

# Organic acids concentration by Nanofiltration and Reverse Osmosis

**Problem:** The possible energetic employments of biomass are manifold. It can be either used as transport fuel, for heating or for industrial applications. In order to make biomass-based fuels more competitive in the market, a novel two-phase-fermentation process for biogas production is being developed. In this scenario Microfiltration and Reverse Osmosis acquire importance, with a view to concentrate the ultra-fast degradable organic compounds (UD-OC) coming from a first fermentative stage and feed them to the final stage, where they convert into methane. In this juncture the main challenge is to limit fouling as much as possible, or even to forebode its emergence in order to plan cleaning cycles.

**Tasks:** Within this study, the application of nanofiltration and reverse osmosis membranes for the concentration of volatile fatty acids (VFA) will be evaluated. The goals are 1) to give an overview about mechanisms influencing VFA separation, 2) to investigate how biofouling affects the performance of the membrane and 3) to evaluate OCT (Optical Coherence Tomography) as a method to characterize fouling formation in NF and RO. In the context of this work following tasks should be carried out:

- Chose the type of membrane that better fits the operational requirements
- Investigate the influence of the feed characteristics (composition, ionic strength, pH, etc.) on the performances of the separation process.
- Evaluate the deposition of biofilm – i.e. fouling – on the membrane by means of Optical Coherence Tomography

The scope of the assignment can be adapted to a Bachelor's or Master's thesis or a study project as desired.

**Especially suitable for students of the disciplines:**

CIW, VT, BIW, WaSE

**More Details:** <http://wasserchemie.ebi.kit.edu/>

**Type of work:** Primarily practical

**Beginning:** Immediately, after consultation

**Supervision:** Engler-Bunte-Institute, chair of water chemistry and water technology

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