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Biogas Research at NWU, Potchefstroom

Unit for Environmental Sciences and Management
North-West University, Potchefstroom Campus

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NORTH-WEST UNIVERSITY
YUNIBESITI YA BOKONE-BOPHIRIMA
NOORDWES-UNIVERSITEIT
POTCHEFSTROOMKAMPUS

It all starts here[®]

Research areas / interests

- Sanitation and organic waste utilization → co-treatment options
- Characterization of microbial communities
- Hygiene and health risks associated with the OW / sanitation service chain
 - pathogens, micro substances and especially antibiotics and antibiotic resistance
- General substrate characterization

Sampling and Sample preparation according to VDI4630

“Fermentation of organic materials - characterisation of the substrate, sampling, collection of material data, fermentation tests”

And SOPs (adapted from existing SOPs) to fit local conditions:

SOP1_Faecal Sludge Sampling of Pits

SOP2_Handling and basic preparation of Faecal Sludge Samples

SOP3_Handling of Chemicals incl N₂ Gas and Chemical Spills in the Biogas Lab

SOP4_Disposal of Organic Waste Samples

Our AD / Biogas laboratory



giz Deutsche Gesellschaft
für Internationale
Zusammenarbeit (GIZ) GmbH



FSM / Biogas Laboratory



FS Sampling



FSM / Biogas Laboratory (cont)



FSM / Biogas Laboratory (cont)

