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ABSTRACTS

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Occurrence of Microcystins in the Kelani River and a Drinking Water Treatment Plant Facility in Sri Lanka

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Microcystins (MCs) are emerging contaminants produced by toxigenic cyanobacteria and are reported to be hepatotoxic. The Kelani River is a drinking water repository in the Gampaha District; which is the most polluted river in Sri Lanka. A water treatment plant facility (WTPF) with two water treatment plants (WTP I and WTP II) belonging to the National Water Supply and Drainage Board (NWSDB) was selected for this study as it purifies the water of the Kelani River to provide drinking water for most of the areas of the Gampaha District. This study investigated the presence of cyanobacteria and MC variants in both the river and WTPF. Water samples were collected in November 2021 from the Kelani River just before the intake, after band screening, flocculation stage, after settling, clear-water reservoir, and a distribution point for each WTP in triplicates. Physicochemical parameters including temperature, pH, dissolved oxygen, conductivity, total dissolved solids, and salinity were recorded *in situ* using a multiparameter and they met the Sri Lanka Standards (SLS) for drinking water. Water samples were cultured in cyano-specific media, and eight cyanobacterial genera were tentatively identified as *Phormidium*, *Planktothrix*, *Lyngbya*, *Anabaena*, *Pseudanabaena*, *Oscillatoria*, *Anabaenopsis*, and *Nostoc*. Intracellular and extracellular MCs were extracted from collected water samples using 70% methanol and subjected to High-Performance Liquid Chromatography (HPLC). MC-RR-YR-LR standard (SIGMA-ALDRICH 33578) was used to detect MC variants and their concentrations by comparing the peak retention times and area of the peaks. It revealed the presence of MC-YR in the water samples collected from Kelani River at a concentration of 281.18 µg/L. The distribution point of WTP I had MC-RR (3.41 µg/L) while both MC-RR and MC-YR were detected in the distribution point of WTP II at concentrations of 2.07 µg/L and 250.21 µg/L respectively. Hence this study emphasizes the necessity of routine detection of MCs in this WTPF. Although the results indicate the absence of the most toxic MC variant (MC-LR) at the distribution points, research is needed to understand the MC variants and their temporal variation to minimize the health risk of people who rely on this WTPF for drinking water.

Keywords: Cyanobacteria, Drinking Water, Kelani River, Microcystins, Water Treatment Plants