

**FABRICATION AND CHARACTERISATION OF FILLED
POLYVINYL ALCOHOL (PVA) / SAGO STARCH ACETATE AND
MICROCRYSTALLINE CELLULOSE (MCC)**

NADA SYAHIFAH BT MOHD ALI

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This Final Year Project entitled **‘Fabrication and Characterization of Filled Polyvinyl Alcohol/ Sago Strach Acetate/ Microcrystalline Cellulose’** was submitted by Nada Syahifah Bt Mohd Ali, in partial fulfillment of the requirements for the Degree of Bachelor of Science (Hons.) Polymer Technology, in the Applied Sciences and was approved by:



.....
Prof .Dr Rahmah Bt Mohamed
Supervisor
Faculty of Applied Science
University Technology MARA
40450 Shah Alam
Selangor

Assc. Prof. Dr. Siti Zaleha binti Saad
Project Coordinator
B. Sc. (Hons.) Polymer Technology
Faculty of Applied Science
University Teknologi MARA
40450 Shah Alam
Selangor

Assc. Prof. Dr. Azemi bin Samsuri
Head of Programme
B.Sc.(Hons.)Polymer Technology
Faculty of Applied Science
University Teknologi MARA
40450 Shah Alam
Selangor

Date: _____

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ABSTRACT

FABRICATION AND CHARACTERISATION OF FILLED POLYVINYL ALCOHOL /SAGO STARCH ACETATE AND MICROCRYSTALLINE CELLULOSE.

The research was conducted to fabricate Polyvinyl Alcohol (PVA) filled Sago Starch Acetate film and mixtures in water to solve problem of adverse impacts on the environment to replace polyolefin film used in agricultural mulch film. This research will investigate the effect of the PVA/Sago Starch Acetate (SSA) film and Microcrystalline Cellulose incorporation which recently is known to increase mechanical performance of plastics. Determination of thermal and mechanical properties of PVA/ Sago Starch Acetate formulation with and without MCC was investigated. PVA were subsequently mixed in water with Sago Starch Acetate at various proportions with amount of constant MCC. Microcrystalline Cellulose is added to determine its effect on strength of filled PVA. . In this research the thermal properties of these blends were determined by Differential Scanning Calorimetry (DSC) , which indicates the presence of two and more separate phases of sago starch and PVA. The mechanical properties were determined by Testometric Tensile Machine. The physical properties were determined by water absorption test. The viscosities of mixture were determined by Brookfield Viscometer. The highest viscosity will be obtain with the lower SSA of gelatinized sample and the lowest viscosity is the sample non gelatinized of PVA/Sago Starch Acetate with highest SSA percentage. Increase in Sago Starch Acetate resulted in lower tensile strength and modulus. While MCC has proved to provide resisting force effect of tension. MCC provide site for strengthening in each blend samples. Tm will decrease with the increased SSA percentage. The water absorption of these blends is quite high, so this behaviour makes the blends appropriate for mulch film. Hence , with use of MCC, material can assimilate through soil and can be suitable for mulch film as material can be discarded accordingly.

CHAPTER 1

INTRODUCTION

1.1 Introduction

Plastics are being used all over the world. From drinking cups and disposable silverware to parts for automobiles and motorcycles, plastics are continuing to rise. Plastics have been an environmental trepidation because of the lack of degradation. Plastics make up about 20% by volume waste per year. There are over 21,000 plastics facilities in the US, and the employment rate has increased by an average of three percent over the past two and a half decades. Plastics are extremely important to the job market as well as packaging throughout the world. Since plastics are vital to people's everyday lives, production of biodegradable plastics to make plastics more compatible with the environment is necessary.

Biodegradable plastics began being sparking interest during the oil crisis in the 1970's. As oil prices increased, so did the planning and creating of biodegradable materials. The 1980's brought items such as biodegradable films, sheets, and mold forming materials. Green materials (or Plant-based) have become increasingly more popular. This is due impart to the fact that they are a renewable resource that is much more economical then they were in the past. (Mohanty, 2004)