PREPARATION & CHARACTERIZATION OF HYDROGEL PECTIN/CHITOSAN/EUTECTIC MIXTURE FOR HIGH WATER SORPTION

MUHAMMAD ADAM ZAILANI

BACHELOR OF SCIENCE (Hons.) CHEMISTRY WITH MANAGEMENT
FACULTY OF APPLIED SCIENCES
UNIVERSITI TEKNOLOGI MARA

FEBRUARY 2023

PREPARATION & CHARACTERIZATION OF HYDROGEL PECTIN/CHITOSAN/EUTECTIC MIXTURE FOR HIGH WATER SORPTION

MUHAMMAD ADAM ZAILANI

Final Year Project Report Submitted in Partial Fulfilment of the Requirements for the Degree of Bachelor of Science (Hons.) Chemistry with Management in the Faculty of Applied Sciences Universiti Teknologi MARA

FEBRUARY 2023

This Final Year Project Reported entitled **"Preparation & Characterization of Hydrogel Pectin/Chitosan/Eutectic Mixture for High Water Sorption"** was submitted by Muhammad Adam Zailani, in partial fulfilment of the requirements for the Degree of Bachelor of Science (Hons.) Chemistry with Management, in the Faculty of Applied Sciences, and was approved by

Rizana Bt. Yusof (Dr.)
Supervisor
B. Sc. (Hons.) Chemistry with Management
Faculty of Applied Sciences
Universiti Teknologi MARA
02600 Arau
Perlis

Dr. Siti Nurlia Binti Ali
Project Coordinator
B. Sc. (Hons.) Chemistry with Management
Faculty of Applied Sciences
Universiti Teknologi MARA
02600 Arau
Perlis

Dr. Zuliahani Binti Ahmad
Head of Programme
B. Sc. (Hons.) Chemistry with Management
Faculty of Applied Sciences
Universiti Teknologi MARA
02600 Arau
Perlis

Date: 17th February 2023

TABLE OF CONTENTS

ABSTRACT

PREPARATION & CHARACTERIZATION OF HYDROGEL PECTIN/CHITOSAN/EUTECTIC MIXTURE FOR HIGH WATER SORPTION

The use of synthetic and toxic materials in the production of hydrogel leads to environmental problems. A biodegradable hydrogel is proposed as a more environmentally friendly alternative. This thesis describes the creation and characterization of pectin-chitosan and DES hydrogels with high water sorption. The hydrogels are fabricated using a solvent casting technique and then characterized using FTIR to identify their functional groups. The water sorption capacity (WAC) was highest in HYD2 with a 10% Choline Chloride: Ethylene Glycol (DES) concentration. The hydrogels' solubility, mechanical strength, and biodegradability were also investigated. Results revealed that increased DES content led to a positive relationship between the hydrogels' solubility, mechanical strength, and biodegradability. Among all the hydrogels, HYD4, with the highest DES content (20 %), exhibited the highest solubility, mechanical support, and biodegradation rate. The results of this study provide valuable information for the design and optimization of hydrogel systems with specific properties, especially in their ability for water sorption application.