

“sensitive, rapid & cost effective”

Leeder Consulting specialise in non-routine analysis. Independence and commitment to your project’s “**data quality objectives**” enables us to suggest innovative and cost effective solutions. If it is high-tech, challenging, difficult or out of the ordinary - call us now.

Microtox is a standardised toxicity test system which is rapid, sensitive, reproducible, ecologically relevant and cost effective. It is recognised and used throughout the world as a standard test for aquatic toxicity testing.

The Procedure employs the bioluminescent marine bacterium (*Vibrio fischeri*) as the test organism. The bacteria are exposed to a range of concentrations of the material being tested. The reduction in intensity of light emitted from the bacteria is measured along with standard solutions and control samples.

The change in light output and concentration of the toxicant produce a dose / response relationship. The results are normalised and the EC₅₀ (concentration producing a 50% reduction in light) is calculated.

Ecological Relevance There have been numerous studies and a large body of published data comparing the Microtox system with toxicity values for fish, crustaceans and algae for a wide range of organic and inorganic chemicals. The studies have shown an excellent correlation.

The Microtox system is ecologically relevant in a more fundamental way. The more common application is for testing complex chemical mixtures such as effluents, leachates or sediment pore waters. It is well recognised that there is no single test which can detect a range of compounds and the toxic effects, but if the ultimate aim of toxicity testing is to protect the environment from toxic stress then the test must have good sensitivity to a broad range of toxic substances as has been demonstrated with Microtox.

Acceptance The Microtox system has been used as an aquatic toxicity test since the early 1980’s and is accepted as a standard test in a number of countries including Australia.

In the United States it is a recognised test method in a number of federal programs. The U.S. EPA, has adopted Microtox as a standard test in an ongoing program of Assessment and Remediation of Contaminated Sediments. Microtox has been adopted by the U.S Fish and Wildlife Service as a screening test at the National Fisheries Contaminant Research Centre. Microtox is similarly recognised in Canada, the United Kingdom, Germany, Sweden and the Netherlands.

In Australia, the Microtox system is recognised by and listed in discharge, trade waste and effluent regulations by a number of Authorities. In Victorian, Microtox toxicity is used to check regulatory compliance of some discharges and effluents.

Benefits - The Microtox system has many benefits over other toxicity testing systems. The low cost enables it to be used as a regular monitoring and screening test. A full Microtox assay costs between \$150 and \$250 per sample. Other toxicity tests are about 10 times the cost of the Microtox assay.

It is usually desirable to have toxicity results as soon as possible. Microtox assays can be completed within an hour and a report available within 24 hours, making them a very rapid form of testing.

The test requires a small volume of sample (a few mL) which enables analysis of low yield leachate systems, sediment pore water extracts, chemical fractions and bench scale and pilot scale testing.

Information on some Microtox applications & Case Studies are contained over the page.

Microtox® is a registered trademark of AZUR Environmental.

Leeder Consulting offer a range of specialised high-tech, non-routine and on-site services. Access to leading edge technology and expertise in Australia and overseas guarantees results when and where you require. To discuss your requirements or for more information **call us now.**



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Applications of the Microtox System

Effluents and Discharges

- Ballast Discharge waters
- Industrial Tradewastes
- Mining activities
- Cooling Towers

Leachates

- TCLP prior to disposal
- Landfill leachates
- Slags and Waste for reuse

New Products

- Assessing impacts
- New Product Registrations

Waters

- Bore waters
- Oil & Gas Exploration
- Oil & Gas Production
- Groundwater monitoring

Soils & Sediments

- Sediments prior to dredging
- Soils at remediation sites
- Stockpiles

Cleaner Production

- Selecting products
- Minimising impacts

How Microtox has helped to solve and prevent problems.

Cleaner Production

The Microtox toxicity of an effluent stream appeared to be increasing. An investigation of the activities on site established that a new brand of detergent was being used on site. The company had a policy of selecting products based on a number of criteria including toxicity. The product was subsequently tested and found to have a significantly higher toxicity than the original detergent.

Selecting the Best Products

Drilling Mud used in oil exploration is made up of a number of different chemicals so toxicity and effect on the environment are difficult to predict using traditional chemical tests. The oil exploration company assessed and tested a range of drilling muds and chemicals to compare their toxicity. Since performance and price of the products were similar, the decision on which product would be used was based on the lowest toxicity.

Predicting the Impact

An industrial manufacturer was in the position of having to stockpile a waste byproduct while attempting to find a new form of disposal. The slag was leached in the laboratory using the TCLP procedure and the leachate analysed for toxicity using Microtox. The data allowed them to predict what the toxicity of the leachate would be and confirm that it could be discharged into an existing pond system. The testing assisted in confirming the waste was fairly stable and non - toxic and could be used as a resource in some activities on site, with the potential for sale to other industries instead of paying for disposal at landfill.