



**BUSITEMA
UNIVERSITY**
Pursuing Excellence

FACULTY OF ENGINEERING

**DEPARTMENT OF PROCESS AND CHEMICAL ENGINEERING
BACHELOR OF SCIENCE IN AGRO-PROCESSING ENGINEERING**

**ANALYSIS OF BIOGAS POTENTIAL GENERATED FROM COW DUNG
OF ANIMALS FED ON BANANA PEELINGS AND ELEPHANT GRASS**

BY

KAWEESA WILLIAM

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CONT: 0781455245/0750664673

kaweesawilliam50@gmail.com



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DEDICATION

I dedicate this research final project report to my mentor Mr. Maka Daniel, my mother Nalongo Lovisa and Br. Moses Isingoma for the love, care, financial and social support, and encouragement.

DECLARATION

I, Kaweesa William, declare that the work presented in this report is my own and has never been presented to any University or higher institute of learning for any academic award.

Signature..... *[Handwritten Signature]*

Date..... *25th May, 2017*



APPROVAL

This project report has been submitted to the Department of Process and Chemical Engineering for examination with approval from the following supervisor:

Mr. Kayuma Chrish

Signature:.....

Date:.....

ABSTRACT

In this research to determine the potential of biogas generation from cow dung of different kind, involved obtaining the cow dung by feeding the animal on elephant grass and banana peeling in the proportions: 100% elephant grass, 75% elephant to 25% banana peelings, 50% elephant grass to 50% banana peeling and finally 100% banana peelings. In this done weekly, one ration of fodder was fed weekly to obtain the cow dung. This cow dung was characterized by testing for the C/N, the pH and tested for biogas yield.

5 litre capacity digesters were used to investigate the potential of biogas. It was a batch reactor experiment and the daily gas yield from the plant was monitored for a period 24 days. The slurry temperature was monitored daily and it ranged from 25 – 28 °C. Besides, the pH of the slurry was monitored at setting up the experiment and at the end since the reactor was of batch type. The pH range for both the initial and final testing was between 6.0 and 7.1 which optimum for methanogen activities.

The results obtained from biogas production showed that substrate D yielded the highest biogas volume of 3616 ml followed by substrate C with 3395ml, then B with 2876ml and substrate A had the lowest yield of 2655ml for the period of 24 days. Since substrate D came from feeding the cow on 100% banana peelings and peeling are considered as animal supplementary food. It was suggested to be the best ratio to be the animal. Elephant grass and banana peeling in the ratio 1:1 was taken in this research as the best ration. And biogas users advised to mix elephant grass with banana peelings in that above recommended ratio for a better biogas yield.

Key words: Biogas composition, cow dung, banana peelings, elephant grass, and methane.

CHAPTER ONE: INTRODUCTION

1.1 Introduction

This chapter comprises of the background of the study which shows how the different forms of energy being used in Uganda that leads to the problem statement and justification. It also contains the main and specific objectives and the scope of the project.

1.2 Background of study

Biogas production and usage at different homesteads is of major importance for the sustainable use of farm biomass as renewable energy source. Economic biogas production depends on high biogas yields. Since biogas production in Uganda is still low, the production is mainly for domestic use. Consequently, the biomass based power generation is increasingly becoming competitive and considerably clean to use and cheaper (Kamese, 2004) than thermal power based on fossil fuels (Kwesiga, 2015) and hydro power. The need for modern biomass energy has become more tenable due to increased electricity demand, coupled with unfavorable weather changes that have resulted into decreased water levels in Lake Victoria. Co-generation is convenient in situations where there are excess agricultural residues such as bagasse, coffee and rice husks. Energy generation from biomass feed stock can substitute the conventional energy resources and utilizing the biomass based fuels would reduce emission of greenhouse gases (Zhengyun *et al.*, 2013). Biogas which is a potential greenhouse gas can be emitted from animal wastes through filling different bio-digesters with these wastes.

Ugandans have been eating bananas for many years and about more than 10 million people eat bananas as their main food source (Ndiho, 2014). Besides, banana (matooke) is the staple food of Baganda (Amony, 2014). According to Nagarajaiah (2011) about 40% of the total weight of fresh banana is generated as a wastes. At present, banana peelings are being used as fodder and supplemented with potato peeling, cassava peeling, and other kitchen refuse.

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