

UNIVERSITI TEKNOLOGI MARA

STUDY OF SELECTED BAMBOO
SPECIES ON THE ENHANCEMENT
OF RECYCLED PAPER
PROPERTIES

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Thesis submitted in fulfillment
of the requirements for the degree of
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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out following the regulations of Universiti Teknologi MARA. It is original and is the results of my 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.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Recycled paper is already used as a replacement for pulp and paper raw material as a way to minimize emissions of greenhouse gases that contribute to climate change. Homification of recycled paper has decreased its conformability and interfiber bonding capacity. The effect of the bamboo fiber (Aur, Semantan, and Beting) to enhance the strength of recycled fiber was investigated. Technical Association of Pulp and Paper Industry (TAPPI) standard methods were used as guidelines for this study. The bamboo was pulped using soda anthraquinone (AQ) pulping with the pulping condition of 20 % NaOH, 170 °C pulping temperature, 1:6 bamboos to liquor ratio, 0.1 % AQ, 90 min time to reach pulping temperature, and 90 min time at pulping temperature. The bamboo at ages 1, 3 and 5 we used in this study and age 1 showed the highest pulping yield (41.0% to 51.7%) thus was chosen to undergo the beating process of 0, 1000, 2000, 4000, and 8000 revolutions, and beating revolution 4000 gave the optimum result for the paper mechanical properties [Aur (tensile index 55.40 Nm/g, bursting index 4.75 kPa.m²/g, tearing index 9.76 mN.m²/g and folding endurance 285 double folds), Beting (tensile index 66.49 Nm/g, bursting index 5.82 kPa.m²/g, tearing index 16.26 mN.m²/g and folding endurance 709 double folds) and Semantan (tensile index was 50.65 Nm/g, bursting index was 4.74 kPa.m²/g, tearing index was 16.63 mN.m²/g and folding endurance was 222 double folds)]. Then bamboo pulp was then combined with recycled paper pulp. The outcomes showed that when the percentage of beaten bamboo fiber in the recycled pulp increased, the mechanical properties of recycled paper were also increased. Thus, Malaysian bamboo is very promising for improving and enhancing the characteristics of recycled paper. As a result, bamboo is a viable alternative to the already imported virgin softwood pulps.

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