

# AutoDip Platform

## Electrochemical Pesticide Detection in Food

Processing inhomogeneous or viscous samples as they occur in environmental or food analysis is still a major challenge for lab-on-a-chip devices. Components of the sample matrix may block integrated microchannels, leading to system failure. The novel AutoDip platform allows fully automated analysis of complex samples with minimal sample preparation.

Core of the AutoDip platform is a cartridge with integrated ball-pen mechanics, which translates a simple vertical movement operated by an external actuator into a rotational movement. This allows sequential dipping of a functionalized solid phase (e.g. a biosensor) into reagents and the sample. By transporting the solid phase instead of pumping liquid reagents through small channels, the risk of blocking is ruled out, even when processing crude samples.

All platform components can be transported in a suitcase for on-site analyses. The simple mechanics and an integrated reagent pre-storage module promise robust assay automation and easy handling. Potentially, the cartridge can be designed as a closed disposable system, allowing analyses of infectious samples with minimal risk.

A large spectrum of biochemical analysis methods can be imple-

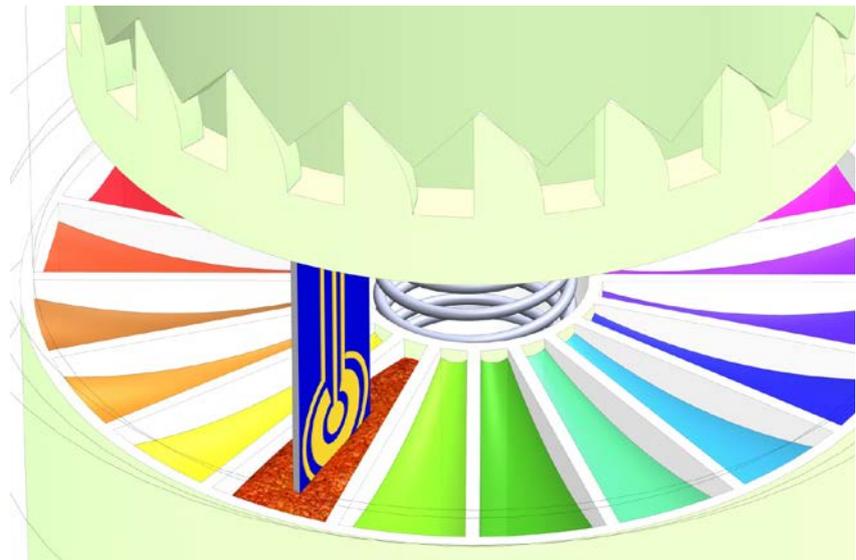


Fig. 1: View into the AutoDip cartridge. Pen mechanics allow consecutive dipping of a biosensor into different reagents pre-stored in the lower module of the cartridge and inhomogeneous sample.

### Features

- Simple and robust assay automation by ball-pen mechanics
- Processing of inhomogeneous "real-world" samples
- Reagent prestorage module
- Disposable cartridge
- Closed system allows analysis of hazardous substances

mented by integration of different solid phases and reagents.

By inserting an electrochemical acetylcholinesterase (AChE) biosensor as solid phase, we demonstrated a detection of the organophosphorous pesticide chlorpyrifos-oxon spiked into an apple sample at very low concentrations of  $10^{-7}$  M.

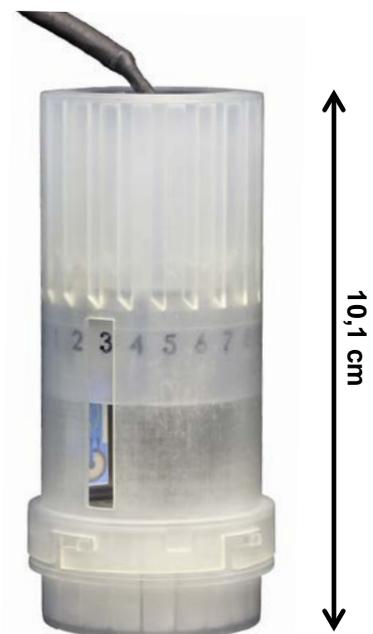


Fig. 2: Prototype of the AutoDip cartridge manufactured by stereolithography. LAB ON A CHIP 15 (3), s. 704–710. DOI: 10.1039/c4lc01214c