



FACULTY OF ENGINEERING
DEPARTMENT OF POLYMER TEXTILE AND INDUSTRIAL ENGINEERING
FINAL YEAR PROJECT

PRODUCTION OF LEATHER MATERIAL FROM MANGO FRUIT WASTES.

By

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ABSTRACT

This is a project implementation report on the research we have conducted during the second semester of fourth year at Busitema University from 5th September 2022 to 18th November 2022. The main objective for the project is to develop natural leather from mango fruit wastes. The research project aims at equipping engineering students with the basic skills required to become competent and also provide a fascinating insight into engineering works. The Chapters of this report include: Introduction (Background of the study, problem statement, objectives of the study, significance of the study, scope of the study and Justification of the study), Literature Review (composition of mango fruit, production of bacterial cellulose, vegan leather, products from vegan leather, hydrophobicity of bacterial cellulose, structure of bacterial cellulose), Materials and Methods (materials to be used, tools and equipment used, production of bacterial cellulose, Characterization of bacterial cellulose from mango fruit wastes, Determination of the bacterial cellulose yield, Results and Discussion, Recommendation, Appendices (Budget, workplan) and References.

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We greatly thank the almighty God so much for having given us life, strength and determination for fully participate in the final year project implementation and successfully writing the report.

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We also thank the research coordinator Madam Tusiimire Yvonne for her dedication and guidance towards writing this report. Special thanks to Head of Polymer textile and Industrial Engineering Dr Kamalha Edwine for organizing and overseeing to ensure that project implementation is conducted well.

APPROVAL

The following supervisor has confidently approved this report submitted to the department of Polymer Textile and Industrial Engineering.

01. Prof. Rwahwire Samson

Signature

 12/01/2023

DECLARATION

We BWIRE NATHAN AND AIRO ANGELLA VITALIS hereby declare that this final year project report was written by us and it has not been utilized for academic award by any individual in any learning institution.

BWIRE NATHAN

Signature:



AIRO ANGELA VITALIS

Signature:



Date: 25/01/2023

DEDICATION

I Bwire Nathan dedicate this report to My beloved Father Mr. Mangeni Johnstone, my beloved mother Makhoha Annet and my Beloved brother Ojiambo Foustine who endlessly supported and motivated me towards my goal and throughout the project proposal.

I Airo Angella Vitalis dedicate this report to My beloved Father Mr Okipanyi Martin who has tirelessly supported me in my journey of academics.

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LISTS OF ACRONYMS.

BC	Bacterial cellulose
W/V	Weight per volume of the solution.
V/V	Volume per volume of solution
PVC	Poly Vinyl Chloride.

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1.0 CHAPTER ONE: INTRODUCTION

1.1 Introduction

This chapter includes the background, problem statement, significance of the study, the scope of the study, and justification.

1.2 Background of the study

Leather is a “Bio-based” material that is made by use of biogenic raw materials such as hides and skins instead of using fossil gas, coal, or petroleum. It’s as well as “biodegradable” (can be decomposed by microorganisms such as bacteria to reduce environmental pollution). Leather material exhibit very many important properties which make it suitable for its application in different sectors such as protective applications (textile industry for example shoe manufacturing) and technical applications as it’s in transmission belts, gears, and in vessels. These properties include; water vapor permeability, its strength (tensile strength, tear strength, elongation at break) and elasticity (modulus of elasticity), abrasion resistance, and durability. It is unique due to its beneficial properties, natural appearance and touch of a notable material. (Micheal and Dietrich, 2021).

The leather industry in its attempt to constantly change to offer affordable products to attract customers to buy its products, due to the production of a huge amount of wastes, the sector is one of the main factors leading to global pollution. These wastes include; hair wastes, buffing dust, fleshing effluent containing chemicals namely; chlorides, sulfates, hydrocarbons, amines and also heavy metals for example Arsenic and chromium(Ababa, no date). When these toxic chemicals are discharged into the environment, they are hazardous to the living organisms such as animals, plants, and water-borne organisms, their release into the environment causes pollution of the entire ecosystem. (You, Be and In, 2021b). Toxicity in the leather industry has unintended consequences for human health, continuous discharge outside of hard-to-decompose synthetic microfibers pollutes the environment(Saha, 2019). As a result of these problems of environmental pollution due to toxicity, researchers have developed other types of leather such as synthetic leather, fiber based leather and vegan leather.

Synthetic leathers have been formulated from fossil fuels such as polyvinyl chloride (PVC) or polyurethane (PU) to provide an alternative for conventional leather. The production of synthetic leather is also associated with different problems such as use of toxic chemicals and production

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