

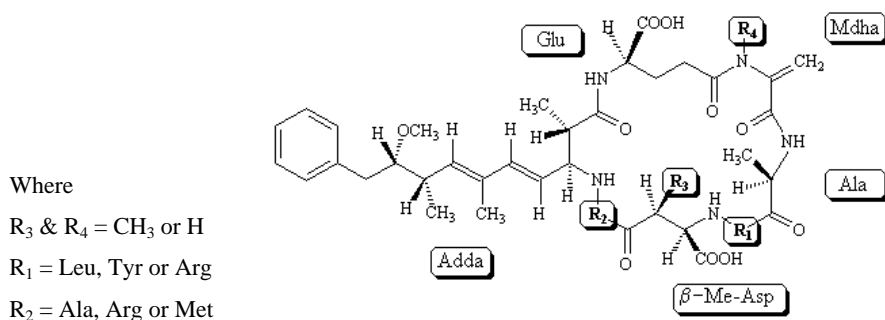
APPLICATION OF CAPILLARY ELECTROPHORESIS - ELECTROSPRAY MASS SPECTROMETRY TO THE ANALYSIS OF TOXIC PEPTIDES FROM CYANOBACTERIA

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Cyanobacterial blooms are a common occurrence in most countries around the world. It is, therefore, increasingly important to monitor water bodies for the presence of cyanobacteria, and to assess the toxicity of blooms when required. The Mouse Bioassay has been the most extensively used method for determining the toxicity of cyanobacterial blooms, but in-vivo methods are expensive, non-specific and often considered unethical. Microtox Bioluminescence Inhibition Assays however are rapid and inexpensive, but also non-specific¹. Electrospray Mass Spectrometry is potent tool for identifying components from complex mixtures, and when coupled to a powerful separation technique such as Capillary Electrophoresis will provide invaluable quantitative and qualitative information².



Structure of Microcystin (Hepatotoxin)

The cyanobacterial toxins include peptide hepatotoxins and alkaloid neurotoxins. Since not all blooms are toxic, it is essential that the presence and concentration of toxins be quickly ascertained. In combination with *in vitro* methods for detection of general toxicity, a scheme for short term monitoring of cyanobacterial toxicity is currently being developed.

We have studied a number of cyanobacterial samples and have determined toxicities by the Mouse Bioassay and Microtox Bioluminescence Assay. The electrospray mass spectra of the cyanobacterial samples were then obtained and shown to correlate quite well with the aforementioned techniques. This however, did not provide any quantitative information, therefore a separation technique such as Capillary Electrophoresis was employed, and the results obtained are compared with previous methods.

1. Codd G.A., Lawton L.A., Beattie K.A., Hawser S.P and Campbell D.L., 1994, Evaluation of assay methods for the determination of cyanobacterial hepatotoxicity. *Detection Methods for Cyanobacterial Toxins*, Codd G.A., Jefferies T.M., eds., The Royal Society of Chemistry. pp 111-117.
2. Neissen W.M., Tadjem U.R and Van der Greef J., 1993, Capillary Electrophoresis - Mass Spectrometry. *Journal of Chromatography*. V636. pp 3-19