

Novel toxic activity associated with the cyanobacteria *Limnothrix*: Use of screening assays for detection.

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Development of biochemical screening assays for cyanobacterial toxins allows identification of toxins based on known activity. While this may be diagnostic for the toxin or toxin class that the assay has been designed for (e.g. microcystins, cylindrospermopsins) there is also potential to pick up new, unidentified toxins.

In this example, screening cyanobacterial samples for the toxin cylindrospermopsin led to the identification of novel toxic activity from the cyanobacterium *Limnothrix*.

The cell-free protein synthesis assay was inhibited by the *Limnothrix* extract as would be expected when cylindrospermopsin is present. However analysis by immunoassay (ELISA) and analytical techniques (HPLC, LC-MS) could not detect cylindrospermopsin itself. PCR amplification of genes associated with cylindrospermopsin production was also absent.

Further characterisation revealed that the toxic responses induced by the *Limnothrix* extract could not be attributed to other known cyanobacterial toxins. Distinctive toxic effects of the *Limnothrix* extract in mammalian cells include significant ATP depletion and marked granulation of cells as observed by both microscopy and flow cytometry. Current work aims to identify and characterise the toxic agent present.

This case highlights how biochemical screening assays can complement analytical techniques for the identification of toxic activity in cyanobacterial samples. Adequate validation of such techniques is required.