

Daphnia are established test organisms to indicate water quality. The **bbe Daphnia Toximeter** observes Daphnia under the influence of constantly running sample water. bbe developed this new 24/7 sensitive method to detect hazardous compounds in water from rivers (source-water protection), plants, distribution systems and production drains to preserve human health and to monitor water. The instrument is also designed as an early warning system to rapidly detect the entire range of dissolved toxic compounds including pesticides, neurotoxins and warfare agents, thus it is well suited to detect wilful (terrorist attacks) or negligent incidents (spills, accidents). The **bbe Daphnia Toximeter** can also be used for long-term monitoring for the “strategic” evaluation of water quality and as a valuable tool in the hazard management. The **bbe Daphnia Toximeter** has been deployed worldwide now for over 10 years.

Sample water (0.5 - 2 l/h) continuously runs through the measuring chamber containing the Daphnia. The live images obtained using a CCD-camera are evaluated online with an integrated PC in order to analyse changes in their behaviour. If this change is statistically significant, an alarm is triggered.

Measurements

The method of image analysis enables a series of measurement methods and plausibility tests to assess the Daphnia behaviour using different criteria.

Speed measurements:

- average speed
- speed distribution

Behaviour observation:

- swimming height
- fractional dimension - measurements
- for turns and circling movements, curviness

Growth observation:

- determination of daphnia size

Toxicity Index

The concept of the toxicity index is based on the evaluation of certain measurands, such as swim speed or height, and changes in these measurands. Only if more than 2 of the measurands simultaneously show unusual results within a fixed period of time does the Daphnia Toximeter trigger an alarm. Due to a dynamic alarm threshold an increase in Daphnia size (growth) does not affect the alarm.

Applications

- drinking water supply
- dam monitoring
- waterway analysis and assessment
- general environmental monitoring
- intake assessment
- chemical analysis
- limnological work
- research and education

Software

The database software is used to record and analyse the data. The most important features are...

- determination of different behavioural patterns
- alarm analysis
- saving of data and parameters
- graphic display of all measurement values
- online display in LAN
- calibration of the instrument
- parameterisation of the measurements
- data export to EXCEL or text files
- print function