

Detection and Quantification of the Cyanotoxin Cylindrospermopsin from Anuradhapura Water Reservoirs Using a Biochemical Method

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Most of the world's population relies on surface freshwaters as its primary source for drinking water. The drinking water industry is constantly challenged with surface water contaminants that must be removed to protect human health. Toxic cyanobacterial (blue-green algae) blooms are an emerging issue worldwide due to the production of cyanotoxins as their secondary metabolites. Among them, cylindrospermopsin (CYN) is one of the potent cyanotoxins which affects to the kidney and liver function. This study was performed to identify cyanotoxin CYN in Anuradhapura water reservoirs and water samples were collected from 4 water reservoirs. Under microscope, *Cylindrospermopsis* species were recorded as the dominant cyanobacterial species in the environmental water samples collected from all four reservoirs along with *M. aeruginosa*, *Anabaena*, *Chroococcus*, *Phormidium*, *Microcystis spp.*, *Oscillatoria*, which were comparatively moderate to low in numbers. In molecular detection the presence of cyanobacteria, cyanobacterial strains that have the genetic potential to produce microcystins, the presence of *Cylindrospermopsis* and also the presence of CYN producing *Cylindrospermopsis* species were confirmed. Finally all water samples were subjected to cylindrospermopsin ELISA detection kit in order to confirm the presence of CYN and to quantify the toxin concentrations. Ten samples were positive with mean concentrations of 0.104, 0.091, 0.255 and 0.0967 ng/ml for Jaya Ganga, Kala Wewa, Nuwara Wewa and Tissa Wewa respectively. Further, water samples collected from water purification centre in Anuradhapura showed 0.245 and 0.154 ng/ml of CYN toxicity before purification and after addition of chlorine respectively. However, a sample treated with chlorine and alum collected from the same purification centre was negative. The method is simple, rapid and highly sensitive and allows detecting CYN concentration between 0.05-2.0 ng/ml, the sensitivity of which is more than in the HPLC method. Further, the test kit does not require any sample processing and therefore water samples can be directly subjected to ELISA assay. In conclusion, the results confirmed the presence of CYN in water reservoirs which could be a risk factor for the prevailing health issues in Anuradhapura.