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DIRECT TOXICITY ASSESSMENT USING BBE ALGAL MONITORS

Several large agrochemical companies have successfully employed the BBE algal cuvette monitor, to assist with their toxicity assessment programmes. Applications have included the measurement of algal populations in artificial test ponds, subjected to doses of new products, and the assessment of production centre effluents for potential toxic effect on the receiving water course or sewer, the latter being done by measuring the suppression of activity of single class algal cultures. In both cases the decisive advantages were: speed, low operating cost, low skill requirement and low capital investment.



The fluorometer may be used in the laboratory or in the field, say in the back of a van, thus adding versatility to its long list of attributes.

Samples are taken manually by the operator and transferred into a glass cuvette, which is placed into the front aperture of the instrument.

The sample is then illuminated sequentially with 5 LED's of differing wavelengths. The resulting fluorescence is measured at a fixed wavelength and a multiple linear regression applied, to fit the measured curve to that constructed from the spectral fingerprints of five known classes of algae. The amount of each class of algae is then calculated and presented as the percentage of the Total Chlorophyll concentration, which is also displayed on the front panel in microgram's/l.

In addition a red laser light illuminates the sample and the resulting fluorescence is used to calculate the activity of the algae (Genty Parameter). This activity measurement becomes suppressed when the sample is subjected to herbicidal toxins.

When used as a DTA tool, results comparable to the standard official EC50 72hr test were obtained in less than 24 hrs.

The same technology has also been applied to a continuous on line toximeter, which will indicate toxins in the sample stream within minutes of reaching the instrument. More than ten of these units have been deployed in Germany and Holland, on tributaries of the Elbe and Rhine, primarily for intake protection and long-term quality assessment.

Another application of the cuvette fluorometer and the submersible fluoroprobe is to monitor the development of toxic algal blooms in recreational and potable water bodies, rapidly and cheaply, thereby enabling the implementation of suitable control strategies.