

Optofluidic detection setup for multi-parametric analysis of microbiological samples in droplets.

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Abstract

High-throughput microbiological experimentation using droplet microfluidics is limited due to the complexity and restricted versatility of the available detection techniques. Current detection setups are bulky, complicated, expensive, and require tedious optical alignment procedures while still mostly limited to fluorescence. In this work, we demonstrate an optofluidic detection setup for multi-parametric analyses of droplet samples by easily integrating micro-lenses and embedding optical fibers for guiding light in and out of the microfluidic chip. The optofluidic setup was validated for detection of absorbance, fluorescence, and scattered light. The developed platform was used for simultaneous detection of multiple parameters in different microbiological applications like cell density determination, growth kinetics, and antibiotic inhibition assays. Combining the high-throughput potential of droplet microfluidics with the ease, flexibility, and simplicity of optical fibers

results in a powerful platform for microbiological experiments.

Beteiligte Forschungseinheiten

[Biotechnikum Miriam Agler-Rosenbaum](#) [Mehr erfahren](#)

Leibniz-HKI-Autor*innen



Miriam Agler-Rosenbaum

[Details](#)



Sundar Hengoju

[Details](#)



Martin Roth

[Details](#)



Oksana Shvydkiv

[Details](#)



Miguel Angel Tovar Ballen

[Details](#)

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