

Bioresponse-linked instrumental analysis: Bridging the gap between Cause and Effect?  
*Risk Analysis – Risk Assessment: Detection of bio-effect environmental compounds by bio-activity based analysis in HPTLC.*

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The investigation of environmental samples, such as water, soil and air, for toxicologically relevant substances presents problems for every analytical technique.

The aim of bioactivity based analysis must be to detect and identify organic pollutants, from environmental samples, having biological-toxicological activity in trace concentrations within the 100-200 ng/kg range. It is also necessary to detect and quantify a direct correlation with their toxic properties.

The so called risk analysis has to be a bioresponse-linked instrumental analysis which involves a coupling together of two different methods. On the one hand, a pollutant analysis, using trace analytical methods, is used for the determination of selected organic pollutants and, on the other hand, the physical/chemical assessment is followed by a biological or biochemical toxicity test, thus, allowing a direct activity-dependent evaluation to be made after chemical/physical characterization.

In the case of High Performance Thin Layer Chromatography (HPTLC) the separated components can be detected and quantified directly on the chromatogram by physical and chemical methods. Coupling high performance thin-layer chromatography with biological or biochemical inhibition tests it is possible to detect toxicological active substances in situ.

Biological and biochemical test procedures are used to detect physically active pollutants in activity analysis. Specific enzyme inhibition tests on the thin-layer plate or test procedures involving organisms that use inhibition of photosynthesis, the inhibition of bacterial growth, inhibition of bacterial luminescence or inhibition of the growth of a yeast strain as the signal serve to detect the presence of toxicologically relevant pollutants.

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