# UNIVERSITI TEKNOLOGI MARA

# THE PAPER
# PROPERTIES OF KENAF FROM APMP PULPING PROCESS USING RSM

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**MSc**

**August 2020**

# 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.

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

In this particular research, the kenaf stalk variety of V 36 has been pulped using Alkaline Peroxide Mechanical Pulping (APMP). Three pulping parameters were studied such as the percentages of hydrogen peroxide, sodium hydroxide and soaking time. The regression equation was obtained to determine the fitness of the quadratic model. The range of the sodium hydroxide (NaOH) used was between 6% to 12% and the hydrogen peroxide ($H_2O_2$) in 30% concentration was in range 5% to 10%. The soaking time was set between 45 and 90 minutes. The temperature was at 70 $^oC$ constant at each experimental runs. The design of experiment (DOE) was analyzed and determined to produce 17 experimental design runs. The statistical analysis and experimental runs was done by using Response Surface Methodology (RSM) and by applying Design Expert 6. The paper properties studied were physical properties such as tensile, tear and burst strength. The optical properties were brightness and opacity. The optimum condition for the pulping parameter that has been obtained was: $H_2O_2$ at 8.33%, NaOH at 6.05% and soaking time at 55.75 minutes. The actual responses produced were at 25.05$Nm^2/g$ for tensile index17.32$mNm^2/g$ for the tear index, and 3.6433$kPam^2/g$ for the burst index, 61.49% for the brightness percentages and 89.7617% for the opacity percentages.

# ACKNOWLEDGEMENT

Alhamdullilah, praise to Allah S.W.T for His blessing gave upon me to complete this project paper. I would like also to give my sincere gratitude to many parties especially my advisor, Dr. Shaikh Abdul Karim Zakaria and my second advisor, Mr. Amran Shafie because of their attentions and guidance's during this project paper research. I would like to thank Mr. Syukri, an officer from LKTN whom assists in the raw material procurement.

Thanks also to all of my friends who are directly or indirectly involved upon completion of this project paper. To those people or parties that involved in this paper research, but I did not mention their name; I would like to say thank you very much.

Last but not least, to my father and family, thank you all for everything. Thank you for always stand s and support me during these research developments. I dedicated this thesis to my dear beloved departed mother; May Allah placed you amongst those He loves and in Jannah.

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