



**BUSITEMA
UNIVERSITY**
Pursuing Excellence

**FACULTY OF ENGINEERING
DEPARTMENT OF MINING AND WATER RESOURCES ENGINEERING
FINAL YEAR PROJECT REPORT**

**ANALYSIS OF WATER HYACINTH POTENTIAL IN PRODUCTION OF BIOGAS
CASE STUDY: LAKE VICTORIA SHORES, PORT BELL**

BY

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ABSTRACT

Bio-gas is fuel obtained from decomposition of organic waste under controlled conditions, a highly technological development complex process.

It is also called gasification process. The major gas produced is methane which is highly combustible.

The main objective of this project was to do an analysis on the potential of water hyacinth to produce biogas in a bid to eliminate it from decomposing in the open at the shores and causing other related environmental concerns such as water, land and air pollution when removed from the lake

The substrate material for bio-gas production considered was water hyacinth as a means of its eradication from the infestation of Lake Victoria. The project site was located at port bell along the shores of Lake Victoria. This report is comprised of five chapters each entailing different information and study about the whole project as described below:

Chapter one: looks at the proposal for the project which details the main objective of the project, the specific objectives and the existing problem which led to the initiation of the whole project.

Chapter two: shows detailed content of the existing Literature on water hyacinth, its physiology and the entire process of bio-gas formation and the chemical composition of bio-gas.

Chapter three: This chapter describes the methods which were used to achieve the set objectives. These involved field investigations, laboratory testing using the different standard and scientific methods and equipment.

Chapter Four: this entails all the results obtained throughout the entire project for each stated objectives in chapter one with detailed discussions about them.

Chapter five: this chapter covers the conclusions, recommendations and challenges derived from the above results in the previous chapters.

DECLARATION

I Tibasiima Modesta declare that the work in this project report is out of my own efforts with the help of my supervisor. It has never been presented to any institution of higher learning.

Signature.....*Tibasiima Modesta*.....

Date.....*26th/05/2017*.....



APPROVAL

This is to certify that the project work in this writing has been done under my supervision and this report is ready for submission to the Board of examiners and senate of Busitema University with my approval.

SUPERVISOR: Mr.Kavuma Chris

SIGNATURE:

Date.....

ACKNOWLEDGEMENT

My sincere thanks goes to the Almighty God for the gift of life and for uplifting me always.

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LIST OF ACRONYMS

TS	Total solids
Vs	Volatile solids
LVBCS	Lake Victoria basin cover statistics
LVEMP	Lake Victoria Environmental Management Plan
NAS-NRC	National Agricultural Services – National Research Council
HRT	Hydraulic Retention Time
C/N	Carbon- Nitrogen ratio
LBCS	Lake Victoria Basin Cover Statistics
APHA	American Public and Health Association

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CHAPTER ONE: INTRODUCTION

1.1 Background.

Although Water hyacinth is known to have been kept in Nairobi and Mombasa as an ornamental plant since early 1957 (Mailu, 2001), it first appeared in the natural water systems of East Africa in 1956 through River Sigi and Pangani in Tanzania (Mailu, 2001).

In 1980s reports point out that the weed came into existence in Lake Kyoga (Uganda) and Lake Naivasha (Kenya) then later in Lake Victoria (Johnson, 1996).

It entered Lake Victoria in Uganda via the Kagera river in 1989 (Albright, 2004) and (Muli, 1996). The maximum water hyacinth cover in Lake Victoria was between 1994 and 1995 (LVBCS, 2011). Since late 1980s and early 1990s, it filled up (water hyacinth) 80% of the shoreline in Uganda (LVBCS, 2011). It then increased in some areas of Lake Victoria between 2006 and 2007 mostly lake shores. The ability for this plant to tolerate a large range of temperatures, nutrients and pH levels, gives it a superior advantage over other native freshwater plants that generally have slower growth rates (Malik, 2007) and (Pianka, 2011).

At Port Bell, five miles south of Uganda's capital, Kampala, men struggle with picks and shovels to tear water hyacinths out of the water in order for the passenger and cargo boats to dock refer to figure 1.3(a and b). The port bell area is surrounded by many industries that releases waste organic materials in the lake rich in nutrients like nitrogen and phosphorous which encourage the growth of water hyacinth (Luiló, 2008).

The management program used for water hyacinth control at port bell, Uganda is the physical method whereby they use machines called Barges to remove the weed from the deep waters and dump it in an open to rot. Such dumping has effects to the environment and the people around for example during heavy rains the biomass erodes into the water body through runoff as shown in figure 1.1(a and b) thus depleting oxygen supplies in the water, Fish and other aquatic species are killed when decomposing litter is in the lake, , the decomposing biomass, refer to figure 1.2(a and b) becomes a nuisance to the public when flies congest on it as it rots thus resulting into diseases which are as a result of poor sanitation like diarrhea and cholera.

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