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Toxin Producing Cyanobacteria in Labugama, Kalatuwawa Drinking Water Reservoirs

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Abstract

Cyanobacteria are photosynthetic bacteria found naturally in lakes, streams, ponds, and reservoirs. *Microcystis aeruginosa*, *Anabaena* sp., *Nostoc* sp., *Oscillatoria* sp. are some harmful cyanobacteria that produce cyanotoxins. Microcystin-LR (MC-LR) is the dominant type of cyanotoxin produced by these cyanobacteria. MC-LR causes hepatotoxic effect on human beings and are harmful to animals as well. Therefore, World Health Organisation (WHO) has recommended a guideline value of less than 1 µg/l of MC-LR should be present in drinking water. The present study assessed the presence of toxin producing cyanobacteria and quantifies MC-LR in Labugama and Kalatuwawa drinking water reservoirs, from June to December 2014. Water samples were collected from five sampling locations of both water bodies and plankton samples were collected using 55 µm plankton net. Filtered water samples were fixed in acidified lugols' solution at a final concentration of 1%. Following natural sedimentation, identification of cyanobacteria was carried out. Quantification of MC-LR was done using photodiode array-high pressure liquid chromatography method (PDA-HPLC). *M. aeruginosa* (54.6±0.17%) was the dominant cyanobacteria whereas *Pediastrum duplex* (30.4±1.89%), *Coelastrum* sp. (12±0.19%) and *Ankistrodesmus* sp. (3±0.02%) were the non-toxic algae strains present in Labugama reservoir. *M. aeruginosa* (68.2±0.09%) and *Anabaena* sp. (16.2±0.12%) were the toxic cyanobacteria present in Kalatuwawa reservoir whereas *P. duplex* (7.3±0.08%), *Coelastrum* sp. (5.6±0.24%), *Staurastrum* sp. (1.2±0.05%) and *Scenedesmus* sp. (1.5±0.004%) were found as non-toxic algae species. MC-LR concentration of Labugama and Kalatuwawa reservoirs ranged between 0-1.27±0.04 µg/ml and 0.76±0.001-1.45±0.02 µg/ml respectively. Based on the results of the present study, both reservoirs were contaminated with MC-LR and responsible cyanobacteria strains would be *M. aeruginosa* and *Anabaena* sp. Thus, continuous monitoring is essential in order to assess the suitability of these two water bodies for human drinking purpose.

Keywords: Cyanobacteria, *Microcystis. aeruginosa*, MC-LR, Drinking water, PDA-HPLC