



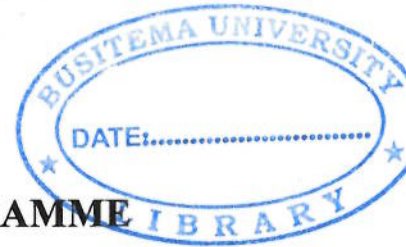
**BUSITEMA  
UNIVERSITY**  
*Pursuing Excellence*

**FACULTY OF ENGINEERING**

**DEPARTMENT OF CHEMICAL AND PROCESS  
ENGINEERING**

**AGROPROCESSING ENGINEERING PROGRAMME**

**FINAL YEAR PROJECT REPORT**



**Design and Construction of a Pedalled Pineapple Peeler, Slicer and  
Corer**

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## ABSTRACT

This project report is written to the department of chemical and process engineering as a partial requirement for an award of a bachelors of science in agro-processing engineering and the project was estimated at a cost of about USD 268. The money was used to obtain the main objective of the project which was to design and construct a low cost pedalled pineapple fruit peeler, slicer and corer. This main objective was systematically achieved through the following specific objectives, that is; to design the pineapple peeler, slicer and corer, to fabricate the machine parts of the machine, to test the performance of the machine and to cost evaluate the pineapple peeler, slicer and corer.

The project approximately took one year to have it completed and then implemented and involved consultations from the experts as regards the proposed machinery. The machine was successfully designed, constructed and tested and had an efficiency of 66.67%.

The need for this project was to provide easy to use machinery for the upcoming entrepreneurs of Uganda since many of the pineapples are actually sold to the local market at low prices and the rest facing are risk of perishing due to the poor preservation facilities and hence heavy losses. The interested parties include the entrepreneurs and the farmers, all these are anxious to achieve the desired outputs and impacts that the machine provided.

The entrepreneurs will actually have their work simplified especially the unit operations involved in pineapple processing while the farmers will have their pineapples bought in time since a regular demand for the material is expected to rise because of the machinery. The project also takes into consideration the consumers who will enjoy a quality product as either sliced pineapple or as juice.

The project will benefit the communities around since employment opportunities shall be created and an increased flow of income within homesteads. As a result, the impact on the community is expected to be significant and the agricultural sector is expected to be boosted up.

This project builds on previous work done by Bamuleseyo Deborah, Busitema University who designed and constructed a pineapple peeler cum-ring-slicer for domestic use and considerations have been taken to increase the output of her machine.

## DECLARATION

I **ORONO EMMANUEL** hereby declare that, this Project Report to the best of my knowledge is an absolute and genuine piece of my own work and has never been submitted to any academic institution anywhere by any single or group of person (s) for any academic award.

Signature: .....  .....

Date: ..... 22/05/2015 .....



## ACKNOWLEDGEMENT

I thank the almighty God for having enabled me to complete this project to this point by providing me with wisdom, good health, his abundant grace and good health.

In a special way I thank my dear parents for enabling me attain this project completed; inform of financial support and care.

I also thank all my supervisors, Mr. Sserumaga Paul (main supervisor), and Mr. Kavuma Chris (Co- supervisor) for their sequential guidance in composing this project report.

I also acknowledge all my beloved friends who continuous encouraged me to persist even when tough times came my way.

**May the ALMIGHTY God the father bless all of you abundantly!**

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## LIST OF SYMBOLS

1.  $\sigma$  – Stress
2.  $I$  – Mass Moment of Inertia
3.  $\omega$  – Angular Velocity of the Body.
4.  $T$  – Torque
5.  $\alpha$  – Angular Acceleration
6.  $\Phi$  – Angular Displacement
7.  $P$  – Power
8.  $N$  – Number of Revolutions

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## LIST OF ACRONYMS

Acronym	Representation
DFID	Department For International Development
HACCP	Hazard Analysis Critical Control Point
EUREPGAP	Euro-Retailer Produce working Group-Good Agricultural Practice
BSMD	Business Services for Market Development
EU	European Union
FAO	Food Agricultural Organization

## CHAPTER ONE

### 1.0 INTRODUCTION

#### 1.1 BACKGROUND OF THE STUDY

Pineapple (*Ananas comosus*) is climacteric fruit grown widely in Kayunga and Luwero districts. It is rich in vitamin C, magnesium calcium, potassium, iron and the protein digesting enzyme, bromelin.

In the national and local markets an average of 40,000 pineapples are bought each day by groups of traders and sold to different buyers. For the domestic market the quality criteria include: ripeness; size; and no bruises (DFID, 2005).

Pineapple production in large quantities is quite a huge challenge in the agro-processing industry. However it can be done in mass production played by large complex machinery which is quite costly to the local Agro-processor. This explains why the enterprise is being done by the big companies with sophisticated machines to perform unit operations like peeling, slicing and coring. In this project a machine capable of performing these unit operations with a low cost in Uganda shall be designed. The focus is on the design of a low cost and a manually operated machine to perform slicing and coring that can capture the market in Uganda.

For those reasons, the suitable process are slicing and coring. Coring involves the process of cutting out the centre of the pineapple whilst slicing is a process of cutting the pineapples into slices. These processes can be combined in one machine so that the final product shall be sliced and cored.

Basically pineapples in Uganda are not grown for commercial purposes rather farmers prefer selling their pineapples to the local markets. This explains why the pineapples are planted on a small scale and in unplanned schedule. The pineapple plant in Uganda depends on the farmer rather following the pull of technology. This dangerous act leads to unbalanced supply in Uganda because of unsynchronized planting.

Pineapple production in large quantities is quite a huge challenge in the agro-processing industry. However it can be done in mass production played by large complex machinery which is quite costly to the local processor. This explains why the enterprise is being done by the big companies with sophisticated machines to perform unit operations like peeling, slicing and

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