

Detection of toxic components in waste water

Many toxic components in chemical industry are dumped into waste water. During waste water processing in specific plants these toxic components underlay degradation. But the following components could be also toxic, so that the overall toxicity of waste water does not change during the whole process. It is therefore of interest to detect all toxic components during degradation in waste water plants.

The use of intact luminous bacteria (*Vibrio fischeri*) for toxicity assessment has some clear advantages that have been scientifically validated. These bacteria are self-maintained luminescent units that, under proper conditions, emit high and steady levels of luminescence.

Toxicants of different characteristics such as pesticides, herbicides, chlorinated hydrocarbons, heavy metals etc. or agents that affect the cell's integrity and especially membrane function or affect cell respiration, the rate of protein or lipid synthesis have a strong effect on in-vivo luminescence. This strong effect can be used to identify toxic components of waste water using TLC.

In general samples of waste water are spotted on TLC plates (Illustration 1) and developed according to known procedures. After the run the plates were dipped into a solution of luminescent bacteria only for seconds (Illustration 2). The luminescence on the TLC plate is detected under the NightOWL. Black spots show those areas, where bacteria were weakened or killed due to toxic components (Illustration 3).

Knowing the spots of these toxic components, these components can be collected on a second, same treated TLC plate via an extractor, developed at the University of Münster, Germany, and identified via LC/MS.



Illustration 1



Illustration 2

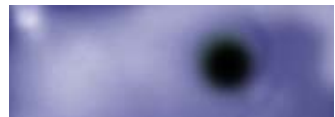


Illustration 3