Main tool for capacity building

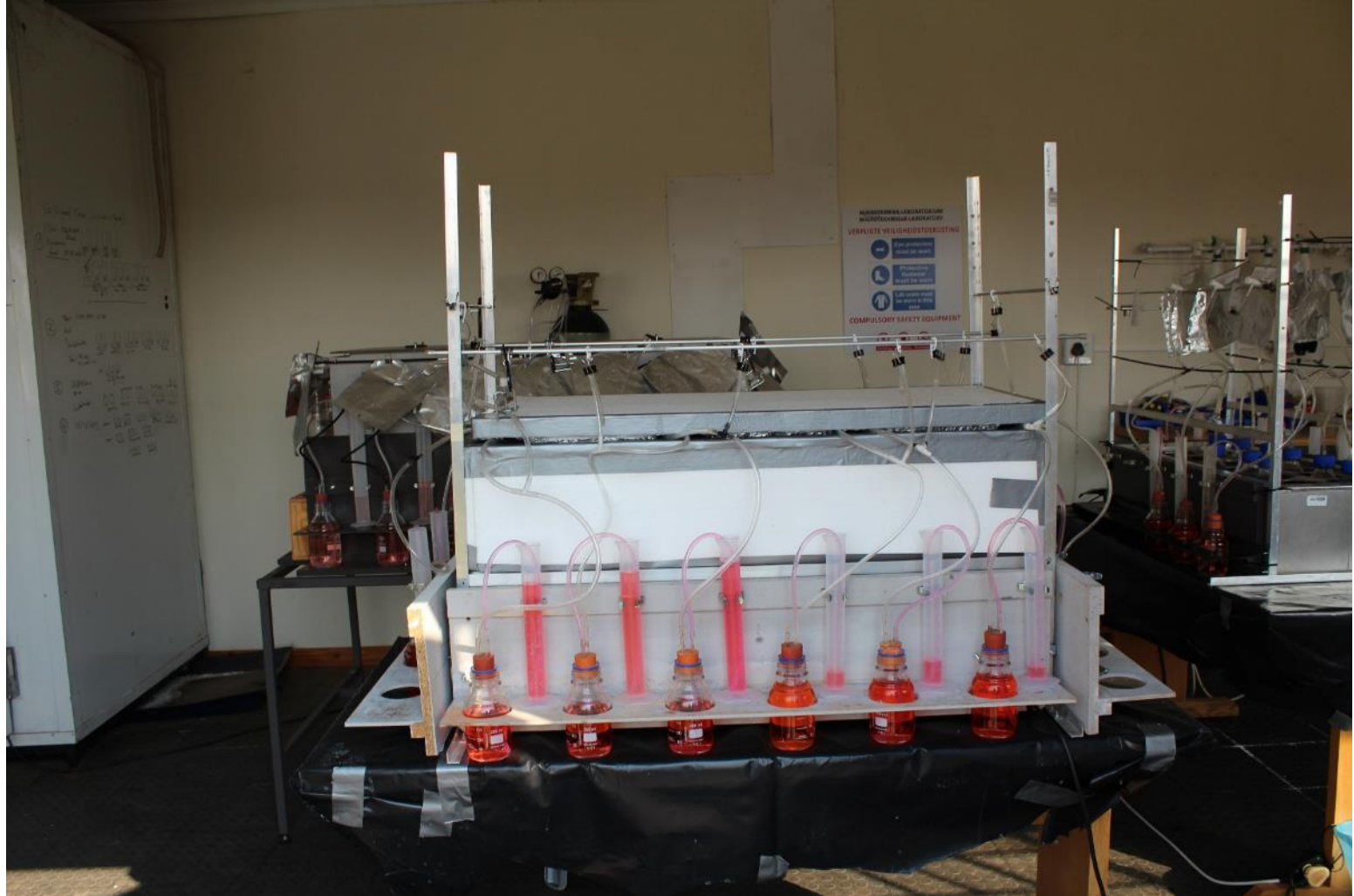


Batch Test - Incubator Box (37°C)

