



Bachelor Thesis / Master Thesis:

Sample Preparation for Estimating State Variables in Biogas Plants

Project Description:

In this work, you will deal with the important task of preparing samples for the calibration of near-infrared (NIR) sensors, which are crucial for estimating essential state variables for the flexible operation of biogas plants. Acetic acid concentration, VFA/TA ratio, and dry matter content are essential state variables that characterize the current state of biogas plants. However, these cannot be measured in real time with state-of-the-art sensors, so plant operators usually send samples to the laboratory on a regular basis to obtain these values.

Real-time estimation of these state variables means complete observability of the biogas plant. This is particularly important because the biogas plant must be operated flexibly to increase profits, especially when no government subsidies are available.

Tasks:

Sample collection and preparation: In the initial phase of the work, samples must be taken from the fermenter of the biogas plant and prepared for subsequent analysis.

Data collection for machine learning: A robust data set is required to calibrate the NIR sensors. You will collect data on dry matter, acetic acid concentration, and VFA/TA ratio from the samples taken. This phase forms the basis for the subsequent machine learning calibration.

Laboratory work: The core of this thesis consists of extensive laboratory work. You will deal with a range of sample preparation techniques, measurements, and data recording. This phase requires attention to detail and a methodical approach.

Data preprocessing: Once the dataset has been compiled, the next step is to preprocess the data to prepare it for machine learning calibration. This phase is critical to ensuring the accuracy and reliability of the subsequent sensor calibration.

Start Date:

As soon as possible

Contact:

Interested in this exciting opportunity? For further information or to apply, please contact:

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