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Detection of cyanotoxin; microcystin from Kandy Lake with molecular and biochemical methods

H M Liyanage[1], D N Magana – Arachchi[1*], S A Kulasooriya[1], N V Chandrasekharan[2] and R P Wanigatunge[1]

[1]*Institute of Fundamental Studies, Hantana road, Kandy.*
[2]*Department of Chemistry, University of Colombo, Colombo 3*

Water blooms of cyanobacteria from the genus *Microcystis* are of increasing concern due to their production of microcystin, a cyclic heptapeptide which is formed non-ribosomally by peptide and polyketide synthetases. A number of studies have targeted the PCR amplification of microcystin synthetase gene cluster for the identification of toxic cyanobacteria while HPLC analysis and phosphatase activity inhibition assays are utilized to analyze the concentration of microcystins from environmental samples.

In October 2009, following an outbreak of fish death in Kandy Lake, this study was conducted to detect the presence of microcystins producing cyanobacteria and to analyze the amount of microcystins in the water source. Samples collected from seven sites of the Kandy Lake were analyzed with Polymerase Chain Reaction (PCR) using the cyanobacterial specific oligonucleotide primers for the 16S rRNA gene and genus specific oligonucleotide primers for the *mcy*E gene of *Microcystis*. All the samples gave positive amplification for 16S rRNA gene by yielding a unique ~ 450 bp DNA fragment. However, 5 samples gave unique ~250 bp amplification for *mcy*E gene indicating the presence of *Microcystis* species that may have the genetic makeup to produce microcystins. MicroCystest kit, based on the inhibition of phosphatase activity by microcystin was used to analyze the amount of microcystin in water samples. This test kit allows the detection of microcystin concentrations between 0.25 to 2.5 μg/dm^3, a higher sensitivity than that of the HPLC method. The results revealed 2.22 μg/dm^3 of mean microcystin concentration from seven sites in the lake exceeding 1 μg/dm^3 of safety limit set by the World Health Organization. In conclusion, the results confirmed the presence of microcystin producing *Microcystis* species and 2.22 μg/dm^3 of microcystin concentration in the water source and therefore, cyanobacterial bloom could have been a cause for fish death in the Kandy Lake.

nayomam@yahoo.com Tel: (0)81-2232002