

Alkaline pre-treatment for the production of cellulose acetate from *Acacia mangium*

ABSTRACT

Pre-treatment is an often neglected but important preparatory process prior to the main treatment. Wood pre-treatment includes a wide array of methods with distinctive function that allows the following process to be more effective such as for preservative penetration or enhancing wood morphology. For this study, the effect of alkaline pre-treatment on *Acacia mangium* pulp were investigated for the production of cellulose acetate. The process involves two types of alkaline reagent, which is the sodium hydroxide (NaOH) and potassium hydroxide (KOH) for the pre-treatment, followed by the main acetylation process that uses acetic acid and acetic anhydride as its main reagent, with sulfuric acid as catalyst. To avoid over substitution of hydroxyl functional group in the cellulose, the process underwent hydrolysis before the cellulose acetate are able to be extracted. The chemical properties such as the functional group identification via FTIR spectroscopy and degree of substitution were determined. Based on the results, KOH-pretreated cellulose acetate is considered the best in most testing where there are differences 0.39 in value for the degree of substitution if compared to the sodium hydroxide-pretreated cellulose acetate. Both samples show the presence of carboxyl (C=O) and acetyl (C-O) groups with reduction in hydroxyl (O-H) absorbing intensity, confirming the successful esterification process. The withstanding difference in its chemical properties in regard to the pretreatment process shows the effectiveness of pretreatment in general as well as the profound effect of the reagent selection specifically in cellulose acetate production.