

UNIVERSITI TEKNOLOGI MARA

**COTTON BIOCHAR POLYPROPYLENE COMPOSITE:
THE STUDY OF MECHANICAL PROPERTIES**

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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

COTTON BIOCHAR POLYPROPYLENE COMPOSITE: THE STUDY OF MECHANICAL AND THERMAL PROPERTIES

This study has been taken to investigate the effect of different biochar loading on the mechanical and thermal properties of BC-PP composite. The biochar loadings in this study were 0%, 0.5%, 1.0%, 1.5% and 2.0%. The BC-PP composite were characterized and tested by using Attenuated Total Reflectance – Fourier Transform Infrared Spectroscopy (ATR-FTIR), Differential Scanning Calorimetry (DSC), Tensile test and Impact test. For, FTIR results, the study shows that the biochar loadings with PP gives no structural or chemical change based on the no appearance or disappearance of any peaks of functional groups. Furthermore, based on the results of the DSC there were no obvious change in melting temperature (T_m) and the results for degree in crystallinity (X_c) shows that the decreases of X_c as the biochar loading increase. Meanwhile, the mechanical properties show the improvement on tensile strength as much 7.52% at 1.5 wt% of biochar loadings comparing it to the neat PP. In the other hand, the Young's modulus and elongation at break is contradict to each other. The modulus of the BC-PP composite is steadily increasing as the increase the biochar loadings. The highest percent change of the modulus is at 2.0 wt% for 21.4% compared to the neat PP. Because of the high stiffness and rigidity of this composite, the composite becomes more brittle and automatically the impact strength is decreasing along the increases of biochar loadings.

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