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Pursuing Excellence

DEPARTMENT OF TEXTILE AND GINNING ENGINEERING

**TEXTILE ASSEMBLIES FOR TRANSDERMAL DELIVERY OF PLUMERIA OBTUSA
EXTRACT FOR MEDICAL APPLICATION.**

BY

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DECLARATION

LONGWEN DICKENS, certify that:

- a) Except where due acknowledgement has been made, the work is that of the candidate alone;
- b) The work has not been submitted previously, in whole or in part, to qualify for any other academic award;
- c) The content of the report is the result of research which has been carried out from different sources between the periods of September 2013 to June 2014.



APPROVAL

This report has been submitted to the department of Textile and Ginning Engineering for examination with the approval of the supervisors.

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DEDICATION

This goes to my beloved family and friendly course mates who supported me with prayers and words of encouragement towards coming up with this report.

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Great thanks and applause goes to my lecturers who have laid a foundation for my project.

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ABSTRACT

As science and technology has developed, the manner by which drugs can be delivered has grown. Medicines may be taken orally, applied as topical pastes, creams or oils, patches or administered by direct injection to the body cells. This research explores an alternative method for the delivery of therapeutic compounds to the body. The basis of the study involves the application of *plumeria obtusa* extract used to treat fungal infection and respectively through transdermal topical application, using a textile substrate as the carrier.

Different performance, durability and drug delivery tests (such as wash fastness, rub fastness, and *invitro percutaneous* tests) were carried out. The P.O extract was found to adhere to woven cotton fabric. The fabricated medical textile had lower rub fastness value showing a higher presence of P.O extract on the adjacent cotton fabric, and the high wash fastness values indicate the negligible transfer of the P.O extract on to the adjacent simulated skin. Using simulated skin, the loss of the fabric weights in *invitro percutaneous* test showed significant transfer of P.O extract from fabric through the skin.

Key words: Drug delivery, transdermal, *plumeria obtusa*, *invitro percutaneous*, textiles, cotton, fabric

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CHAPTER ONE: INTRODUCTION

1.1 Background of the study

Over the past three decades, significant advances have been made in drug delivery technology. This effort, pioneered by Alza Laboratories of Palo Alto, California, among others, has been accelerated in recent years due to the substantial decline in the development of new drug entities (*Urquhart and J 1987*). Drug delivery has now become a multidisciplinary science consisting of *biopharmaceutical* and *pharmaco kinetic* (*Anderson et al., 1988*).

The underlying principle that drug delivery technology, perse, can bring both therapeutic and commercial value to health care products has been widely accepted. This has created an intense need for presenting “old” drugs in new forms and utilizing novel forms of delivery (*Tyle; P 1988*).

In the U.S., the Drug Price Competition and Patent Term Restoration Act (also known as ANDA-Exclusivity Provisions Act) was passed in 1984. This provided new incentives to manufacturers who can distinguish their products from the competition, with features such as longer dosage schedules, improved safety profiles, new indications for existing drugs, and new combinations (*Shacknai; J 1985*). Some of the common drug delivery methods involve controlled-release which is a perfectly zero-order release, which is the release over time irrespective of concentration.

Hydrophobic drug delivery is very difficult to control as they are not soluble in water. Due to this they are not transported to different parts of the body and thus require more attention (*Aastha et al., 2011*).

Tissue Specific delivery system, synthetic water-soluble polymeric delivery systems have been developed to allow selective delivery of therapeutic and imaging agents to *muscular skeletal* tissues (*Aastha et al., 2011*).

Although some drugs have inherent side effects that cannot be eliminated in any dosage form, many drugs exhibit undesirable behavior that is specifically related to a particular route of administration. One recent effort at eliminating some of the problems of traditional dosage forms is the development of transdermal delivery systems. Oral administration of drugs has been

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