

**SYNTHESIZE AND CHARACTERIZATION OF
MODIFIED DES AS CONDUCTIVE FILM**

NUR A'INA A'ISYAH BINTI YAHYA

**BACHELOR OF SCIENCE (Hons.)
PHYSICS FACULTY OF APPLIED SCIENCES
UNIVERSITI TEKNOLOGI MARA**

AUGUST 2022

**SYNTHESIZE AND CHARACTERIZATION OF
MODIFIED DES AS CONDUCTIVE FILM**

NUR A'INA A'ISYAH BINTI YAHYA

**Final Year Project Submitted in Partial
Fulfilment of the Requirement for the Degree of
Bachelor of Science (Hons.) Physics
In the Faculty of Applied Sciences
Universiti Teknologi MARA**

AUGUST 2022

This Final Year Project Report entitled “Synthesize and Characterization of Sago Starch Modified DES as Conductive Film” was submitted by Nur A’ina A’isyah Binti Yahya in partial fulfilment of the requirements for the Degree of Bachelor of Science (Hons.) Physics, in the Faculty of Applied Sciences, and was approved by

Dr Rosyaini Afindi Zaman
Supervisor
B. Sc. (Hons.) Physics
Faculty of Applied Sciences
Universiti Teknologi MARA
02600 Arau
Perlis

Dr Khuzaimah Nazir
Project Coordinator
B. Sc. (Hons.) Physics
Faculty of Applied Sciences
Universiti Teknologi MARA
02600 Arau
Perlis

Date: _____

ABSTRACT

Sago palm or known as Metroxylon sago is a high-yielding and sustainable source of starch. Sago starch has gained popularity in recent years for a variety of non-food applications. The purpose of this work was to create and describe biofilms using sago starch and modified sago starch film in addition with DES (a 1: 2 molar mixture of choline chloride and urea). Sago starch was synthesized by casting technique. By adding a concentration of 10 wt%, 20 wt%, 30 wt% and 40 wt% of DES, biofilms were created, with the DES serving as a plasticizer to give the starch film its thermoplasticity. By the use microscope and fourier transform infrared spectroscopy (FTIR), the chemically modified sago starch and pure sago starch film were investigated. The surface appearance of all pure sago starch film became clear, colorless, transparent with different time of gelatinization. Thoroughly examined, the sago starch film when added with various concentration of deep eutectic solvent produces is smooth and soft, same as pure sago films. The modified films are similarly rather flexible, but they are more difficult to peel off when compared to pure sago films. The characterization of pure sago starch and modified sago starch film by DES is run by using Fourier Transform Infrared Spectroscopy (FTIR). Sago starch film exhibit a peak corresponding to O-H, C-H and C-O-H stretching bonds at specified wavenumbers. The modified sago starch film with DES exhibit the same peak as pure sago starch film but with addition of C=O stretching. The conductivity of sago starch enhances by adding DES where it acts as plasticizer for the film. However, due to lack of time, the conductivity test cannot proceed but it is believed that the conductivity of sago starch with DES in range of 10^{-4} Scm^{-1} .

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	i
TABLE OF CONTENT	ii
LIST OF TABLES	iv
LIST OF FIGURES	v
LIST OF ABBREVIATIONS	vii
CHAPTER ONE: INTRODUCTION	1
1.1 Background of Study	1
1.2 Problem Statement	2
1.3 Research Question	3
1.4 Objective of Study	3
1.5 Significance of Study	3
CHAPTER TWO: LITERATURE REVIEW	4
2.1 Sago Starch	4
2.2 Sago Starch of Conductive Films	5
2.3 Synthesis and Preparation of Sago Starch as Conductive Films	7
2.4 Surface Structure of Sago Starch Conductive Film	11
2.5 Molecular Structure of Sago Starch Conductive Film Using FTIR	13
2.6 Electrical Conductivity of Sago Starch	17
CHAPTER THREE: METHODOLOGY	19
3.1 Introduction	19
3.2 Raw Materials Used	19
3.3 Experimental Procedure	19
3.3.1 Preparation of Sago Starch Conductive Film Modified	19
3.4 Surface Structure Modification by Microscope	23
3.5 Molecular Structure Measured by FTIR	24