



BIOCHEMICAL ANALYSIS IN MICROTITER PLATES

Task

A wide range of analytes, including hormones, toxins, active drug ingredients, etc., can be detected and quantified highly specifically on the basis of antibody-based biochemical assays. Minute quantities of liquid must be applied and mixed with each other for automated assay analysis in microtiter plates. Depending on the assay, an optical readout is then made, for instance in the form of a fluorescent measurement. Thorough mixing of the liquids is an important factor since inhomogeneities can cause false measurement results.

Method

The project aims to develop a demonstrator for quantitative and highly sensitive assay analysis in microtiter plates. The system should allow liquids to be pipetted, homogenized and optically measured in an automatic process. The homogenization takes place using a piezo ultrasonic transducer, which vibrates the microtiter plate and sets the liquids contained in the wells in motion. Inhomogeneities and bleaching effects during the optical measurement can thus be avoided.

Result

Working together with project partners from industry and the research community, a demonstrator was built at Fraunhofer ILT for automated multitoxin analysis. Both the pipetting of the assay components using an electronic pipette and the optical measurement of the fluorescence polarization take place automatically. The assay components assembled in a microtiter plate – sample extract, fluorescence dye and antibodies – are mixed using ultrasound and homogenized.

Applications

The primary area of application is food analysis, in particular mycotoxin analysis of cereal products. In principle, the demonstrator that has been developed is capable of detecting any analyte for which a specific binding antibody is available.

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