BUSITEMA UNIVERSITY
Pursuing Excellence

FACULTY OF ENGINEERING

TEXTILE AND GINNING ENGINEERING DEPARTMENT

PRODUCTION OF SILK FIBROIN NANOPARTICLES FROM BOMBYX MORI COCOONS

By

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MAY, 2017.

DECLARATION

I NABASIRYE JOSEPHINE Registration Number BU/UG/2013/91 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

Sign.....

Date: 28th May 2017

APPROVAL

This is to certify that the project proposal under the title "PRODUCTION OF SILK FIBROIN NANOPARTICLES FROM BOMBYX MORI COCOONS" has been done under my supervision and is now ready for examination.

DR. RWAHWIRE SAMSON

Sign.....

Date.....

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May the good Lord bless and reward you all abundantly.

Above all I thank the almighty God for the gift of life, knowledge, wisdom and understanding.

ABSTRACT

Chapter one gives the background, problem statement, objectives, scope and justification of the study

Chapter two shows the literature review which includes silk in Uganda and worldwide, silk structure, silk production process, properties of silk, preparation methods of silk nanoparticles

Chapter three illustrates the methodology indicating the manufacturing steps and characterization of the silk fibroin nanoparticles.

Chapter four shows the results and discussions of my research

Though the research project was successfully, there were some challenges but recommendations towards such challenges are included in chapter five

LIST OF FIGURES

LIST OF ACRONYMS

UIRI - Uganda Industrial Research Institute

NARL - National Agricultural Research Laboratories

UAE - United Arab Emirates

DRP - Democratic Republic

BNP - Bionanoparticles

PVA - Polyvinyl alcohol

SF - Silk Fibroin

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CHAPTER ONE

1 INTRODUCTION

1.1 BACKGROUND

The textile industry is one of the most important industries for consumer goods worldwide generating textiles for clothing, household goods, furnishing and technical purposes. Textiles are formed by weaving, knitting and nonwoven method [*Xiang et al, 2008*]

Natural fibers and textiles have been used for humans since ancient times. Our antecessors firstly used fur and animal skin for dressing and protection from the environment, but very soon they started to use vegetal fibers to make rudimentary fabrics. There are evidences of the use of dyed flax fibers into clothes more than 30,000 years ago [*Balter. M, 2009*]. For centuries, humans have used vegetal fibers (such as flax or cotton) and animal fibers (such as wool or silk) to produce yarns and then weave them into textiles using handmade processes. In the eighteenth century, there was a revolutionary industrial development [*Tunzelmann, GNV, 1995*] with the invention of machines that speeded up the manufacture of fabrics and made them more available and affordable.

This technological revolution changed the concept of textile manufacturing transforming it into a real industry. It could be said that in the twentieth century, there was a second technological revolution with the synthesis of artificial fibers such as rayon [*Kauffman GB. 1993*], nylon, or polyester with good quality and low cost production techniques that rapidly gave those fibers a significant market share because of their good properties such as low cost, chemical stability, and outstanding versatility (dyes, colors, fiber diameters, engineered weaving for special clothes).

Nowadays, there is a new revolution on the textile industry with the apparition of new technologies that could add special functions and properties to the fabrics. In this sense, nanoparticles play a key and significant role in this technological evolution since they show outstanding surface properties that allow multiplying their effect in comparison with bulky traditional additives and materials. Nanoparticles are microscopic particles with at least one dimension less than between 100 nanometers in size [science daily]. Ultrafine particles are the

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