



CYANOBACTERIA & THEIR TOXINS - CAN YOU SPOT THE DIFFERENCE?

The bloom on the left is highly toxic, but the one on the right is non toxic; how do we know? Because Cawthron scientists are experts in the science of freshwater microalgae. We can offer advice on a range of issues relating to cyanobacteria and their toxins.



WHAT ARE CYANOBACTERIA?

Cyanobacteria are an ancient group of organisms with characteristics in common with both bacteria and algae.

In certain environmental and hydrological conditions, planktonic (free-floating) cyanobacteria cells can multiply and form what are known as algal blooms. Cyanobacteria can also grow on bottom substrates forming mats, which can sometimes detach and float to the surface.

Some cyanobacteria species produce toxins (cyanotoxins) which pose a risk to humans and animals when consumed in drinking water or by direct contact during recreational activities.

Blooms and benthic mats can occur in:

- * stock water troughs
- * oxidation ponds
- * rivers
- * lakes and reservoirs.

The range of samples Cawthron processes is not limited to this. We are able to offer processing of one off samples through to comprehensive long term compliance monitoring. We can advise you on options for testing.

INTRODUCING FRESHWATER MICROALGAE ANALYSIS

The Cawthron Microalgae Laboratory is ISO 17025 accredited for monitoring the freshwater environment using the Utermohl method for microscopic analysis.

Samples processed currently include: state of the environment monitoring, recreational water monitoring, and quality assurance for drinking water supplies.

Methods are consistent with current Australasian methods for processing microalgae samples.

We offer a range of testing options from the identification of dominant species through to enumeration of all microalgae species detected.

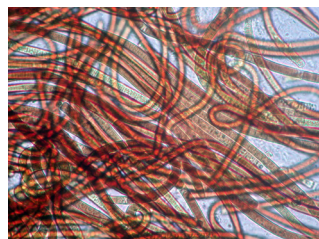
Our aim is to find out **what you want** and offer advice on the type of analysis to suite your needs.



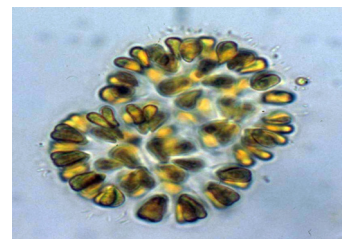
LCMS Technology



Anabaena



Phormidium



Gomphosphaeria

WHAT ABOUT THE TOXINS FROM CYANOBACTERIA?

Cawthron has that covered too. Our Biotoxin Laboratory operates the first ISO 17025 accredited laboratory in the world for Biotoxin analysis with complete LCMS confirmation capabilities.

The following table summarizes our current analytical capabilities for cyanotoxins and compares the method limits of detection (LODs) to the maximum allowable values (MAV's) in the drinking water standards for NZ (2005).

Toxin	Test	LOD µg/L	PMAV µg/L
Microcystins	LCMS	0.01	1
Nodularin	LCMS	0.01	1
Cylindrospermopsin	LCMS	0.2	1
Saxitoxins	IMMA	2	3
Anatoxin a	LCMS	0.2	6
Homoana toxin a	LCMS	0.5	2
Anatoxin a(s)			

Both the Biotoxin and Microalgae Laboratories work in close liaison to provide you with quality results and advice. The laboratories also have access to Cawthron researchers in the areas of freshwater and marine ecology, and collaborations are maintained with other pre-eminent research teams in New Zealand and overseas.

RESEARCH SAMPLES

In some cases samples may require more detailed examination as part of investigations into unusual toxicity or novel algae. Cawthron research teams have a range of bioassays (brine shrimp; cytotoxicity, receptor binding) and algal identification techniques available to investigate the nature of toxicity and algal species involved. Bioassay-guided chemical fractionation of water extracts is available to isolate active fractions for spectroscopic (LCMS, UV, NMR) characterisation of toxins.

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THAT'S NOT ALL WE CAN DO:

- *Sampling:* Cawthron will give you all the information you require on collection, handling and transport of samples. We will provide you with bottles and chillbins as required.
- *Programme Design:* If you are interested in compliance monitoring we can help. Our experts will tailor a programme designed to meet your needs.
- *Data Interpretation:* Relating results back compliance documents and guidelines.
- *Bloom management:* Long & short term treatment options.



CAWTHRON'S OTHER ANALYTICAL SERVICES INCLUDE:

Marine Biotoxins – shellfish testing for export and public health purposes; risk management advice; test method development.

Phytoplankton – early warning systems for shellfish industry and regulatory bodies; harmful algal blooms, analysis of fresh water algae and toxins.

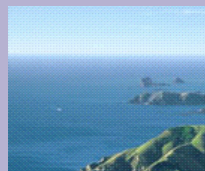
Food Chemistry analysis – for production and regulation, export Certificates of Analysis, and label claims.

Environmental Testing— chemical testing of samples for nutrients and trace elements, for regulators (monitoring) and industry (compliance).

Nutraceuticals testing – for Good Manufacturing Practice Certification of Nutraceuticals and natural remedies.

Microbiological testing – for industry compliance.

Our laboratory services, analysis & advice deliver maximum returns to our customers.



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