

**THE EFFECT OF MECHANICAL AND PHYSICAL PROPERTIES OF
CHITOSAN / POLYVINYL ALCOHOL (PVA) BLEND FILMS**

NUR RAZYATUL ANISAH BINTI MOHD ZAINI

**Final Year Project Report Submitted in Partial Fulfillment of the
Requirements for the Degree of Bachelor of Science (Hons.) of Polymer
Technology in the Faculty of Applied Sciences
Universiti Teknologi MARA**

JULY 2019

AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

Name of Student : Nur Razyatul Anisah Binti Mohd Zaini
Student I.D. No. : 2016674828
Programme : Bachelor of Science (Hons.) Polymer Technology (AS243)
Faculty : Applied Sciences
Thesis title : The Effect of Mechanical and Physical Properties of
Chitosan / Polyvinyl Alcohol (PVA) Blend Films



Signature of Student :

Date : JULY 2019

TABLE OF CONTENTS

	Page
AUTHOR'S DECLARATION	iii
ACKNOWLEDGEMENT	iv
TABLE OF CONTENTS	v
LIST OF TABLES	viii
LIST OF FIGURES	ix
LIST OF ABBREVIATIONS	x
ABSTRACT	xi
ABSTRAK	xii
CHAPTER ONE : INTRODUCTION	
1.1 Research Background	1
1.2 Problem Statement	2
1.3 Objective of Study	3
1.4 Significant of Study	3
CHAPTER TWO : LITERATURE REVIEW	
2.1 Polyvinyl Alcohol	
2.1.1 Structure	5
2.1.2 Properties	6
2.1.3 Polymerization	7
2.1.4 Application	8
2.2 Film Packaging	8
2.3 Polymer Blend Films	9
2.4 Chitosan	10
2.5 Pre-treatment	13
2.6 Solvent Casting Method	14

CHAPTER THREE: METHODOLOGY

3.1	Materials	
3.1.1	Polyvinyl Alcohol	16
3.1.2	Chitosan	16
3.2	Formulation	16
3.3	Sample Formulation	17
3.3.1	Pre-treatment	17
3.3.2	Chitosan/PVA blend films	17
3.4	Testing	
3.4.1	Fourier Transform Infrared Spectroscopy (FTIR)	18
3.4.2	Tensile Test	18
3.4.3	Water Absorption Test	19
3.4.4	Micrometre Screw Gauge	20
3.5	Flowchart of CS/PVA Blend Film	20

CHAPTER FOUR: RESULTS AND DISCUSSION

4.1	Characterization Test Result	
4.1.1	FTIR Analysis	21
4.2	Mechanical Test Result	
4.2.1	Tensile Test	24
4.3	Physical Test Result	
4.3.1	Water Absorption Test	26
4.3.2	Thickness of CS/PVA Blend Film	27

CHAPTER FIVE: CONCLUSION AND RECOMMENDATION

5.1	Conclusion	29
5.2	Recommendation	30

REFERENCES	31
-------------------	----

APPENDICES	35
-------------------	----

ABSTRACT

THE EFFECT OF MECHANICAL AND PHYSICAL PROPERTIES OF CHITOSAN/POLYVINYL ALCOHOL (PVA) BLEND FILMS

This study focused on film based Chitosan (CS)/ Polyvinyl Alcohol (PVA). The films were prepared by solvent casting method. CS/PVA blend films solution were produced then casted into petri dish before being dried in an oven until a finely thin film formed. Range of thin film thickness from 0.12mm to 0.20mm was being tabulated. Mechanical, physical and characterization were conducted. FTIR spectrum is used to identify the peak changes occurring among PVA and chitosan. From the characterization with FTIR, different peak occur from 3284.44 cm^{-1} to 3280.52 cm^{-1} after added the chitosan. The OH group of the blend film was reduced due to the presence of OH stretching vibration of PVA with the secondary NH group of chitosan. The tensile were carried out by using PVA filled with chitosan powder. From the result obtained, 40/60 CS/PVA blend film has the highest tensile strength which is 28.26 MPa, while 100% PVA has highest elongation at break which is 100.90%. The percentage of water absorption increase 1.4% with the addition of chitosan as filler. Thus, it is conclude that 40/60 CS/PVA have the best tensile strength among those loadings which have been reported in this study and can be improve by addition of coupling agent for better mechanical properties.