conferenceseries.com
International Conference on
Chemical Engineering
September 12-14, 2016 Phoenix, USA

Application of Acti-Zyme in wastewater treatment for recovering biogas

Daniel Ikhu-Omoregbe[1], **M M Manyuchi**[1,2], and **O O Oyekola**[1]
[1]Cape Peninsula University of Technology, South Africa
[2]Harare Institute of Technology, Zimbabwe

Anaerobic treatment of wastewater is becoming increasingly popular since it provides process stability and control for wastewater treatment plants. In anaerobic treatment of wastewater, there is no additional nutrient requirement and valuable by-products such as biogas are produced. Therefore, anaerobic treatment of wastewater using biocatalysts such as Acti-Zyme is an attractive treatment option. Acti-Zyme is a bacterial enzyme that biodegrades organic waste anaerobically. During the digestion process, Acti-Zyme multiplies and reproduces due to the availability of nutrients in the wastewater. Acti-Zyme can reproduce as much as 2 billion bacteria colonies per gram added to water in 48 hours. Anaerobic Acti-Zyme action on wastewater results in enhanced water treatment due to reduced BOD, nitrates, phosphates and TSS by more than 40% according to studies that were conducted on Mid-Mupfure dam water, on piggery wastewater in Zimbabwe, on wool scouring wastewater and sewage. Acti-Zyme neutralizes the wastewater pH and increase the wastewater effluent DO by more than 100%. Acti-Zyme can also be used to treat blocked sewer pipes. Acti-Zyme also helps in eliminating odour, which is a challenge in sewage treatment and can also be used for treating municipal, agricultural, commercial and food industries wastewater. Acti-Zyme loading in wastewater ranges between 3-50 g/m^3 at stirring rates of 40-60 rpm have been employed during wastewater treatment. Biogas was generated from wastewater using Acti-Zyme as bio-catalyst, from wool scouring wastewater, in hog wastes and from sewage. The amount of bio-methane generated was also higher as compared to previous studies with Acti-Zyme whereby they obtained a biogas with a composition of 60% CH4 for digesting hog waste using Acti-Zyme with 0.00625% of Acti-Zyme for 50 days at 35°C for the hog waste loading of 0.75-0.99 kg/kg VSS. Earlier studies have also reported a biogas composition with 68% CH4 after digesting wool scouring wastewater at 35°C using 1% (v/w) of Acti-Zyme for 207 days for the wastewater loading of 0.5-1.5 L/day. A high bio-methane quality in this attributed to higher Acti-Zyme loading which assisted in catalyzed digestion of the sewage sludge. Acti-Zyme can be used as a bio-catalyst in wastewater treatment for value added resource recovery mainly biogas. The properties of Acti-Zyme can be exploited to achieve high quality biogas.

Biography

Daniel Ikhu-Omoregbe holds a first class honours degree in Chemical Engineering from the University of Benin, Nigeria in 1979; an MSc in Biochemical Engineering (1982) and a PhD in Chemical Engineering (1985) both from the University of Birmingham, UK. He was a Lecturer in University of Benin, Benin City, Nigeria (1985-1997); Senior Lecturer, National University of Science and Technology, Bulawayo, Zimbabwe (1997-2002); Associate Professor, University of KwaZulu-Natal, Durban, South Africa (2003-2008). He is currently Professor and Head of Department of Chemical Engineering, Cape Peninsula University of Technology. He is a corporate member of the Institution of Chemical Engineers, UK and a Chartered Chemical Engineer. His research interests include Renewable Energy, Food Processing, Environmental Engineering, and Waste to Energy. He has authored more than 60 academic papers.

IkhuOmoregbeD@cput.ac.za

Notes: