



**BUSITEMA
UNIVERSITY**
Pursuing Excellence

FACULTY OF ENGINEERING

DEPARTMENT OF POLYMER, TEXTILE & INDUSTRIAL ENGINEERING

FINAL YEAR PROJECT

Production of packaging paper from banana fibers blended with waste paper

By

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This Project report is handed in partial fulfillment of the requirement for the award of a Bachelor's Degree in Textile Engineering at Busitema University

ACKNOWLEDGMENT

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And to my classmates and friends who have been there to listen to my never ending questions and given me ideas.

I lastly thank the Busitema University, at the faculty of engineering, for taking me through my higher education.

DEDICATION

I dedicate this report to God almighty, my strong pillar, source of inspiration, wisdom, knowledge and understanding, also to my guardians and siblings for the great work they did in supporting my education.

I further dedicate this report to my brothers and sisters; Ssembajjwe Geoffrey, Nabuyondo Flavia, Nalwanga Daisy, Lule Nicholas and others

APPROVAL

I certify that this project titled “**production of packaging paper from banana fibers blended with waste paper**” has been executed under supervision by:

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ABSTRACT

The economic and social benefits of the use of plastics and polythene bags for packaging products like food and drinks are less compared to the harm they cause to the environment as observed through environmental degradation and soil fertility deterioration or decline. In fact plastic bags take over 20 years before they can partially degrade in the environment; this has caused a lot of pollution to the water bodies and degradation of the environment hence affecting the well-being of flora and fauna.

Therefore it's wise to adopt the use of biodegradable packaging materials for packaging products especially consumer products before we think of manufacturing engineered microorganisms that can degrade plastics or coming up with natural plastic like packaging materials because I believe the answers for saving the environment are already with us and what we need is to study their optimal utilization by revisiting the already existing answers and make better use of them optimally. According to this project I chose paper as a good source of these packaging materials because paper is naturally biodegradable.

But you find that when we talk about paper as a good alternative for packaging material, majority might resort to cutting down of trees for paper manufacturing which is as well a disadvantage to the environment for example over 40% of cut timber in the world is used for making paper and therefore I suggest use of natural fibers like hemp, sisal, flax, banana fiber e.t.c and according to this project I chose the banana fiber generally as my best option basing on being sufficient as a source of raw materials for paper for example a banana fiber is big in size, unlike trees it takes 2years to grow and it easily multiplies through its off springs which take on to be parent plants when the older banana plant is harvested after bearing of the fruit and you find that it has to be thrown away if not used for mulching or feeds for cattle of which there are a lot of alternatives for such.

Another better source of raw materials for paper would be waste paper which is abundant in the environment and at times it has to be burnt to get rid of it hence polluting the environment yet more trees have to be cut down for manufacturing paper. But paper can only be recycled 6-7times before it loses its tensile strength hence according to this project I preferred use of blends of banana fiber and waste paper to manufacture my packaging paper material.

To come up with a better proto type, tests were made to determine the effects of blend proportions of banana fiber and waste paper on the physical and mechanical properties of the packaging material and these properties were the wetting resistance and bursting strength of the packaging material plus the other required tests in paper like thickness and GSM. The blend proportions I chose were, 100%BF, 30% WP : 70%BF and 50% WP : 50%BF (WP=waste paper and BF=Banana fiber). And the banana fiber used was obtained from the banana stem to save on the use of excess sodium hydroxide for cleaning the banana fiber as would be observed if the banana stock, roots and leaves were included.

From the tests, the 100%BF gave the optimal results with highest wetting resistance and bursting strength which are better requirements for a good quality packaging material unlike paper blends since waste paper is made up of secondary fibers which are weak and less resistant to water. But to consider trade statistics and encouraging proper material utilization I had to consider 30% WP : 70%BF as my optimal blend proportion since I would not require a very strong packaging material but instead I would require at least an adequately strong packaging material to be used for less than a month before it could be blended again with virgin banana fibers in appropriate proportions to make more packaging materials for use.

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