

Monitoring coliform contamination at Mahaweli river water intakes to ensure safe drinking water supply

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Introduction and Objectives: Safe drinking water supply is a concern under the UN sustainable development goal 6. The Mahaweli river and its main tributaries are the main sources of drinking water in the Kandy District. High microbial contamination of river water, mainly due to rapid urbanization and population increase has been a major concern. The objective of the present study was to monitor coliform contamination of both raw and treated river water at 14 water treatment plants (WTPs) belonging to the National Water Supply and Drainage Board (NWSDB) along the Mahaweli River between the Kotmale and Victoria reservoirs.

Methods: Both raw and treated water samples were collected from the river and after chlorination in June 2022, September 2022 and February 2023. Samples were analysed for Total Coliform Count (TCC) and Faecal Coliform Count (FCC) using membrane filtration and specific culture techniques. Water samples were filtered through 0.45 µm pore size membrane filters and cultured on m-ENDO agar media at 35±1 °C and mFC agar media at 44±1 °C to grow Total Coliforms (TC) and Faecal Coliforms (FC), respectively. The TCC and FCC values were obtained after a 22 ± 2 hr incubation period using triplicates of each water sample.

Results: TC and FC were not detected in the treated water samples collected from all WTPs. The TCC and FCC of raw water samples varied according to the location (400-4705 and 100-3650 Colony Forming Units (CFU)/100 mL respectively). The highest and lowest average TCC and FCC were detected in Nanuoya (4705 ± 1862 CFU/100 mL and 1806 ± 1003 CFU/100 mL) and Doluwa (400 ± 0 CFU/100mL and 100 ± 0 CFU/100 mL) respectively.

Conclusions: TC and FC of treated water were in accordance with the requirement of SLS 614:2013 standards (TCC ≤ 3 CFU/100 mL and FCC = 0 CFU/100 mL). None of TCC and FCC values in raw river water exceeded the national ambient water quality requirement (<10000 CFU/100 mL as per the National Environmental Act No.47 of 1980). Bacterial counts in the samples were high in areas with greater anthropogenic activities and in rainy seasons.

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Keywords: Coliform bacteria, membrane filtration, water quality, water treatment plants

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