



**RHEOLOGICAL BEHAVIORS AND MECHANICAL PROPERTIES OF
KENAF-POLYPROPYLENE COMPOSITES**

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**A thesis submitted in partial fulfillment of the requirements for the award of
Bachelor Engineering (Hons) (Mechanical)**

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MAY 2010

“I declare that this thesis is the result of my own work except the ideas and summaries which I have clarified their sources. The thesis has not been accepted for any degree and is not currently submitted in candidature of any degree”

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ACKNOWLEDGEMENT

Alhamdulillah, thanks to Allah for giving me the opportunity to finish my research study successfully.

First of all, I would like to express my gratitude to my main supervisor, Pn. Nor Amalina bt Nordin who had supportively guiding and helping me in so many things throughout the research project. Thanks for the good advices and encouragements. Thank you also to En. Nazeman, En. Hairi, En. Raimi and En Azman lab technicians who's helped a lot during the fabrication and testing process. My thanks also go to all my friends such as Aishah, Noor, Hazril, Kay and Jamal.

Finally, I would like to extend my appreciation and gratitude to my beloved parents, Johari Bin Hamidon and Manna Bt Mohd Salleh for their advices and continuous moral support.

Thanks to all. May Allah bless all of you.

ABSTRACT

This project is carried out to study the mechanical and rheological properties of kenaf powder reinforcement with polypropylene (PP). The effects of incorporating coupling agent which is maleic anhydride grafted polypropylene (MAPP) at 3wt% to the strength and toughness of the composite were investigated. The size of the kenaf powder was selected is limited to 150 μ m with the different kenaf ratio of 10 wt%, 20 wt%, and 30 wt% kenaf; with and without MAPP, mixed with polypropylene and compounded using hot press machine. Tensile and flexural tests were performed to evaluate the tensile and flexural properties. The composite with 30% of kenaf with MAPP exhibited the highest tensile stress, flexural stress and modulus. Tensile and flexural properties were enhanced with the addition of kenaf powder. However, the sample with MAPP gave the higher strength than the sample without MAPP. The rheological behavior of the compounding material was analyzed using capillary rheometer at a range of temperature allowed investigation of the relationship between pressure, volume, and temperature. The rheology analysis of kenaf-polypropylene exhibited that 30 wt% kenaf having the higher viscosity than other percent of kenaf at operating temperature of 190°C. Fracture surface observation revealed that the failure mainly due to fiber delamination in addition to ductile failure of PP. However, to compete with glass fiber effectively, further research is needed to improve natural fiber processing.

TABLE OF CONTENTS

CONTENT	PAGE
PAGE TITLE	i
ACKNOLEDGEMENT	ii
ABSTRACT	iii
TABLE OF CONTENT	iv
LIST OF TABLES	viii
LIST OF FIGURES	ix