

Advice Sheet 34: Assessment of Biomethane Potential (BMP) in feedstocks for Anaerobic Digestion (AD)

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. This gives information on the volume of biomethane produced over time under simulated conditions. Suitable feedstock for a digester includes any biodegradable animal matter or food and drink waste, processing residues, agricultural residues, crops, and sewage sludge.

Samples are usually homogenised by blending but can be analysed as received if indicated on the analysis request form. The dry matter and volatile solids (at 550°C) are then analysed to determine the sample quantity to take for BMP analysis. A representative portion is added to a small digestion vessel with an inoculum of sewage sludge to provide microorganisms. This is incubated at 37°C and the biomethane produced is measured over a set time period. All analysis is carried out in triplicate and the average reported.

NRM analysis options for BMP

NRM offer 3 standard test durations, each with the option to also determine the composition of the gas as methane (%), carbon dioxide (%), and hydrogen sulphide (ppm).

NRM Analysis Code	Description
4901	14 day test with determination of gas composition *
4903	28 day test with determination of gas composition
4905	40 day test with determination of gas composition

* The 14 day test report will be sent and the customer given the option to stop or carry on until 28 days (charged at the 28 day rate). We will need a written confirmation (email) within 3 working days that continuation to 28 days is required, otherwise the test will be terminated.

The composition of the gas (CH₄, CO₂ and H₂S) produced from the feedstock (if option selected) will be carried out on days 3, 7, 14, 21, 28, and 40 days depending on the duration of test requested.

A PDF report will be sent by email showing a plot of the biomethane produced each day expressed as litres per kg of volatile solids (l/kgVS). The report will also give values for the biomethane potential, dry matter, and volatile solids content of the sample.

Analysis of your samples

Due to the various options in the duration and supply of plant/customer specific inoculum and the instrumentation capacity, we will not always be able to start the test on the day of receipt. Samples will be processed in a chronological order, i.e. on a first-come first-served basis. If we do not have the capacity to commence testing your sample within 10 working days, we will contact you and inform you of a predicted start date and check that this delay is acceptable. During this time your sample will be stored under appropriate conditions.

How to submit a sample for analysis

Please send us the samples using our courier service. In order to proceed with the analysis, we need to receive a **2L bottle of liquid** or **1kg of solids in a large grip seal bag**. Suitable sample containers can be provided on request. Samples should be labelled and kept under cool conditions during transit. Please provide paperwork to accompany the samples with your client code and the analysis option you require.

If you do not wish the samples to be blended then please indicate this on the paperwork.

NB: If samples are also being submitted for additional analysis, please provide a further sub-sample. This will be dealt with and reported separately.

Inoculum

It may be desirable for a particular inoculum to be used with certain samples. This can be accommodated. Please indicate this requirement clearly on the accompanying paperwork and supply six litres for the first sample and a further two litres per additional sample. If you are submitting more than one inoculum to be used alongside your samples, please ensure that it is clear which inoculum should be used for each sample.

Bespoke trial work

We understand that there may be a requirement from our customers to carry out trial work for R&D purposes that may not fit into the standard BMP service outlined in this document (such as the analysis of supplements to improve the digestion process). If you require such a trial, please contact our business development team (through the enquiries details provided below) to discuss your requirements.

Contact details

To discuss any aspect of this service, please contact enquiries@nrm.uk.com or **01344 886338**.

Method reference

VDI 4630 Fermentation of organic materials. Characterisation of the substrate, sampling, collection of material data, fermentation tests (2006).