Process performance evaluation

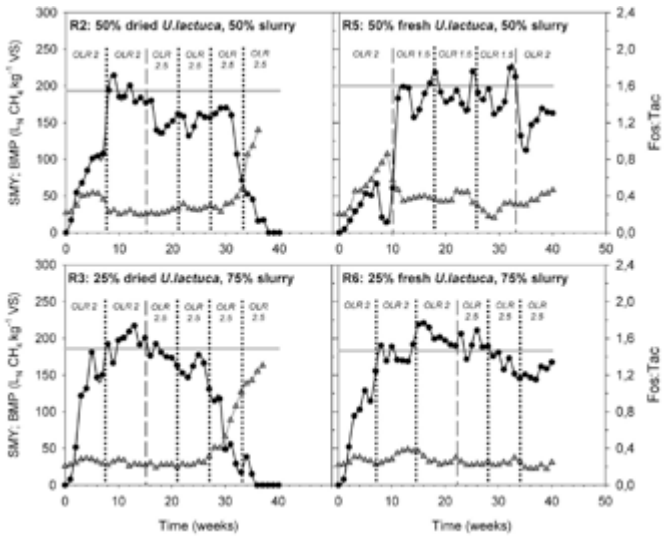
Monitoring and evaluating the performance of a continuous process is very important in order to know where the process is heading and whether the process is operated at optimal conditions. For biogas production this is normally carried out by measurement of standard parameters (e.g. gas production, gas composition, pH, VS, TS, alkalinity, VFA), however, also regularly performed batch tests with the substrate, reactor content and digested sludge might disclosure additional key information on the state and performance of the process, as well as metabolic activities of anaerobic bacteria. These kinds of analysis are optimally performed with the highly automated batch fermentation test platform AMPTS II as this allows for both high quality and quantity data with minimal effort.

Example 1

Determination of maximal methane potential

By performing regular batch tests of the incoming substrate, it is possible to monitor the maximum methane yield that can be expected from the continuous process. If the methane potential is further compared with the obtained methane yield, the efficiency of the continuous process and whether any adjustments to the organic loading rate and/or hydraulic retention time are necessary can be determined.

By using the AMPTS II these kinds of tests can be performed with minimal effort and high certainty in the results (Murto et al., 2013; Allen et al., 2014; Browne et al., 2014).



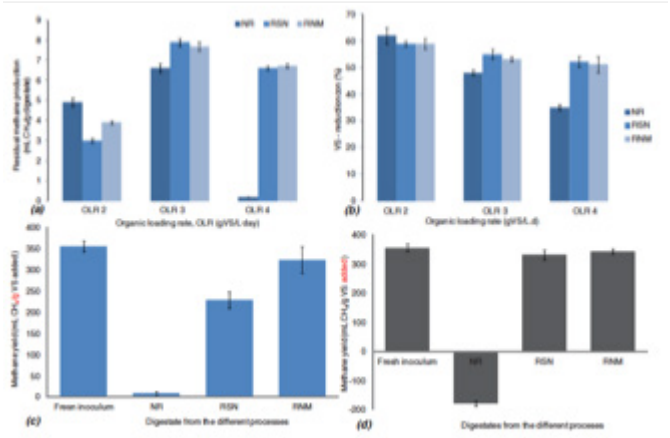
Specific methane yield, BMP and organic acid to alkalinity ratio (Fos:Tac) from continuous operation with different mixtures of dried and fresh seaweed (*U. lactuca*) and dairy slurry (Allen et al., 2014).

Example 2

Determination of residual gas potential

By performing batch tests with the digested sludge at regular intervals it is possible to monitor the efficiency of the conversion from biomass to biogas and the potential greenhouse gas emissions from the digestate. In order to minimise the greenhouse gas emission, it is important to closely monitor and ensure that the residual gas potential is kept at a low level.

AMPTS II is ideal tool for this kind of analysis as it allows the user to perform the test with low labour demands and easy accessible data visualisation (Achu et al., 2015).



Residual methane potential (a), VS reduction (b) and methane potential of cellulose with fresh sludge from process (c) and sludge that was starved for 30 days (d) (Achu et al., 2015).

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