



# Research



National Centre for  
Engineering in Agriculture



*Biogas Research at NCEA*



High rate anaerobic lagoon, Oakey Beef Exports

## ALTERNATIVE ENERGY, WASTE TREATMENT & ENVIRONMENTAL BENEFITS.

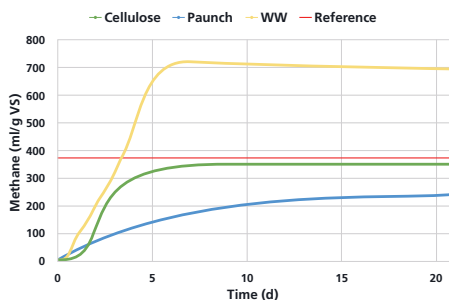
The **Energy Conservation & Management (ECM)** research theme at the **NCEA** explores ways to reduce consumption of non-renewable energy and the viability of renewable energy sources both on and off farm. Biogas produced from organic waste is one of the key areas investigated by the **Bioresources & Waste Utilisation** research group within the ECM theme. They have been actively involved in number of projects which assess the suitability of a range of feedstocks from **agro-industrial industries** in the production of methane. Projects have involved red meat processing, pork and feedlot industries giving the NCEA a well-rounded yet high level of expertise in anaerobic digestion and a good understanding of a range of feedstocks.

In addition to the engagement in research projects, the NCEA provides **consultancy** for companies and institutions interested in biogas feasibility studies or to support the operation of an existing biogas plant.

The focus of the biogas research includes:

- Assessment of different waste streams;
- Evaluation of their suitability for anaerobic treatment;
- Process monitoring and control, as well as improvement of processes.

Substrates for the biogas process can be analysed with reference to their characteristics. The methane potential (BMP) of organic wastes can be determined using the AMPTS system. This system measures the methane production after inoculation with anaerobic active sludge until no more gas is produced. It shows the amount of methane produced from a defined amount of input and provides information on the degradability of the substrate.



## SUBSTRATE CHARACTERISATION

Parameter	Description
Total and Volatile Solids	Assesses the amount of water and organics
Volatile organic acids (VOA)	An intermediate substrate for biogas production but can also inhibit the process of anaerobic digestion
Nitrogen/ammonium (NH <sub>4</sub> )	Important for biomass formation and acts as a buffer
Chemical Oxygen Demand	An assessment of wastewater strength
Alkalinity	Indicates buffering capacity and process stability

The NCEA also has a suit of state-of-the-art 2L, 5L, and 10L continuous bioreactors which complement the AMPTS II system. The reactors allows for a greater understanding for:

- Determining the suitability of a potential feedstock for biogas production;
- Defining the suitable Organic Loading Rate;
- Establishing Retention Time for a given feedstock; and
- Designing suitable feedstock schedules.

## RESEARCH AT USQ

The University of Southern Queensland is recognised for its research in agriculture and climate science applications, regional development, and digital literacy and education. Our three Institutes focus the university's strengths through multi-disciplinary research programs to tackle national and global challenges affecting agriculture, natural resource management, and people living and doing business in regional areas.

## OUR RESEARCH VISION

USQ is a regional university which develops research solutions that deliver global impact.

Our vision is to be a leading discovery partner in our priority research areas. We align our research with regional and global agendas in agriculture and natural resource management, regional development, regional health and well-being, education and digital literacy.

Our researchers are to be found in the field, working alongside our partners to develop solutions that can be applied directly to industry and community. We are focused on delivering impact in our areas of research strength.

## NATIONAL CENTRE FOR ENGINEERING IN AGRICULTURE

At the NCEA we develop solutions for a sustainable and profitable rural sector with research focusing on sustainable agriculture, energy use, water resources and food security.



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