MEDITECNA
Instrumentación | Proyectos | Servicios

bbe
biological · biophysical · engineering
moldaenke

Algae Toximeter II



Fast and sensitive detection of toxic substances in water

www.bbe-moldaenke.de



Algae fermenter and chlorophyll sensor

Advanced technology for water quality control

The bbe Algae Toximeter analyses water for the presence of toxic substances by recording the activity of algae cells under the influence of a sample stream. Based on the fluorescence measurement of chlorophyll bbe has developed a sensitive method for the detection of hazardous compounds in samples of e.g. water supply systems, rivers, treatment plants, soil recultivation and sewers. Continuous biological monitoring with the bbe Algae Toximeter enables the detection and warning of toxic discharges. The instrument records the amount and duration of these discharges. Rapid response and a record of the incidents are made promptly available to the responsible authority. Thus, bbe biomonitoring systems are well-suited to prevent wilful or negligent damage to water supplies and are already in use for the long-term surveillance of water quality around the world.



Parameters

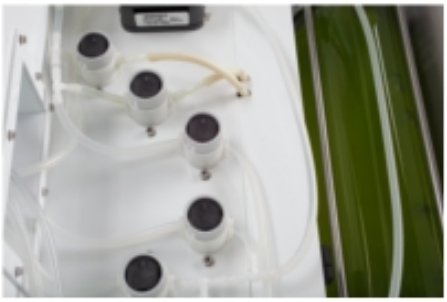
The Algae Toximeter determines the following parameters:

- measurement of variable chlorophyll fluorescence of the water sample (Genty method) shows the percentage of active chlorophyll and serves as degree of toxicity
- measurement of the sample transmission enables compensation of turbidity effects
- toxicity / inhibitation
- measurement of direct chlorophyll fluorescence corresponds to the wet-chemical chlorophyll analysis
- measurement of algae class distribution gives a quantitative mass of different algae classes: green algae, blue-green algae, diatoms and dinoflagellates and cryptophytes

Check your water quality by sensitive online biomonitoring

Principle

The bbe Algae Toximeter determines toxic substances in surface waters. Molecular interaction of these substances with the photosynthetic apparatus of green algae results in a loss of activity (primary production, oxygen evolution). The activity is related to chlorophyll fluorescence – a natural phenomenon of photosynthesis. The test organisms – the algae – are cultivated in an integrated fermenter. A water sample is mixed with the standardised algae. If the algae are affected, e.g. by the negative impact of a herbicide that reduces activity of the algae, an alarm is induced. The major advantage of the fluorometric assay is high sensitivity and the immediate response of fluorescence measurement, and the detection of the broad range of different chemicals that influence algae activity.



The fermenter

The cultivation of the standardised algae takes place in a fermenter, which is regulated "turbidostatically" by an additional fluorescence measurement. This regulation insures that the algae concentration and their activity are maintained at a constant level.

Option

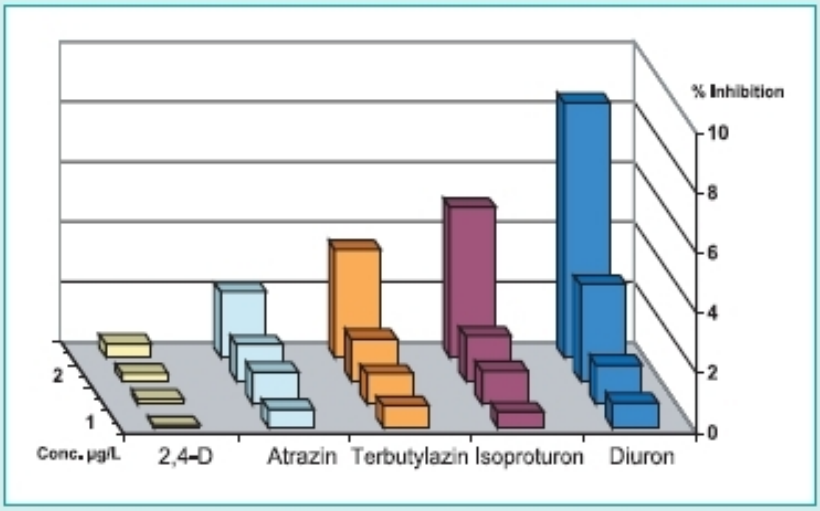
Programmable reference solution procedure. An extra feed line provides a reference measurement with a standard, i.e. a toxin, with a defined concentration.

