

Process Integrated Syngas Conversion

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Project Description

Syngas fermentation to valuable chemicals is a promising option in a bio-based economy, however suitable microorganisms and processes still need to be developed.

At the process side, the gas-liquid interface mass transfer is the major resistance for gaseous substrate diffusion. This is one of the urgent challenges to be tackled in syngas fermentation to building blocks, so that sufficient productivity and product titers can be achieved. This PhD project addresses the question of how membrane systems can be used to achieve processes with the required productivity. Membrane bioreactors are potentially a suitable configuration for syngas fermentation since they can provide a high surface-area-per-unit-volume and mass transfer driving force.

The project is focused on the design and testing of a scalable novel membrane bioreactor system that potentially allows: high syngas mass transfer, high cell density and *in-situ* product removal. Syngas mass transfer and bioconversion in the membrane bioreactor is described by an established and experimentally validated mathematical model.

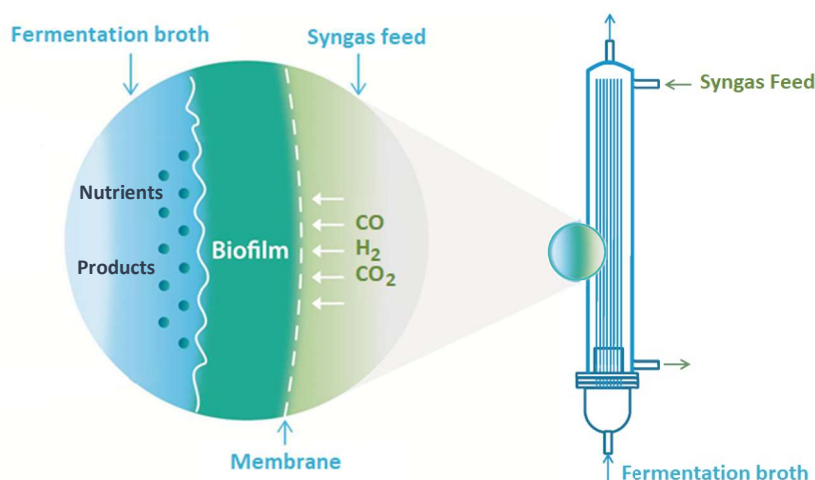


Figure 1. Schematic overview of syngas mass transfer and consumption in a hollow fiber membrane bioreactor.