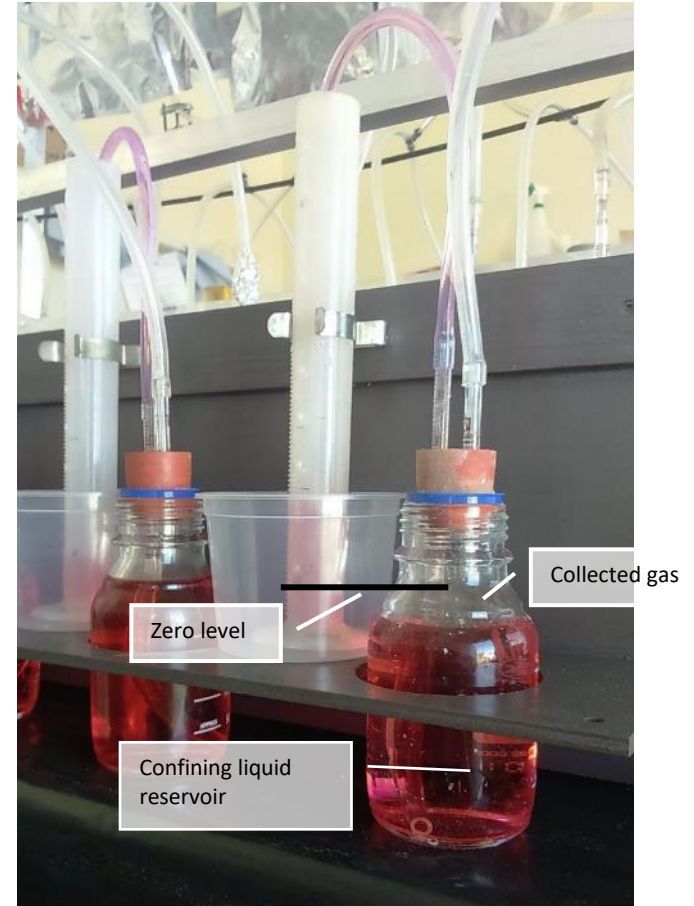
Incubator box for mesophilic tests



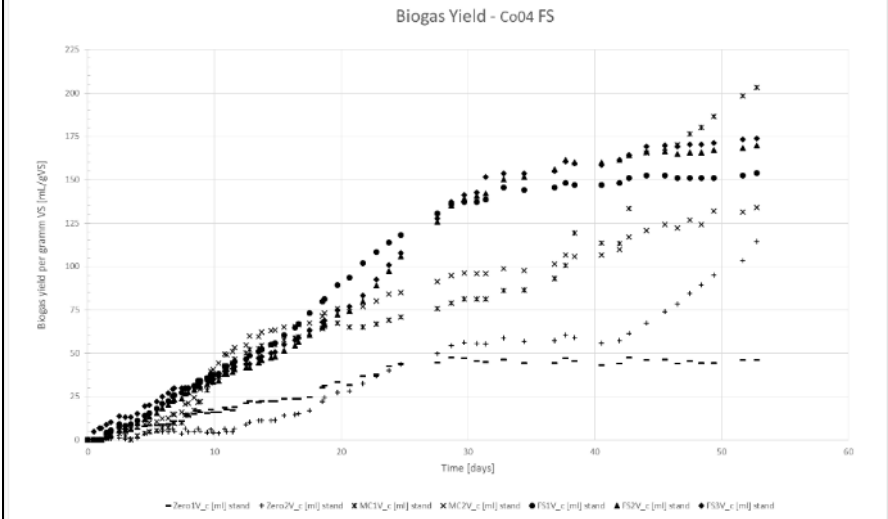
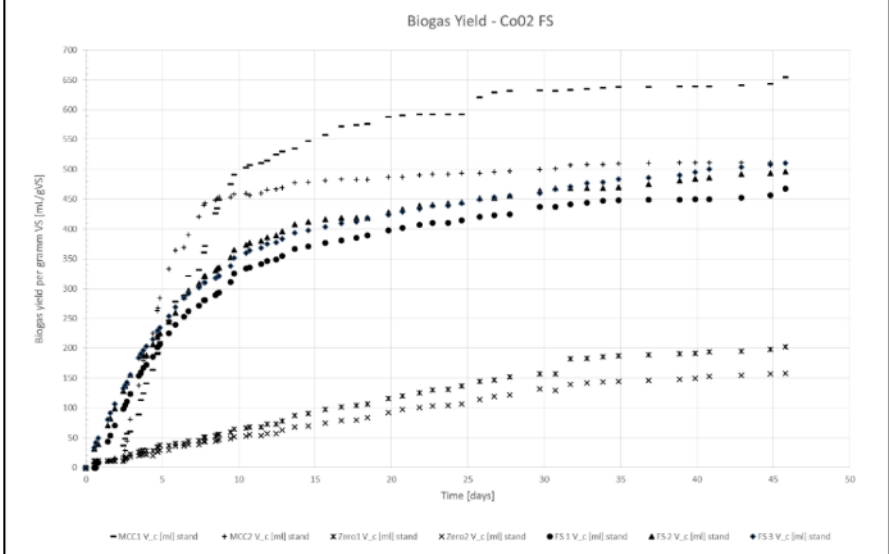
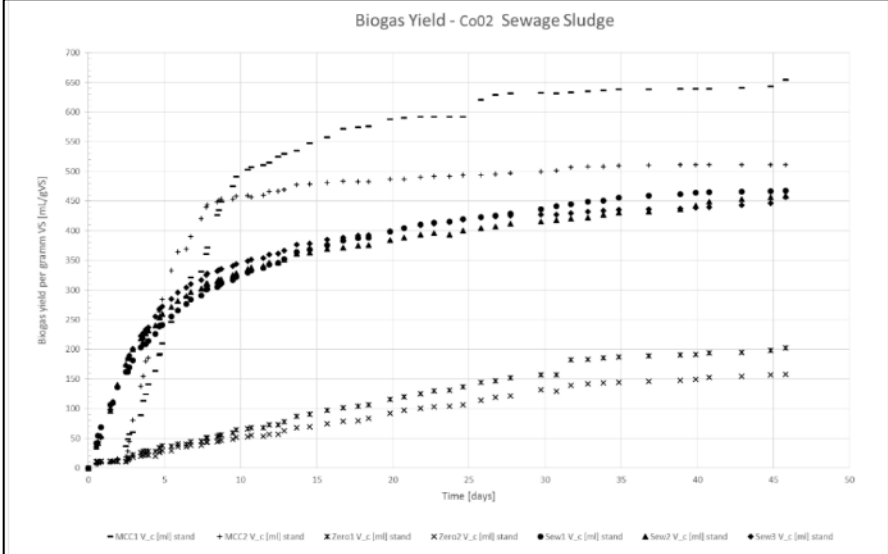
Batch Test - Thermophilic Set (55°C)



