Advice Sheet 42: Biomethane Potential (BMP) in Feedstocks for Anaerobic Digestion – Analysis Options

Introduction

Anaerobic Digestion (AD) is the process of producing bioenergy from organic waste by the action of microorganisms in the feedstock under anaerobic conditions. To optimise conditions and assess the economics of an AD plant it is useful to determine the Biomethane Potential (BMP) of a feedstock. NRM offer three different ways of assessing the BMP of feedstock. This document details the principles behind each technique to help select the appropriate test.

Theoretical Biogas

Samples are tested for Crude Fibre, Crude Protein, Crude Fat (OAH / Oil B), Ash and Moisture. The results are fed into a 'Baserga' equation to calculate how much biogas a feedstock may theoretically produce based on the nutrient content and a series of accepted conversions.

This is the most cost-effective analysis option with a turnaround time of 10 working days. However, results can be high as it is a theoretical estimate of the biogas potential not an actual measurement.

BMP

This gives information on the volume of biogas produced over time under conditions simulating the process in an AD reactor. A representative portion of homogenised sample is added to a small digestion vessel with an inoculum of sewage sludge to provide microorganisms. This is incubated at 37°C and the biogas produced is measured over a set time period. All analysis is carried out in triplicate and the average reported. The composition of the gas can also be determined.

This test gives the best picture of how the feedstock will behave in an AD plant and more information is provided (gas yield, rate of digestion and gas composition). However, the test is long (14 to 40 days) and it is relatively expensive.

Bullet BMP

A Near Infrared (NIR) scan of the dried and ground sample is compared to a calibration database which links key components of the NIR spectra to the traditional laboratory method. This provides a prediction of the biomethane potential of a feedstock. The test includes an assessment of microbial inhibition in the sample.

This provides a rapid indication of the BMP at a lower cost to the full method (5 working day turnaround). However, it is not suitable for liquid samples with low solids content or samples high in fat / oil which cannot be dried *e.g.* dairy products and glycerol.

This test is subcontracted to AMUR.

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