

## Anaerobic activity test

# Process optimisation by measurement of bacterial activity

For an efficient AD process it is important to monitor the viability and density of the anaerobic microbes involved in the process. This information may be obtained by performing activity tests (i.e. specific methanogenic, acidogenic and hydrolytic activity). Such assays determine the catabolic activity of the most central degradation steps

and have traditionally been carried out by manual methods, which are both labour demanding and prone to human errors. However, by using the highly automated batch fermentation system AMPTS II for this purpose, the tests can be performed with minimal effort, guaranteeing maximal quality of the generated data at the same time.

## Example 1

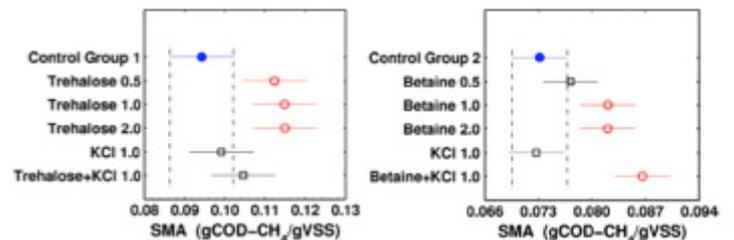
### Activity tests to evaluate process modifications

Analysis of change in biomass activity is an excellent approach to evaluate and compare the effect of various process modifications. In particular the specific methanogenic activity (SMA) is commonly applied for this purpose and the AMPTS II has successfully been used to monitor the change in biomass activity due to common process variations, such as operation at varying retention times (Ersahin et al., 2014) and different reactor configurations (Wang et al., 2015).

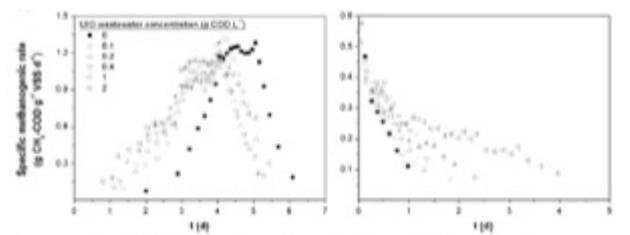
## Example 2

### Activity tests to investigate the influence of additives

A common application for activity tests is to evaluate how various additives influence the process, in particular how they may reduce the toxicity of a sample. These types of studies are ideally performed by AMPTS II, since the simple operation of the system allows the user to screen many types and different amounts of additives simultaneously (Zhang et al., 2014).al., 2014).



Effects of additives on SMA of anaerobic sludge from treatment of brackish recirculation aquaculture systems sludge (Zhang et al., 2014).



Acetoclastic and hydrogenotrophic specific methanogenic production for different concentrations of used industrial oil wastewater (Garcia-Mancha et al., 2012)

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## Example 3

## Activity tests to determine the optimal substrate composition

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Activity tests can also be used to evaluate how the concentration (Garcia-Mancha et al., 2012) or composition (Buntner et al., 2014) of substrates influences the performance of an anaerobic digester. This information allows the researcher to determine optimal operating conditions which give the highest methane productivity for a given biomass activity.

## References

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Buntner, D., Spanjers, H., van Lier, J.B., 2014. The influence of hydrolysis induced biopolymers from recycled aerobic sludge on specific methanogenic activity and sludge filterability in an anaerobic membrane bioreactor. *Water Res.* 51, 284–292.

Ersahin, M.E., Ozgun, H., Tao, Y., van Lier, J.B., 2014. Applicability of dynamic membrane technology in anaerobic membrane bioreactors. *Water Res.* 48, 420–429.

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