



**BUSITEMA  
UNIVERSITY**  
*Pursuing Excellence*

**FACULTY OF ENGINEERING  
DEPARTMENT OF GINNING AND TEXTILE ENGINEERING**

**MAKING PAPER FROM GROUNDNUT SHELLS**

**BY**

**ARYEK JENNIFER**

**BU/UG/2013/85**

**Email address: [jennieryek@gmail.com](mailto:jennieryek@gmail.com)**

**Tel: +256 781176358/+256 756794694**



**SUPERVISORS**

**MAIN: Dr NIBIKORA ILDEPHONSE**

**CO: Mrs. MUHAME YVONNE**

**A FINAL YEAR PROJECT REPORT SUBMITTED IN PARTIAL FULFILMENT OF THE  
REQUIREMENTS FOR THR AWARD OF BACHELOR OF SCIENCE IN TEXTILE  
ENGINEERING TO BUSITEMA UNIVERSITY**

**MAY 2017**

## ABSTRACT

The pollution of our environment is as a result of trying to hasten waste by burning, the high rate of deforestation which is the second largest human-caused source of carbon dioxide to the atmosphere, in addition to its other diverse effects like soil erosion and the blockage of the ground surface from aeration by polythene bags because of failure to decompose in to the environment

The purpose of this study is to produce bio-degradable polished paper of different samples from groundnut shells, backcloth and waste paper which can be used in place of non-bio-degradable polythene bags so as to eliminate the pollution of the environment with polythene bag chemicals, to test the selected properties like GSM, bulk density, thickness and moisture absorbency, to compare the properties and determine which is suitable for what kind of end use.

The results showed that G/B had longer fibres compared to G and G/W fibres because of the high moisture content in the blended fibres which facilitates easy fibre extraction. The basis weight for the 100% groundnut shells sample paper is lower than that of G/W and G/B. However, the addition of either waste paper or backcloth increases the basis weight at different rates with G/B giving the highest basis weight compared to waste paper. The bulk decreases with addition of waste paper. However when backcloth is added, the bulk slightly increases. With the addition of waste paper the Cobb value reduces compared to that of groundnut shells alone. However with the blend of backcloth, the rate at which it takes up the water is high.

## **ACKNOWLEDGEMENT**

This research wouldn't have been possible without the Spirit of God; I therefore give all the glory and praise to Him.

I would love to recognize and appreciate individuals who tirelessly rendered their support to me in form of financial assistance, guidance and prayers, especially friends and my family.

I wish to express my profound and sincere gratitude to my supervisors Dr. NIBIKORA ILDEPHONSE and Mrs. MUHAME YVONNE for the insight, encouragement and support during the time of this project. Special thanks go to my friends from Busitema University.

In a similar way am grateful to the companies where I did my research from especially; UIRI, UNBS, not forgetting the outstanding individuals: Mr. Godfrey K Atuheire, Mr. Muwanguzi, Mr. Ogwang Alex, Madam Doreen from UIRI, Mr. Elisha, Mr. Morris, Mr. John Okumu, the materials testing manager UNBS all for their support to me.

## DECLARATION

I ARYEK JENNIFER Registration Number BU/UG/2013/85 hereby declare that this project report is my original work except where explicit citation has been made and it has not been presented to any institution of higher learning for any academic award

Signature.....



## **DEDICATION**

I would love to dedicate this research project to my beloved parents Mr. OTTO FORD and Mrs. OYELLA ALICE OTTO for the outstanding support given and sacrifice they have made in my life.

## **APPROVAL**

I ARYEK JENNIFER, hereby submit my research project proposal for approval to my supervisors.

### **MAIN SUPERVISOR**

NAME: DR. NIBIKORA ILDEPHONSE

SIGNATURE: .....

DATE: .....

### **CO-SUPERVISOR**

NAME: Mrs. MUHAME YVONNE

SIGNATURE: .....

DATE: .....

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## **LIST OF ACRONYMS**

USA – United States of America

UCA – Ugandan Census for Agriculture

GSM – Grammes per Square Meter

FAO – Food Agricultural Organization

UBC-TV – Uganda Broadcasting Television

AKD – Alkyl Ketene Dimer

ASA - Alkenyl Succinic Anhydride

pH – Potential Hydrogen

Kg/ha – kilogram me per hectare

Ha – Hectare

Mt – Million Tones

KCCA – Kampala Capital City Authority

KACITA – Kampala City Traders Association

NEMA – National Environmental Management Authority

G - Groundnut shells

G/W- Groundnut/waste paper

G/B – Groundnut/backcloth

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## **CHAPTER ONE**

### **1.0 INTRODUCTION**

Groundnuts (*Arachis hypogaea*), also known as peanuts or monkey nuts, are the edible seeds of a legume plant that grow to maturity in the ground. Cultivated in nearly 100 countries, over 90% of which are developing countries, the groundnut is a staple food and valuable cash crop for millions of households (CGIAR, 2004-2005). The 'nuts' are high in edible oil content (40-50%) and protein (25%), and also a good source of a variety of essential vitamins and minerals. They can be consumed directly, processed into oil or cake/meal, or further processed into confectionary products or snack food. The quality characters and uses of groundnut vary among the developed and developing countries. In developed countries, groundnut is used for the preparation of peanut butter and confectionery products. In developing countries, it is mainly used for oil extraction and its by-product is utilized for feed and food purposes (Jambunathan 1991). In many countries, groundnut cake and haulms (straw, stems) are used as livestock feed. Groundnut is also a significant source of cash income in developing countries that contributes significantly to food security and alleviates poverty.

### **1.1 BACKGROUND**

Before the invention of continuous paper making on machines, paper was made in individual sheets by stirring a container of pulp and either pouring it into a fabric sieve called a sheet mould or dipping and lifting the sheet mould from the vat. While still on the fabric in the sheet mould the wet paper would be pressed to remove excess water and then the sheet would be lifted off to be hung over a rope or wooden rod to air dry (handmade paper technology). Many fibre crops have showed a great potential in pulping like: Bast fibers, Esparto, Jute, Flax, Indian hemp, Dogbane, Hemp, Hoopvine, Kenaf, Linden Bast, Nettles, Ramie, Papyrus, Abacá, Sisal, Bowstring Hemp, Henequen, Phormium, Yucca, Seed fibers, Coir, Cotton, Kapok, Milkweed, Luffa, rayon and pineapple crowns. All these contain different amounts of cellulose and lignin. (Atuheire., 2007) .

For all fibre crops that can be used for pulping, their cellulose content should be relatively high with a low content of lignin. (Atuheire, 2012). Groundnut shell contains about 65.5-79.3% cellulose, 10.1% hemicellulose, 26.4% lignin, their chemical compositions give it a high potential for making pulp.

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