

Online measurement of CO₂ and total gas production in parallel anaerobic shake flask cultivations.

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Abstract

Online measurements of off-gas streams are often crucial for studying bioconversion processes. However, for anaerobic processes, options for online off-gas analysis are typically restricted to lab-scale bioreactors or larger systems, while gas measurements at smaller scales typically do not discriminate between different gases. In this work, a method for online measurement of CO₂ and total gas production in anaerobic fermentations at the shake flask scale is described, extending capabilities of a previously reported device developed for aerobic processes to anaerobic bioprocesses. The novel design allows anaerobic fermentations to be performed in multiple parallel vessels, all of which collect online gas signals. The online gas signals are used to calculate the transfer rates, allowing near real-time visualization of the progress of eight fermentations operating in parallel. Conditions such as carbon source depletion, inhibition of growth, and exhaustion of a single carbon source in a dual-substrate fermentation can all be clearly distinguished. The combination of online signals and offline analysis allowed for carbon balances

to be performed with high degrees of closure. The new design allows for higher throughput screening of anaerobic bioprocesses, an area lacking in small-scale options with off-gas analysis capabilities.

Involved units

[Bio Pilot Plant](#) [Miriam Agler-Rosenbaum](#) [Read more](#)

Leibniz-HKI-Authors



Lars Regestein

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