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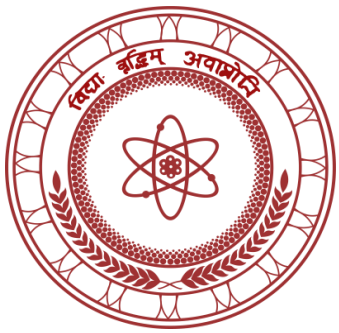
Part I
Abstracts

Sri Lanka Association for the Advancement of Science



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Part I: Abstracts

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Characterization of growth-related cyanotoxin production in selected cyanobacteria

H.M.S.A.T. Gunathilaka and D.N. Magana-Arachchi*

Molecular Microbiology and Human Diseases Programme, National Institute of Fundamental Studies, Kandy, Sri Lanka

Cyanobacterial toxins pose significant health risks to humans and animals. Understanding the relationship between cyanobacterial growth and cyanotoxin production is the most suitable approach for mitigating their proliferation in freshwater reservoirs. This study aims to investigate the differences in microcystin (MC) production among selected cyanobacterial species during their growth stages. Five cyanobacterial isolates, (*Microcystis* sp., *Fischerella* sp., *Nostoc* sp., *Pseudoanabaena* sp., and *Leptolyngbya* sp.,) were cultivated as batch cultures in BG11 media. The initial cell concentration was maintained at 1×10^8 cells ml^{-1}. Chlorophyll-a extraction was performed and pigment concentrations were determined by measuring absorbance at 470 nm, 665 nm, and 720 nm using a UV-vis spectrophotometer within 8 days after culturing, continuously for 2 months. The brine shrimp bioassay was conducted, and mortality percentages were calculated using extracts from cyanobacterial pellets and supernatants. Microcystin content was analysed using high-performance liquid chromatography (HPLC) with a reference MC standard (SIGMA ALDRICH 33578) for both cyanobacterial pellets and supernatants. Preliminary cytotoxicity assays revealed that *Pseudoanabaena* sp. had the highest toxicity (45%) in the supernatant, while *Fischerella* sp. and *Nostoc* sp. showed a similar high toxicity (85%) in the pellets. Analysis of growth curves showed three distinct phases: lag, exponential, and stationary. The average final cyanobacterial cell concentration exhibited an approximately 4% decrease compared to the initial cell concentration. Cyanotoxin production exhibited significant difference between the lag and exponential phases ($p<0.05$), but no significant variation was observed during the stationary phase ($p= 0.08$). *Pseudoanabaena* sp. (2.541±0.57 mg l^{-1}) and *Fischerella* sp. (1.5152±0.14 mg l^{-1}) exhibited the highest toxin concentrations during the stationary phase. *Microcystis* sp. displayed a negative correlation ($p<0.05$, $r = -0.7135$) between cyanotoxin production and growth, while the selected filamentous-type cyanobacteria showed a positive correlation ($p>0.05$, $r = 0.3324$). In this study, filamentous-type cyanobacteria exhibited higher microcystin toxicity compared to unicellular *Microcystis* sp. Cyanotoxin production is significantly different between the lag and exponential growth phases. The intracellular toxin concentration was higher than the extracellular concentration in the selected cyanobacterial isolates. However, in natural environments, the toxin production of these organisms can vary due to different microenvironmental and molecular factors.

Keywords: Cyanobacteria, colonial, filamentous, growth stages, microcystin

E-mail: dhammika.ma@nifs.ac.lk