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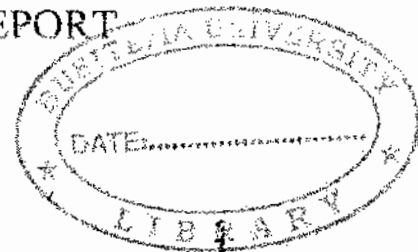
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**FACULTY OF ENGINEERING**  
**DEPARTMENT OF CHEMICAL AND PROCESS**  
**ENGINEERING**

**FINAL YEAR PROJECT REPORT**



**Design and Construction of a Dual Powered Groundnut Oil  
Extractor**

**BY**

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**BU/UG/2014/2023**

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*A final-year project report submitted in the partial fulfilment for the award of Bachelor's Degree in Agro-processing Engineering of Busitema University.*

## DECLARATION

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

MUKE JOHNBAPTIST

Date: 23/04/2018 .....

Signature:  .....



## **ABSTRACT**

Groundnut is a very important oil seed and food crop around the globe based on its nutritional and trade values, it also serves as food for humans or livestock, and in the absence of meat, forms a valuable dietary protein component. Oil extracted from groundnut by traditional means can produce about 20-30% from the groundnut whereas the mechanical methods will yield a higher percentage. A mechanical means of extracting oil was designed, constructed with locally available materials and tested for groundnut oil extraction. The machine consists of the frame, hopper, a chain and sprocket reduction system and the power shaft. It was powered by a 3 hp, 1450rpm 3-phase electric motor. The extractor has an average capacity of 30kg/hr and 13.4kg/hr when run using motor at a speed of 161rpm and flywheel at an average of 60rpm respectively and on testing however the machine produced oily paste instead of oil, this was due to large size (0.5mm) of oil nozzles on the barrel which allowed some paste through along with the oil and low pressure build up (internal pressure 24MPa) in the barrel. The machine comes with a production cost of 1 million UgX. The extractor can be used for small scale groundnut oil extraction in the rural and urban communities.

**Keywords:** Groundnut, Machine, Extractor, oily-paste, Oil.

**APPROVAL**

**Main Supervisor:** Mr. Sserumaga Paul

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**Co-Supervisor:** Mr Kilama George

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Signature: .....

## **DEDICATION**

I dedicate this work to my beloved grand mum; Kitembo Mary, and aunt; Neema Spechioza for their endless unconditional love and above all their support they have provided to me since the beginning of my academic journey.

## **ACKNOWLEDGEMENT**

Extreme thanks go to the almighty God for enabling me reach this far. I would like to give special thanks to my supervisors: Mr. Sserumaga Paul and Mr Kilama George for their wise suggestions, innovative ideas and whole-hearted help. And also, special thanks go to my lecturers: Mrs Kabasa Mary Sally, Dr. Wilson Musinguzi, Menya James, Kiyemba Andrew, Kimera David for their knowledge invested in me, they have made me what I am today. Lastly, I extend thanks to all my fellow students for the love, unity and co-operation we have had during these four years at Busitema University.

May God bless you all.

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# INTRODUCTION

## 1.0 Introduction

This Chapter describes the background information of the project, the problem statement, significance, purpose, objectives, and scope of the study, the problem statement describes the research problem and identifies potential causes and solution. The significance describes the importance of the project. The specific objective will achieve the main objective

## 1.1 Background

Groundnut (*Arachis hypogaea*) also known as peanut is an oil-bearing seed which contains 45 to 53% oil, 25 to 36% protein and 10 to 15% carbohydrates on a dry seed basis and is a rich source of minerals. (Busolo-Bulafu, 2004). Groundnuts are locally known as 'binyebwa' and is the second most important legume after beans in Uganda. Groundnuts are mainly produced in northern and eastern regions of Uganda that is districts of Amuru, Nyoya, Otuke, etc. (UBOS, 2012)

Groundnuts gives a wonderful pleasant, sweet-flavoured peanut oil low in saturated fats, free from cholesterol, contains essential fatty acid ( linoleic acid (omega-6)) making it as one of the healthiest cooking oils. Being a vegetable oil, it is a good source of plant sterols, especially  $\beta$ -sitosterol. Peanut oil has a pleasing and sometimes light nutty flavor. In addition to its great taste, peanut oil is perfect for deep-frying because it does not absorb the flavor of other foods cooked in the oil. Due to this unique property, you can cook several different items in the same batch of peanut oil and each will maintain their own great taste. Peanut oil is also one of the world's traditional deep-frying oils because it can reach such a high temperature(235<sup>0</sup>C).

This will keep the outside of the food crispy and the inside very moist. Peanut oil works well with all types of cooking and has been the oil of choice for frying by numerous restaurants for many years because of its great taste. (TPHI, 2013)

Oil is extracted from groundnut through either traditional means (mostly dependent on human and/ or energy with about 20-30% of the oil extracted) or mechanical means with over 30% of the oil being extracted (Olaomi, 2008). Most vegetable oils are recovered by grinding, cooking, expelling and pressing, or by solvent extraction of the oil seeds.

Extraction of groundnut oil could be done in two major ways that is the traditional and improved methods. The traditional method is usually a manual process and involves preliminary processing and hand pressing. The improved method consists of chemical extraction and mechanical expression. The chemical extraction method requires the use of

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