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FACULTY OF ENGINEERING

DEPARTMENT OF MINING AND WATER RESOURCES ENGINEERING

WATER RESOURCES ENGINEERING PROGRAMME

FINAL YEAR PROJECT

THE EFFECT OF ATTACHED GROWTH MEDIA ON BIOGAS PRODUCTION

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**A final year project submitted to the Department of Mining and Water Resources engineering
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Water Resources Engineering.**

ABSTRACT

Household energy is increasingly becoming a scarce resource in developing countries. In these countries, cooking accounts for about 90% of all household energy consumption. Motivated by the need to meet the ever-increasing energy demand and sustainability consciousness, many Governments have promoted renewable energy technologies such as biogas. However, further development of biogas technology in Uganda is constrained by insufficient gas production due to the failure to drain the effluent in time from, incomplete breakdown of substrates in the biodigester, Washout of bacterial during release of effluent, accumulation of the substrate in the biodigester. This paper presents the findings of a research that was carried out to determine the effect of attached growth media on biogas yield. The substrates for the experiment in an anaerobic laboratory digester are cow dung and pig dung in a ratio of 1:1, the attached growth medias are macadamia walnut shells and eucalyptus sawdust. The experimental set-ups were sub-divided into three groups of digesters. Each group was made up of five digesters seeded with attached growth media of the wood, from digester A-E (Macadamia walnut shells) and F-J (Eucalyptus sawdust) in the following percentages: 33%, 27%, 20%, and 11%. And digesters K-O (Mixture of walnut shells and eucalyptus sawdust each digester seeded with 100g of attached growth medias) in the ratios of 0:1, 1:3, 1:1, 3:1, 1:0 respectively.

The attached growth media materials in different percentages were added and mixed thoroughly and the methane in biogas produced was recorded at a regular interval of 3 days for a hydraulic retention time of 30 days. The volume of methane in biogas produced ranged from 22.0ml to 345.9ml. In all the experiments, the methane in biogas yield was decreasing with a decrease in percentage of attached growth media materials seeded in the bio digester. Digester E which was seeded with the highest mass(100g) of macadamia walnut shells has the largest methane yield of 56.4 ml/ day while digester A and F which were not seeded with any attached growth media had the least yield of 25.8ml/day and 25.8ml/day methane gas respectively

Keywords: Biogas, Biodigester, Attached growth media, methane, ratio.

DECLARATION

I KADOMA MARGARET, BU/UG/2016/1715 hereby declare that, this report is the work of my hands and this research has never been presented by any person or institution for an academic award.

Signature:

Date:

APPROVAL

This work has been compiled with the guidance and consultation from my supervisor

Supervisor

Mr. KAVUMA CHRIS

Signature.....

Date.....

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LIST OF ACRONOMS

GHF	Green House Gases (GHG)
CDM	Clean Development Mechanism (CDM)
SDGs	Sustainable Development Goals
NGOs	Non-Governmental organizations
AD	Anaerobic Digestion
ppm	parts per million
MSW	Municipal Solid Waste
TS	Total Solids
VS	Volatile Solids
CSTRs	Continuously Stirred Tank Reactors
OLR	Organic Loading Rate
COD	chemical oxygen demand
w/v	weight of slurry per volume of water

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