



# Lab-on-a-Chip

## Unique Continuous DNA Extraction

Continuous sample preparation for flow-through PCR is currently not available. Therefore, Hahn-Schickard has developed a chip for continuous nucleic acid extraction based on Phase Transfer Magnetopheresis (PTM).

Purification of DNA is achieved using well-established solid-phase extraction that is based on reversible adsorption of DNA onto superparamagnetic particles. All assay steps such as DNA binding, washing and eluting can be performed on our PTM platform.

The system features a microfluidic channel structure that is circularly arranged around one rotating permanent magnet. This magnet induces an oscillating magnetic field actuating the superparamagnetic particles dispersed in the extraction buffers. In phase transfer channels where two or more buffer solutions form a laminar flow the particles are transferred across the phase interface from one buffer to the next. Separation chambers serve to concentrate the particles as well as for the removal of impurities.

The fluidic setup produces well-defined flow-conditions for the mobile solid phase. The standard

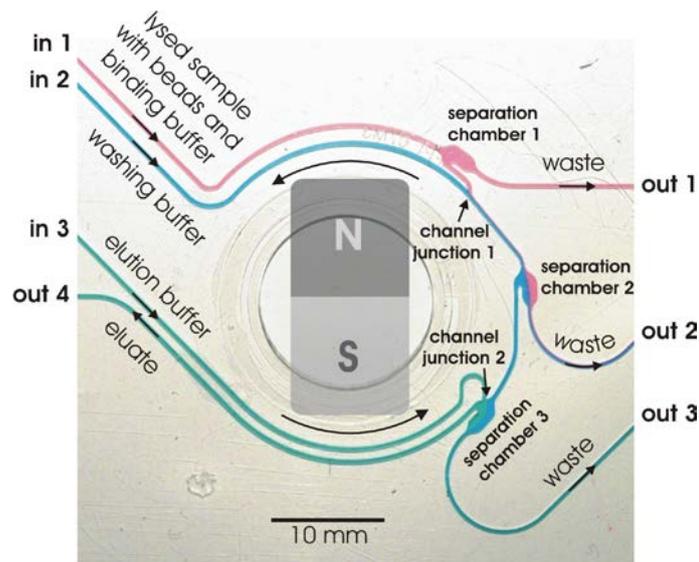


Fig. 1: Photograph of the microfluidic chip. The microchannels have been milled into a polycarbonate substrate. For illustration dyed water has been injected into the chip.

### Fields of application

- Turnaround time of 2 min
- One rot. permanent magnet
- Sample pre-treatment for flow-through PCR
- Possible further applications: (a) Continuous protein purification, (b) immunoassays, (c) cell based assays, etc.

transit time of the sample through the PTM platform is 2 minutes but can easily be adjusted by the inlet flow rate. Therefore, it can be optimized for varying applications. Thus, continuous sample pre-treatment for flow-through PCR has become possible for the first time.

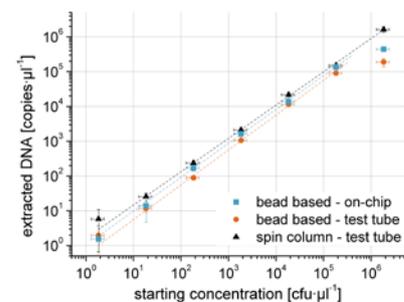


Fig. 2: Quantification of on-chip extracted genomic *E. coli* DNA by real-time PCR.

### Acknowledgement

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