

**SYNTHESIS AND CHARACTERIZATION OF
MICROCRYSTALLINE CELLULOSE (MCC) MODIFIED
POLYMER**

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ABSTRACT

SYNTHESIS AND CHARACTERIZATION OF MICROCRYSTALLINE CELLULOSE (MCC) MODIFIED POLYMER

Cellulose modified polymer is mostly formed from cellulose and acetic anhydride using high amount of solvent during esterification process. Hence, this work is done to reduce the amount of solvent used and to convert MCC to modified polymer using a catalytic amount of I_2 and Br_2 in the presence of maleic anhydride. The objectives are to explore the effect of different types catalyst and the catalyst loading at two different temperature conditions on synthesis of product and to determine thermal (enthalpy and transition temperature) of the MCC maleate produced under said conditions. This project was done by stirring the MCC, MA and catalytic catalyst (iodine or bromine) using hot plate magnetic stirrer; HPS 100 then filtered and dried in an oven at temperature $60^\circ C$. DSC and TGA testing was run to characterized the thermal stability and degradation of MCC modified polymer. It was found that as increasing the amount of catalytic I_2 the thermal stability was increased too. Compared the two different types of catalyst, I_2 is much better than Br_2 which provide stability on thermal and degradation process. For different reaction temperature condition, reaction at temperature $70^\circ C$ is less effective than reaction at RT. Therefore, MCC modified polymer catalyzed with 0.2 gram I_2 at RT was produced the best product than other.

CHAPTER 1

INTRODUCTION

1.1 Background

Cellulose is in many respects, among the most challenging of the polysaccharides. Although it is a dominant component in the vast majority of plant forms and has a number of vital biological functions, and although cellulose based materials have been part of daily life for many millennia, our understanding of its nature remains incomplete. This circumstance is not the consequence of lack of interest in investigations of cellulose, for the effort to develop a scientific characterization of cellulose matter is well over 150 years old. (Rajai, 1999)

The reactions based on cellulose rank among the most important. A view to the changing its hydrophilic and thermoplastic properties, make the production of lipocellulose are one of the most interesting aspects of its chemical modification. (Ginka Antova et al., 2005)

Cellulose as a linear 1, 4- β -glucan is the most common component found in the cell walls of higher plants which has shown in Figure 1.1.1 below. (Baets et al., 2002).