



Centre for Bioprocess Engineering Research

University of Cape Town (UCT)

Cape Town, South Africa

www.ceber.uct.ac.za

Title:	Investigation of the trade-offs between methane productivity and yield in wastewater anaerobic digestion
Abstract:	Anaerobic digestion (AD) is a multistage bioprocess typically used in industrial wastewater treatment for the removal of organic carbon (measured as COD), thus treating the wastewater. This process oxidises and reduces organic carbon to form CO and CH ₄ respectively. Since COD is only removed through the formation of CH ₄ , processes typically focus on using high retention times to allow a high removal of COD – corresponding to a high methane yield. This work aims to investigate the trade-offs between operating AD at both high and low retention times to explore the potential of AD as an intermediate bioprocess in a biorefinery concept. An upflow anaerobic sludge blanket reactor (UASB) will be used to generate data at decreasing retention times, and a feedstock containing easily biodegradable COD (sucrose) will be used. As the carbon load is increased through decreasing the retention time, process intermediates, namely volatile fatty acids (VFA) are expected to accumulate. This is due to the rate at which acidogens form VFA being higher than that at which methanogens consume VFA when the abundance of readily-fermentable sugars is not limiting. This project thus aims to characterise the potential of simultaneous CH ₄ and VFA production through AD in a single reactor.
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Partner institutions:	Water Research Commission (WRC)
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Degree:	MSc
Funded by:	CeBER, Water Research Commission (WRC)
Start date:	03/2015
End date:	06/2017
Feedstock:	Synthetic sucrose-based low-nutrient medium
Value chain products:	Methane, Volatile fatty acids → can be used in various bioprocesses
Geographic source of the feedstock:	Various, across South Africa