



**BUSITEMA
UNIVERSITY**
Pursuing Excellence

FACULTY OF ENGINEERING

DEPARTMENT OF AGRICULTURAL MECHANISATION AND IRRIGATION
ENGINEERING

FINAL YEAR PROJECT

DESIGN AND CONSTRUCTION OF A SEMI-AUTO GROUNDNUT ROASTING
MACHINE.

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ABSTRACT

Groundnut roasting is one of the processing methods of groundnuts which increases its palatability by enhancing the release of aromas and flavors. The process inactivates trypsin inhibitors and eliminates allergenic proteins thereby removing the toxicity that is present in raw groundnuts.

This study was carried out to design and construct a temperature controlled electric groundnut roaster to help groundnut processors to roast more easily and cheaply in a safe way. The groundnut roaster has been designed and developed from locally available materials for roasting of groundnuts and it has a capacity of 2.52kg/batch, the speed of the agitator is 55 rpm. The design of various machine parts was carried out by analyzing forces and effect of heat acting on them which helped in selection of proper materials to withstand the forces and heat to avoid failure. Better insulating methods are recommended to reduce on heat loss to the surrounding and to increase efficiency. Engineering drawings of the various components were drawn before the various components were constructed and then machine parts fabricated. A fully functional prototype resulted after all the above operations. Testing of the prototype was carried out and the figures revealed that the machine was 73.7% efficient. The groundnut roaster has a total cost of 1,150,000 UGX which includes all the taxes, cost of material, machinery and hired labor to construct the machine plus overhead costs. The cost evaluation analysis of the project was based on the payback period method, the project was evaluated to breakeven in 0.08 years and on net present value method with NPV of **1,759,196** UGX over a period of five years.

The optimized roasting time and outer temperature of coil in the developed temperature controlled electric groundnut roaster is 15mins and 80⁰C respectively. The developed groundnut roaster is suitable for roasting groundnuts with an efficiency of 73.7%

DECLARATION

I **WERE MARK** declare to the best of my knowledge that the work presented in this report is my own and has never been presented to any university or higher institution of learning for any academic award.

SIGNATURE

DATE

APPROVAL

This report for the programme of AMI has been submitted to the Department of Agricultural Mechanization and Irrigation Engineering with approval from the following supervisor.

Mr. Menya James.

Signature

Date

DEDICATION

This is dedicated to my beloved mother **WANYENZE ROSEMARY** and to my elder brother **DAVID JABWANA** in appreciation for their selfless care and unflinching support provided to me since childhood, and for the spirit of hard work, courage and determination instilled into me, which attributes I have cherished with firmness and indeed which have made me what I am today. I dedicate it to my close friend **Mr. WANDERA JACKSON** for the guidance he has rendered to me in all aspects of life. May the Almighty God reward you abundantly for such good work.

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Table of Contents

ABSTRACT.....	i
DECLARATION	ii
APPROVAL	iii
DEDICATION.....	iv
ACKNOWLEDGEMENT	v
CHAPTER ONE: INTRODUCTION	1
1.1 Back ground.....	1
1.2 Problem Statement	3
1.3 Justification.....	3
1.4 Purpose of the study.....	3
1.5 Objectives of the study.....	3
1.5.1 Main objective	3
1.5.2 Specific objectives	3
1.6 Scope.....	4
CHAPTER TWO: LITERATURE REVIEW	5
2.1 Groundnuts production in Uganda.....	5
2.2 Groundnuts utilization in Uganda.....	7
2.3 Groundnut anatomy.....	7
2.4 post-harvest handling of groundnuts.....	8
2.5 Types of groundnuts grown in Uganda.....	11
2.6 Roasting of groundnuts and chemistry.....	12
2.7 Other methods of roasting groundnuts.....	12
2.7.1 Roasting manually using frying pans.....	12
2.7.2 Cylindrical Rotating Drums.....	13
2.7.3 Fluid bed roasters.....	14
CHAPTER THREE: MATERIALS AND METHODS.....	16
3.1 Design of different parts of the semi-auto groundnuts roasting machine	18
3.1.1 Design considerations.....	18
3.1.2 Hopper:	18
3.1.3 Roasting chamber;.....	19
3.1.4 The heating coil.....	19
3.1.5 Frame	21

3.1.6 Design of the fan	22
The estimate amount of the required cooling air was determined using the basic heat transfer equation below:	22
3.1.7 Design of temperature control system and the Arduino kit.	22
3.1.7 Motor selection	23
3.1.8 Design of the stirring mechanism	24
3.2 To construct the prototype.	25
3.2.1 Selection of materials.....	25
3.2.2 Fabrication methods.....	25
3.3 Testing the performance of the prototype.	26
3.4 To carry out economic analysis of the machine.....	27
4.1. Design of the machine components.	28
4.1.1. Volume of the roasting chamber V.....	28
4.1.2 Heating coil.....	28
4.1.3 The cooling vessel.....	30
4.1.3 Design of the cooling fan.....	30
4.1.4 Design of agitators	31
4.1.5 Design of the automation kit.....	32
4.1.6 Design of the frame.....	32
4.2 Testing of the performance of the machine	34
4.2.1 Effect of different temperatures on the groundnut seeds	34
4.3 Economic analysis of the machine.....	36
4.3.1 Payback period.....	36
4.3.2 Total Initial Investment.....	36
4.3.3 Overhead Costs	37
4.3.4 Cost of the Machine	38
4.3.5 Net present value (NPV)	38
5. CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS	41
5.1. Conclusion	41
5.2. Recommendations.....	41
REFERENCES.....	42

LIST OF FIGURES

figure 1. 1 showing groundnut production in Uganda	2
figure 2. 1 shows internal structure of groundnut seed	8
figure 2.2 pie chart showing major groundnut varieties in uganda.....	11
Figure 2.3 showing open pan method	13
Figure 2.4 showing cylindrical rotating drum.....	14
Figure 2.5 shows fluid bed roaster	15
Figure 3.1 shows flow chart for the temperature sensor	23