423/D

Detection and quantification of Cyanotoxins; Microcystin and Cylindrospermopsin from Kurunegala water reservoirs and water sources using biochemical methods

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Increase in kidney diseases and cancer amongst the general population in Sri Lanka is likely due to exposure to toxic chemicals. As a biological agent, cyanobacteria can produce a group of structurally and functionally unrelated but highly potent toxins that can collectively affect organ functions. Among them Microcystin (MC) and Cylindrospermopsin (CYN) are potent cyanotoxins that cause acute and chronic illnesses in animals and humans. They are well documented for hepatotoxicity, cytotoxicity and potential carcinogenicity.

This study was performed to address the health issues associated with drinking and recreational waters targeting the identification and quantification of cyanotoxins in villages of Nikawewa and Polpithigama in the Kurunegala District. These water sources are often used for drinking and recreational purposes where the toxin could be encountered in human *via* direct and indirect pathways. Water samples from 10 reservoirs, 11 shallow wells and 2 tube wells were collected in duplicates and subjected to Microcystest (LOD-0.25 – 2.0 ug/L) and ELISA (LOD-0.04 – 2.0 ug/L) test to detect and quantify MC and CYN concentrations respectively. Water samples from Katupaththawa, Mahawewa, Kalawanawewa, Siyabalangamuwa, Deegama and Hakwatuna reservoirs contained more than 1µg/dm^3 of MC concentration which were above the WHO guidelines. Hakwatuna showed the highest MC concentration of 2.26 µg/dm^3. None of the shallow well or tube well samples showed more than 1µg/dm^3 of MC concentration. Further, Ihalawewa, Siyabalangamuwa and Hakwatunawewa showed 0.05, 0.19 and 0.05 ng/ml of CYN concentration respectively while other samples showed negative values.

In conclusion, the results obtained from this study validated the presence of microcystins in many reservoirs and also the presence of cylindrospermopsin in some of the water reservoirs. Therefore, it might be a risk factor for the health issues prevailing in this area. However, since the toxin generating ability in cyanobacteria is strain specific and depends on environmental factors, more epidemiological studies are needed for a confirmation.
Acknowledgements: Financial assistance by Provincial Director of Health Services, Kurunegala

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