

**A STUDY ON PREPARATION AND CHARACTERIZATION OF LIGNIN
BASED BANANA STEM WITH ACRYLIC ACID AND ITS EFFECT ON
WATER ABSORPTION TEST**

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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.

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ABSTRACT

A STUDY ON PREPARATION AND CHARACTERIZATION OF LIGNIN BASED BANANA STEM WITH ACRYLIC ACID AND ITS EFFECT ON WATER ABSORPTION TEST

Preparation of banana lignin grafted with acrylic acid was done by chemical synthesis. Free radical polymerization method was chosen with hydrogen peroxide as initiator. Firstly, lignin from banana stem was extracted with Sodium Hydroxide (NaOH) solution. The concentration of NaOH was 10%. The process was continued with grafted the lignin with acrylic acid at 60 °C. During the reaction, ammonium iron (II) sulphate hexahydrate was used as catalyst for the reaction. This research was studied to characterize the grafting between acrylic acid and banana lignin. Percentage of grafting was calculated to investigate the percentage of grafted in each sample. From result obtained, 0.6 g amount of lignin show the highest percentage of grafting which 50% grafted. After the reaction complete, FTIR and water absorption test was conducted. FTIR test was done to see how successful the lignin grafted with acrylic acid. The successfully grafted was assigned when C-O-C spectrum for sample 1 was appear at 1160.20 cm^{-1} , sample 2 at 1167.11 cm^{-1} while sample 3 at 1161.65 cm^{-1} . Beside, water absorption test was conducted after 2 hour and 24 hour. From that, both properties lignin and acrylic acid shows the increasing water uptake due to presence of hydroxyl group. With the increasing amount of lignin in each sample, increasing water up take resulted.