



UNIVERSITI TEKNOLOGI MARA

**CHEMICAL, PHYSICAL AND MECHANICAL
PROPERTIES ON PRODUCTION OF MEDIEVAL
PAPER AND CARDBORD BY USING GRASS**

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27 DECEMBER 2018

ACKNOWLEDGEMENT

I would like to give my gratitude to my research project supervisor Dr Tan Huey Ling for all her guidance and consultation throughout the completion process of my research project. I also want to thank the Faculty of Chemical Engineering UiTM Shah Alam which included all the other lecturers and staffs that involved in my research project.

I also would like to thank my parents for all their support that kept me motivated to keep working on my project whenever I face problems and obstacles. I will not forget the helps from all my friends and colleagues that kept sharing their knowledge and information with me. Last but not least, I also want to give appreciation to everyone that involved in my research project either directly or indirectly because without all the helps and supports, I will not have what I have today.

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ABSTRACT

Grass has potential to be developed as paper and cardboard production because they have the lignocellulosic content that almost same as tree, which is main sources for paper production all over the years. The process for paper and card board production was adapted from paper production industry. For this production, grass was cut into very small size to make it easily boiled, then the grass was blend until it soft as pulp. Lastly, the pulp was mold into paper and cardboard using suitable molder and dried under sunlight. The paper sample was analyzed using SEM to show the paper structure, FTIR to analyzed lignocellulosic content and tensile to know the paper strength. Based on result of this study, the thickness of paper and cardboard was 0.1 and 0.5 cm respectively, the moisture removal exceed 90% after left 24 hours in 110° C oven, under SEM magnification, untreated pulp has more impurities, rigid and strong bonds whereas treated pulp have ruptured surface due to lignin removal. For FTIR analysis, the result shows presence of cellulose, hemicellulose and lignin for untreated grass and for treated pulp, only cellulose was presented. The tensile strength for paper and cardboard were 70 N and 63 N respectively. The objectives of this study were achieved since the paper produced from grass have almost same characteristic as paper produced from wood.

Keywords-paper production, pulp, lignocellulosic, SEM, FTIR

CHAPTER 1

INTRODUCTION

1.1. Research background

The paper had been used for over the years and until now for various reason such as writing the important notes, printing the information, painting and what more interesting paper also can be use as food packaging to keep the food safe, healthier and last longer [1]. Simply, paper and cardboard can be produced by any agriculture plants that have high contain of cellulose and then the cellulose of the plant will be extracted and be pretreated by various suitable pretreatment method such as organosolv, kraft or sulfide method before we can get the pulping form [2]. The raw wood was choosing for all over the years in papermaking industry because wood offers high contain of cellulose, a polysaccharide that is desired for paper and cardboard production and the world still searching the best materials that can be full utilize such as agriculture waste to produce the high quality of paper same as paper produce from wood. The current research as wood replacement in papermaking industry is the non-wood fibres that could be obtained from tree sources which are agricultural byproduct, industrial crops and naturally growing plants [3].

Without we ever realize for years, we too depend on tree sources to fulfill all over five thousand demands of products such as lumber for home applications, furniture, carpenter tools, aircraft, insulation and also pulp and paper industry. Tree sources are choosing for various product because tree is renewable sources, abundant for certain country and sustainable [2]. Even though tree sources have many good quality aspects to offer as majority raw material in production of various product that have high demands which is papermaking industries, but cutting tree from the forest can cause deforestation. Deforestation is really serious issue because human and animal species also depends on tree as shelter and we are codependency and need each other [2]. Deforestation is only brought negative affect to us and that why we should reduce our dependable sources by try to find substitute for wood applications. In this research report will be more focus on wood alternative for papermaking and cardboard industry because the demand for paper is really high and increases every year because of multipurpose use.