



**BUSITEMA
UNIVERSITY**
Pursuing Excellence

**FACULTY OF ENGINEERING
DEPARTMENT OF PROCESS AND CHEMICAL ENGINEERING**

**DESIGN AND CONSTRUCTION OF A MANUALLY OPERATED PINEAPPLE JUICE
EXTRACTOR**

BY

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A final year project proposal submitted to the Department of Agro- Processing Engineering as a partial fulfillment of the requirements for the award of a Bachelor of Science degree in Agro-Processing Engineering.

ABSTRACT

This report comprises of five chapters; Chapter one presents background to worldwide pineapple growth and juice production and consumption with specific emphasis on Uganda's progress in pineapple production and value addition activities in processing industry. The problem considered in this study is presented in the problem statement and the justification, objectives and scope of the study are also presented.

Chapter two discusses literature review in relation to the objectives of this study, the methods and procedures that will be followed in order to come up with the design of the details of the various aspects involved in pineapple juice production with emphasis on the aspect of pineapple juice extraction; different extraction methods and the operation of the existing extractors

Chapter three shows the methods through which the manually operated pineapple juice extractor was obtained. The proposed fabrication and performance evaluation methods of the prototype were also included. The project schedule and estimated budget for the design is also included.

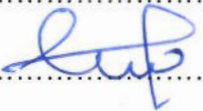
Chapter four focuses on the results and discussion of the design and construction of a manually operated pineapple juice extractor for example the performance evaluation of the machine using parameters like extraction efficiency. This also has got the economic evaluation

Chapter five outlines some of the challenges faced throughout this study whilst clearly showing the several recommendations that should be adopted by the several stakeholders to ensure sustainability and higher efficiency of the manually operated pineapple juice extractor. It as well states the designer's conclusion of the entire study

DECLARATION

I **MUIJUSTYA FAITH** declare to the best of my knowledge that the piece of this report is a result of my research and effort and it has never been presented or submitted to any institution or university for an academic award.

DATE 18th/05/2015

SIGNATURE 



APPROVAL

This project report has been submitted to the department of Process and Chemical Engineering, of Busitema University or any institution of higher learning for similar awards.

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Mr. Edward Lubega Ssemukasa

Sign

Date.....

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Date.....

DEDICATION

I dedicate this report to my beloved parents Mr. Mugisha George and Ms. Namande Rose Kaduyu whose dream and prayer is to see me reach and succeed at the University and afterwards move to greater heights in life

I also dedicate it to my sister and brothers who always spent all they had for me to study and have a better life in future.

Finally, I dedicate it to all my friends who have given moral support, always stood with me throughout the entire course

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LIST OF ACRONYMS

MAAIF – Ministry Of Agriculture, Animal Industry and Fisheries.

Ha – hectares

DFID - Department for International Development

FAO – Food and Agricultural Organization

UNIDO - United Nations Industrial Development Organization.

UEPB Uganda Export Promotions Board

EPU Energy Program Uganda.

CHAPTER ONE

1.0 Introduction

1.1 Background

The pineapple (*Ananas comosus*) belongs to the family *Bromeliaceae* and is one of the most important commercial fruits of the world. Pineapples are thought to have originated in Brazil and Paraguay in South America (Anon, 2013). Today it is found to grow throughout the tropical and sub-tropical regions of the world. Pineapples may have originated in Paraguay but they were perfected in Uganda- the Pearl of Africa (Jon, 2012). Pineapples are by far the most developed and widely grown commodity in the fruit crop range and value chain in Uganda. Current production is estimated at 5000acres (2000ha) on 2500 small holdings in Luweero and Kayunga where pineapples are grown as a sole crop or intercropped with bananas (Anon,2013). Other districts in Uganda include Masaka, Iganga, Kamuli, Tororo, Mpigi, Sembabule and Kyenjojo

Pineapples are recognized as among the most popular fruits because of their flavors around the world. Pineapples in Uganda are generally grown as a sole crop or an intercrop with bananas. Pineapple is mainly grown in Luweero, Kayunga, Tororo, Kamuli, and Iganga. Uganda's pineapples are sweeter and less acidic than those produced in other countries in the East African region. The climate and agronomic practices favor large sized fruits, which are unsuitable for export(then suitable for juice making), but fruit size can be influenced by plant spacing (Uganda Export Promotions Board, 2002).

It's is a tradable fruit and generates reasonable income. Uganda produces only 0.35% of total pineapple production for East Africa compared to 80% and over 19% produced in Kenya and Tanzania respectively (FAO, 2004). Forty percent of pineapples produced in Uganda are exported into the regional market of Democratic Republic of Congo, Rwanda and Kenya (FAO, 2004). Fruit processing in Luweero started around 1999. The main fruits are pineapple, mangos, passion fruits, papaya, avocado, jackfruit, and tomatoes. Uganda has a sizeable share of these fruits in east and central Africa (Agona *et al.*, 2002)

A great proportion of pineapple growing farmers dwell in villages. These farmers use indigenous methods to extract juice from pineapples. For example use of local knives to slice the pineapple into sizeable pieces and then put the pieces in a piece of a cloth after which it is squeezed

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