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Cyanobacteria, cyanotoxins and potential health hazards

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This study was performed to address the health issues associated with drinking and recreational waters targeting the identification of cyanotoxins in water sources. Eight water samples were collected from the Henanigala water reservoir in Girandurukotte. Environmental and cultured samples were subjected to morphological, biological, biochemical and molecular detections. Potential toxin producing cyanobacterial species belonging to orders Pleurocapsales, Nostocales, Oscillatoriales, Chroococcales and Stigonematales were abundant in culture originated samples. Molecular detections with the 16S rRNA gene yielded a unique fragment of ~450 bp with cyano specific forward primer Cya 359F and the reverse primers Cya781Rb and Cya781Ra separately indicating the presence of unicellular and non heterocyst forming filamentous and heterocyst forming filamentous types respectively. Further, DNA sequencing data confirmed the presence of *Phormidium* and *Limnothrix* species in the reservoir, which are known to produce microcystins. A bioassay was performed using *Artemiasalina* to test the lethality of water samples. Filtrates and filters from both environmental and cultured samples were assayed and higher toxicities were recorded in environmental samples. Among the cultured samples, the highest toxicity was recorded in the water samples cultured in BG11 medium in which the LD_{50} value was found to be -1450.70. Biochemical analysis revealed the presence of microcystins and cylindrospermopsins in the water source with mean concentrations of 2.06 $\mu g/dm^3$ and 0.1912 ng/ml respectively. In conclusion, the Henanigala water reservoir contains a vast diversity of cyanobacteria which has a high potential to produce toxins which in turn can cause adverse health effects to human. Therefore, it might be a major risk factor for the chronic kidney disease of unknown aetiology in Hennanigala. However, since the toxin generating ability in cyanobacteria is strain specific and depends on the environmental factors, more epidemiological studies are needed for a confirmation.

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