp.