



**BUSITEMA
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Pursuing Excellence



FACULTY OF ENGINEERING

DEPARTMENT OF CHEMICAL AND PROCESS ENGINEERING

BACHELOR OF SCIENCE IN AGRO-PROCESSING ENGINEERING

FINAL YEAR PROJECT REPORT

ON

DESIGN AND CONSTRUCTION OF A MOTORIZED PINEAPPLE PEELER

BY

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A fourth year project proposal submitted to the department of Chemical and process engineering to the award of Bachelor's Degree in Agro-processing Engineering.

ABSTRACT

Pineapple (*Ananas cosmosus*) is as scientifically known and belongs to the Bromeliaceous family one of the most important tropical fruits. This fruit can be consumed fresh or processed in various forms

Pineapples in Uganda are generally grown as a sole crop or an intercrop with bananas. Pineapple is mainly grown in Kayunga, Tororo, Luwero, Kamuli, Mpigi, Sembabule, Kyenjojo and Iganga

The peeling is done in order to allow edibility and ensure palatability.

The pineapple peels are located in the epidermis while the soluble extract are mainly located in the cytoplasm of fruit flesh cells.

For improved palatability and further processing, pineapple must be peeled and cored. The hand operated peelers and corers are time consuming and hence have limited output. Furthermore, there are high levels of contaminations in the hand operated peelers. Also due to the shape of pineapple fruit, many of the available hand operated peeling machines tend to leave fruit much on the waste.

Because of this there is need to design and fabricate a machine.

The machine consists of a motor, shaft, pulleys, belts, a knife, a shape controller, slide, plate.

The pineapple is fixed and sits on the plate, the shaft will rotate with the pineapple.

With the help of the pulleys and a belt, the horizontal rotation of the motor is transmitted to vertical rotation using a set of pulleys with speed conversion ratio of 1:10. The knife is moved up by a threaded power shaft connected to the knife by a bolt. The knife can then be moved down easily by opening the bolt. The knife is directed along a curved path by the bolt as it peels the pineapple. The knife can be adjusted according to the shape of the pineapple. The deepness of the cut can also be adjusted by moving the slide.

DECLARATION

I ARIBATRE KEVIN solemnly affirm that this project report is the work of my hands and has never been submitted to any university, college or any other Institution for any academic award.

ARIBATRE KEVIN

Date: 23/05/2015

Signature: 



DEDICATION

I dedicate this project to my beloved Parents, my siblings and friends for their kindness and support throughout my undergraduate study.

APPROVAL

Main Supervisor: Mrs. KABASA MARY SALLY

Date:

Signature:

Co-Supervisor: Mr. KILAMA GEORGE.

Date:

Signature:

ACKNOWLEDGEMENT

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CHAPTER ONE

1.0 INTRODUCTION

This chapter describes the background information of the project, the problem statement, and justification of the study, purpose, objectives and the scope of the study. The problem statement describes the problem of the study and identifies potential causes and a solution. The justification describes the importance of the project and the specific objectives will achieve the main objectives.

1.1 BACK GROUND OF THE STUDY

Pineapple (*Ananas cosmosus*) is as scientifically known belongs to the Bromeliaceous family one of the most important tropical fruits. This fruit can be consumed fresh or processed in various forms (Chi *et al.*, 2012A). The pineapple peels are located in the epidermis while the soluble extract in juice are mainly located in the cytoplasm of fruit flesh cells. The peeling is a critical technological parameter in juice processing. The peelings step in order to maintain the quality of juice extracted, this is followed by the crushing step to break down the fruit tissue and cell wall. Then juice extraction can be performed by pressing (Chi *et al.*, 2012B)

The government of Republic of Uganda through NAADS under MAAIF initially spearheaded the production of fruits and vegetables. Therefore, Uganda has merged to be a fruit surplus area and pineapples one of the main fruits grown in most parts of the country with the main districts growing pineapples including; Kayunga, Luwero, Sembabule, Bugerere, Mubende, Masindi Kyenjojo, and Bushenyi. (Wandia, 2011)

Pineapple peeling is a process by which the skin is removed from their original component or raw state (Ikechukwu *et al.*, 2012). Companies such as Britannia Ltd, Sunshine Dairies, cheers and other small scale pineapple juice extractor have majored in pineapple juice extraction.

Pineapple peeling can be achieved by different equipment for example, home-based and industrial-based equipment. Home-based equipment includes the use of kitchen knives and manually operated small scale peelers (Salim *et al.*, 2014A). The electric and automated peelers

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