

DEPARTMENT OF AGRO-PROCESSING ENGINEERING FINAL YEAR PROJECT

PROJECT TITLE: DESIGN AND FABRICATION OF A BANANA JUICING MACHINE

 \mathbf{BY}

TURYAMUSIIMA CLEVER

BU/UG/2016/125

SUPERVISED BY MR KIYEMBA ANDREW

FOR THE PARTIAL FULFILLEMENT OF BACHELOR OF SCIENCE IN AGRO-PROCESSING ENGINEERING

0783136581

victoriousclever@gmail.com

ACKNOWLEDGEMENT

With great honor, respect and love, I'm highly indebted to the head of department Agro processing Engineering and all my lecturers for professional mentor-ship and guidance they have rendered unto me

Great thanks go to my supervisors Mr. Kiyemba Andrew for the tireless efforts rendered to me during the preparation of this piece of work, may the good Lord abundantly bless you.

DECLARATION

I Turyamusiima Clever, declare that the work in this report is my own except where indicated with reference within the text and that it has never been submitted before to any university or institution of higher learning for the award of Degree in Agro-Processing Engineering, APE. I therefore take full responsibility over it.

Student's signature:	• • • •
Date:	

			_	_			_
٨	P	D	D	7	17	Α.	T

This project report has been submitted for examination with approval from the following
supervisor:
Mr. Kiyemba Andrew
Signature
Date

ABSTRACT

The study goes through the step by step procedures which led to the achievement of the intended main and specific objectives. The designed banana juicing machine of capacity 15kg comprised of a kneading, compressing and filtration section, it is driven by a three phase 3 horse power motor by belt mechanism. This machine was designed, fabricated and tested to examine its performance. The banana juicer is essential in production clear banana juice. The results of this study were discussed and it was found that the machine works moderately effective compared to existing traditional method of using feet and hands which is laborious with its associated problems.

Contents

ACKNOWLEDGEMENTi	i
DECLARATIONii	i
APPROVALi	V
ABSTRACT	V
1.0 CHAPTER ONE	1
1.1 BACKGROUND	1
1.2 PROBLEM STATEMENT	2
1.3 PURPOSE OF THE STUDY	2
1.4 OBJECTIVES	2
1.4.1Main objective	2
1.4.2 Specific objectives.	2
1.5 Scope of the Study	2
1.6 Justification of the Study	3
CHAPTER TWO	4
2.1 BANANA	4
2.1.1 Classification of banana cultivars	4
2.1.2 Ripening of banana	6
2.1.3 Biochemical changes that occur during ripening	б
2.1.4 Banana Ripening Techniques	8
2.1.5 Relationship between stage of ripening and juice extraction	1
2.1.6 Banana stage of ripening in comparison to juice yield	2
2.1.7 Extraction of banana juice by kneading	2
2.1.8 Nutritional composition and health benefits of banana	3
2.1.8 Banana juice extraction process	5
2.1.9 Methods of banana juice Extraction	5
2.1.10 Importance of banana juice	7
CHAPTER THREE	0
3.1 MATERIAL SELECTION	0
3.2 PARTS OF THE JUICER AND THE MACHINE WORKING PRINCIPLE	0
3.2.1The mixing chamber	0
3.2.2The filtration chamber	0

3.2.3The Feed Hopper	20
3.2.4The power source unit	20
3.2.5 Drawings	21
3.3 OBJECTIVE 1; DESIGN AND SIZING OF MACHINE COMPONENTS	21
3.3.1 The hopper/inlet.	21
3.3.2 The main frame	22
3.3.3 Cylindrical Housings.	22
3.3.4 Design of the driving mechanism	22
3.3.5 The Pulley Driver Pulley:	22
3.3.6 The belt	23
3.3.7. Design of the mixing chamber	23
3.3.8 Number of shaft Paddle Sets on the mixing shaft	23
3.3.9 Design of the shaft	24
3.4 SPECIFIC OBJECTIVE TWO	24
3.4.1 Fabrication of the machine components	24
3.4.2 Operation of the machine	26
3.4.3 Optimization of juice yield	26
3.4.4 Performance evaluation of the machine	26
3.5 SPECIFIC OBJECTIVE THREE	27
3.5.1 Economic evaluation of the prototype	27
3.5.2Profitability index.	27
CHAPTER FOUR	29
4.1 RESULTS AND DISCUSSION	29
4.1.1 Design of the machine components.	29
Calculating the actual mass flow rate,	35
CONCLUSIONS AND RECOMMENDATIONS	37
Conclusions	37
References	38
Appendices	40