Professur für Regenerative Energiesysteme
Campus Straubing für Biotechnologie und Nachhaltigkeit
Technische Universität München

TUM

Bachelor Thesis / Master Thesis:

Development of Methods for Analyzing Biogas Parameters using Automatic Titration and NIR Spectroscopy

Project Description:

In biogas plants, it is not possible to directly measure parameters like acetic acid concentration, propionic acid concentration, VFA/TA value and dry matter content. It is necessary to take a sample of the biogas substrate from the fermenter and transport it to a laboratory for analysis with GC or HPLC. In addition to being time-consuming, this method can also be costly since consumables are needed to analyze the samples.
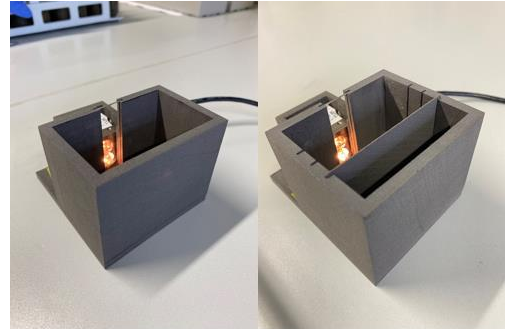
In order to reduce costs and time, machine learning approach is used. The substrate from the fermenter is measured using NIRS sensors, and the resulting data is used to train a machine learning model which creates a database from the training data.

This project involves installing NIRS sensors in the biogas plant to measure the intensities of the actual biogas substrates in the digester. It is then possible to compare the measured intensities with those in the generated database, enabling real-time measurements of biogas parameters.

Tasks:

- Research into literature on the subject of "sample preparation for the measurement of biogas parameters".
- Sample preparation using Laboratory Centrifuges, Automatic Titration, etc.
- Sample measurement with NIR spectroscopy and Moisture Analyzer.
- Development of the final report in English or German.

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