

## Application of membranes in biogas production

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### ABSTRACT

In this study a laboratory scale system containing three units, an anaerobic fermenter, a membrane filtration and a gas separation unit, was designed and examined. It was found that applying external membrane filtration the solid retention time in the anaerobic fermenter could be increased, therefore the potential of biogas production can be intensified. For this step the PS-100H ultrafiltration membrane proved to be the most suitable, with increasing the organic substance concentration with 129%, and the suspended solid concentration with 70%. The concentrated material was recycled to the fermenter, and further biogas was produced. Moreover a gas separation membrane module, containing non-porous membrane, was tested, on purpose to produce high purity biomethane. The permeability and ideal selectivity  $\text{CO}_2/\text{CH}_4$  of single gases was determined. It was found that the separation could be carried out at ambient temperature.

*Keywords:* Anaerobic fermentation; Gas separation; Biomethane; Membrane bioreactor

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