Measurement and Data Evaluation

For the measurement, water samples are pumped into the measuring sensor where the algae concentration and their activity are determined fluorometrically. Based on low light excitation (fo) and high light excitation (fm) the Genty Parameter[1] is calculated as a relative mass of activity. Subsequently, a defined amount of standardised algae is injected into the sensor and the measurement is repeated. The activity of the additional algae stays constant as long as no toxic substances are present. In the presence of toxic substances, the activity of the standardised algae is reduced.

Optical devices under prolonged operation are subject to the development of obstructive biofilms. To prevent biofouling the measuring cell is periodically cleaned with a cleaning device.

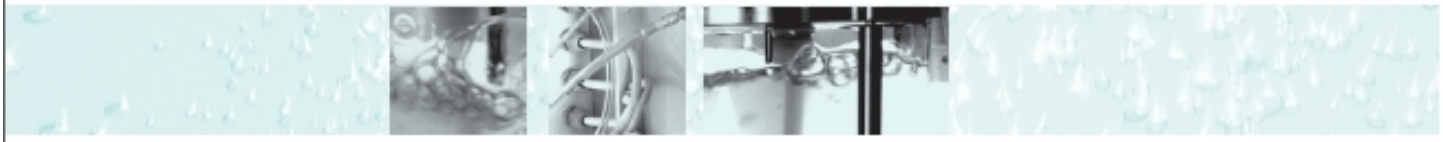
The bbe software offers a concise graphic desktop which displays the status of all the relevant parameters and measurements in full or tiled window mode. The measurement data are automatically stored in a database for continuous access.



Effect of different herbicides on the inhibition of algae activity

For the analysis of the results bbe software is used. This reliable system is used in numerous toximeters. The software recognises rapid changes in signals together with a statistical analysis – and is therefore the suitable program for the determination of toxic events.

1 Genty, B., Briantais, J.-M., Baker, N., R., 1989. The relationship between the quantum yield of photosynthetic electron transport and quenching of chlorophyll fluorescence. Biochem. Biophys. Acta 990: 87 - 92





Applications

- drinking water supply
- waterway analysis and assessment
- general environmental monitoring
- dams, rivers and lakes
- intake assessment
- treatment plants
- soil remediation
- industrial waste waters

Features

- high sensitivity
- reduced measuring interval
- algae differentiation of sample water
- integrated algae fermenter
- precise dosage of supply solutions
- automatic cleaning of the measuring unit
- adaptable software for the needs of user
- autostart after power failure

Specifications

Algae Toximeter

Measuring range (Chlorophyll)	0.3 - 200 µg/L
Sensitivity	0.5 µg/L Atrazin
Temperature range	0 - 50 °C
Weight	160 kg
Size (LxWxH)	1100 x 600 x 680 mm
Protection	IP54
Voltage	110-240 V 50/60 Hz
Power	600 W
Sample temperature	5 - 30 °C
Sample volume	30 ml
Internal PC	HD, LCD display, DVD, USB
Maintenance interval	> 7 days
Outputs	LAN, analog output 4-20 mA (2 X), relay output (2 X), RS232

Subject to alteration!

Your local bbe dealer...

bbe biological · biophysical · engineering

moldaenke

Preetzer Chaussee 177 | 24222 Schwentinental | Germany

phone (+49) 431 38040-0
fax (+49) 431 38040-10
e-mail info@bbe-moldaenke.de
net www.bbe-moldaenke.de