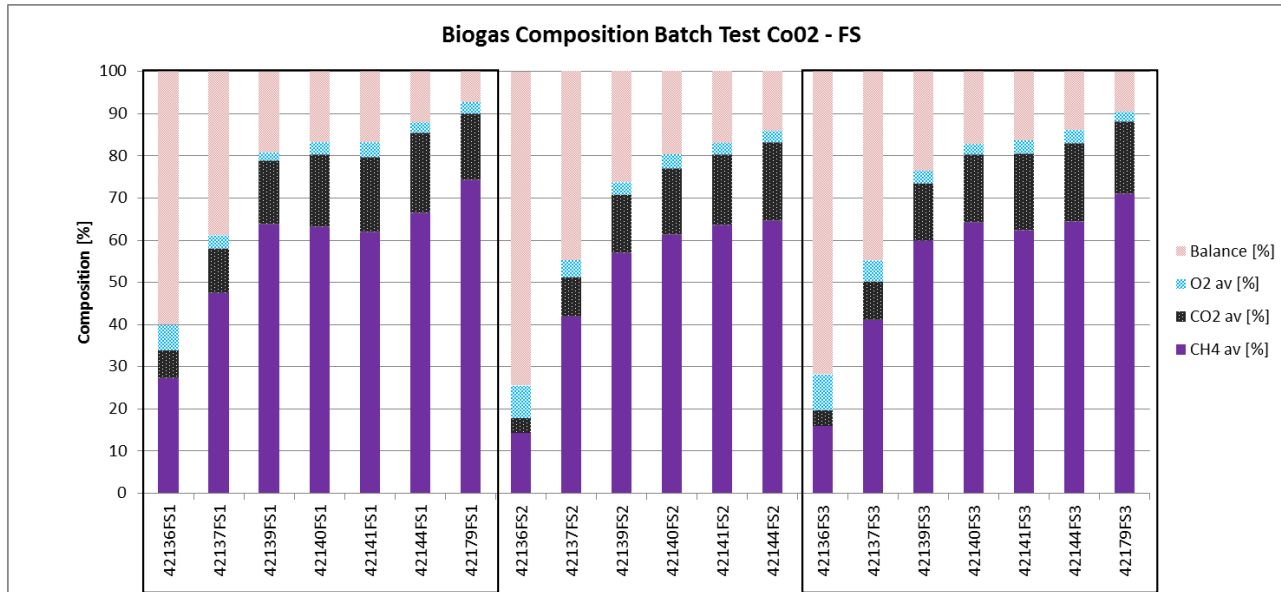
Eudiometers



Results – Sewage and FS



Biogas Composition



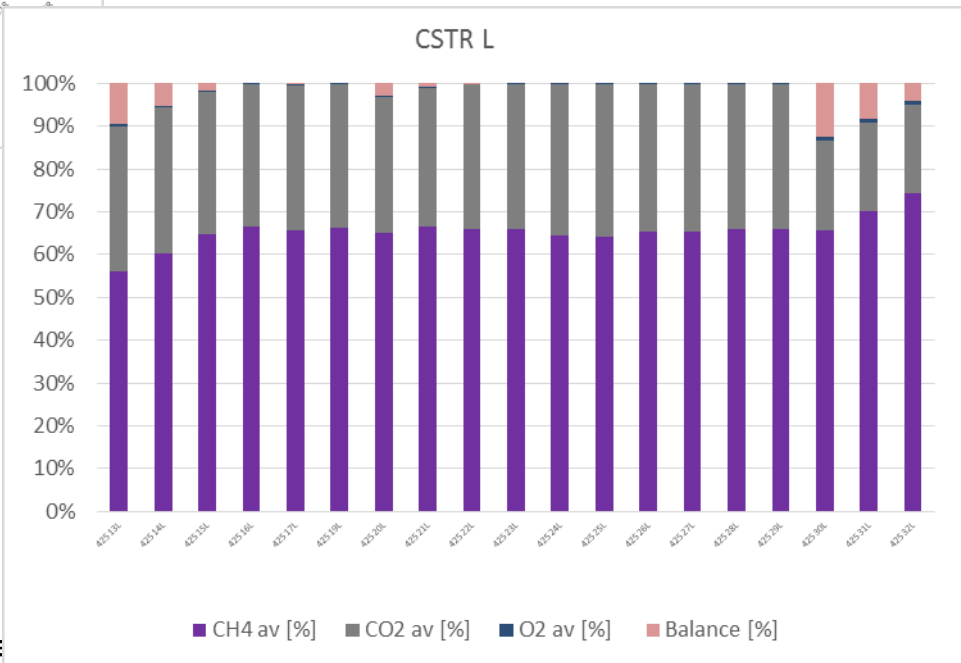
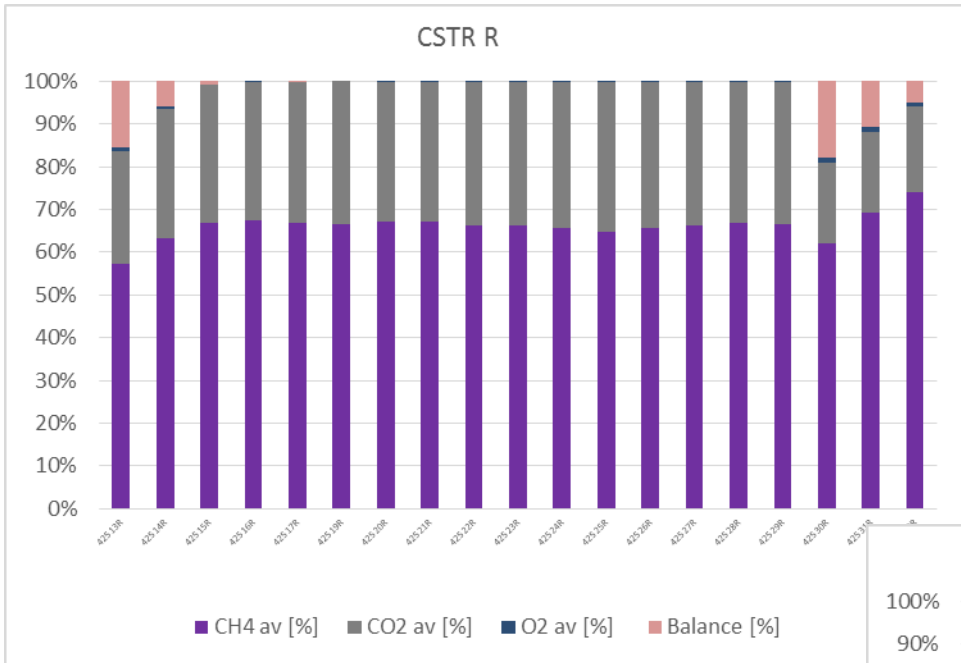
CO₂ and CH₄ concentrations: dual wavelength infrared sensor with a reference channel;
O₂ and H₂S: internal electrochemical sensor



CSTRs



CSTR Gas Composition



Lessons learned

Success of tests depends on **inoculum** with established microbial community.

Experiments are a continuous operation: once you start, don't stop!

Get SOPs and safety protocols in place.

Sampling might require **Ethical Clearance**:

Plan ahead – plan carefully

→ especially when **informed consent** process involved

Stay in touch



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