Automated biomethane potential (BMP) test set-up

Halophytes as Feedstock for Biogas Production: Composition Analysis and Biomethane Potential of *Salicornia* spp. Plant Material from Hydroponic and Seawater Irrigation Systems

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Anaerobic digestion of *Salicornia* spp. achieved biomethane yields similar to that of green grasses and thus has the potential to serve as a feedstock for mono- and co-digestion

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The halophyte crop *Salicornia* can be utilized as a feedstock for biogas production in co-digestion with a non-saline feedstock with biomethane yields similar to that of conventional non-saline grass crops.

The halophyte plant species *Salicornia europaea* and *Salicornia ramosissima* were investigated for their potential to serve as a substrate for biogas production. *Salicornia europaea* was cultivated in hydroponic systems under varying salt concentrations (0, 10, 20, and 30 g/L NaCl), while *S. ramosissima* was grown in greenhouse farming with aquaculture effluent irrigation. The biomethane potential of the two halophyte feedstocks was determined through batch experiments, and correlations to the plant biochemical composition were investigated. Ash and mineral content of *S. europaea* was correlated to the increasing salt concentration used for plant cultivation in hydroponic systems. No indication of inhibition of the anaerobic digestion process was detected for sodium concentrations of up to 2400 mg/L in the anaerobic batch-test assays. The highest biomethane yield of S. europaea of 250 mL CH_4/gVS was obtained when grown under 20 g/L NaCl and up to 300 mL CH_4/gVS for *S. ramosissima*. By concentrating the dry matter content, the biomethane yield per ton of feedstock could be increased from 24 m^3 CH_4/t of the fresh halophyte plant to 74 m^3 CH_4/t by fractionation into a pulp fraction and to 149 m^3 CH_4/t by drying of the plant at room temperature for 1 week.

Reference:
Cayenne, A.; Turcios, A.E.; Thomsen, M.H.; Rocha, R.M.; Papenbrock, J.; Uellendahl, H. Halophytes as Feedstock for Biogas Production: Composition Analysis and Biomethane Potential of Salicornia spp. Plant Material from Hydroponic and Seawater Irrigation Systems. *Fermentation* 2022, 8, 189. https://doi.org/10.3390/fermentation8040189

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