

(46)

Cytotoxic Effects of Microcystin-LR, Microcystin-RR, Nodularin and Cylindrospermopsin on (Vero-89) Kidney Cell Line

**Abeyesiri H.A.S.N.^{1,2}, Dilrukshi K.T.^{1,2}, Perera I.C.³, Wanigasuriya J.K.P.⁴,
Beneragama D.H.⁵, Manage P.M.^{1,2*}**

¹*Centre for Water Quality and Algae Research, Department of Zoology,
University of Sri Jayewardenepura, Nugegoda, Sri Lanka*

²*Faculty of Graduate Studies, University of Sri Jayewardenepura, Nugegoda, Sri Lanka*

³*Department of Zoology, University of Sri Jayewardenepura, Nugegoda, Sri Lanka*

⁴*Centre for Kidney Research, Department of Medicine, University of Sri Jayewardenepura,
Nugegoda, Sri Lanka*

⁵*Department of Pathology, University of Sri Jayewardenepura, Nugegoda, Sri Lanka*

**pathmalal@sjp.ac.lk*

Abstract

Induced kidney injury in mammals have been reported by hepatotoxins; Microcystin-LR (MC-LR), Microcystin-RR (MC-RR) Nodularin (NOD) and cytotoxin; Cylindrospermopsin (CYN). The present study was done to evaluate the cytotoxicity of MC-LR, MC-RR, NOD and CYN on (Vero-89) kidney cell line. Cells were exposed 24 hours to pure MC-LR, MC-RR, NOD and CYN at concentrations of (0.5,1.0,5.0,10.0,50.0,100.0 and 200.0 μ M) and the cytotoxic effect was evaluated by 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) cell viability assay. The respective IC50 values were calculated for each exposure. The highest cell mortality percentage was recorded for CYN exposures to 0.5,1,5,10,50,100 and 200 μ M concentrations. Descending order of cell mortality was found for NOD (91.76 \pm 0.13%), MC-LR (91.53 \pm 0.70%), CYN (91.49 \pm 2.11%) and MC-RR (91.17 \pm 0.41%) exposure respectively at 200 μ M concentration. Significant dose-dependent cytotoxicity on Vero-89 renal cells exposed to MC-LR ($p=0.003$), MC-RR ($p=0.022$), CYN ($p=0.000$) and NOD ($p=0.027$) was found. The results of the study further revealed that the CYN had the lowest IC50 value (98.52 \pm 2.11 μ M) and the NOD had the highest IC50 value (115.26 \pm 2.26 μ M). The results of the present study showed that cyanotoxins cause cytotoxic effects on renal cells. CYN was the most toxic while NOD was least toxic cyanotoxin on renal cells among the tested cyanotoxins.

Keywords: Vero-89, Cyanotoxins, MTT, IC50