

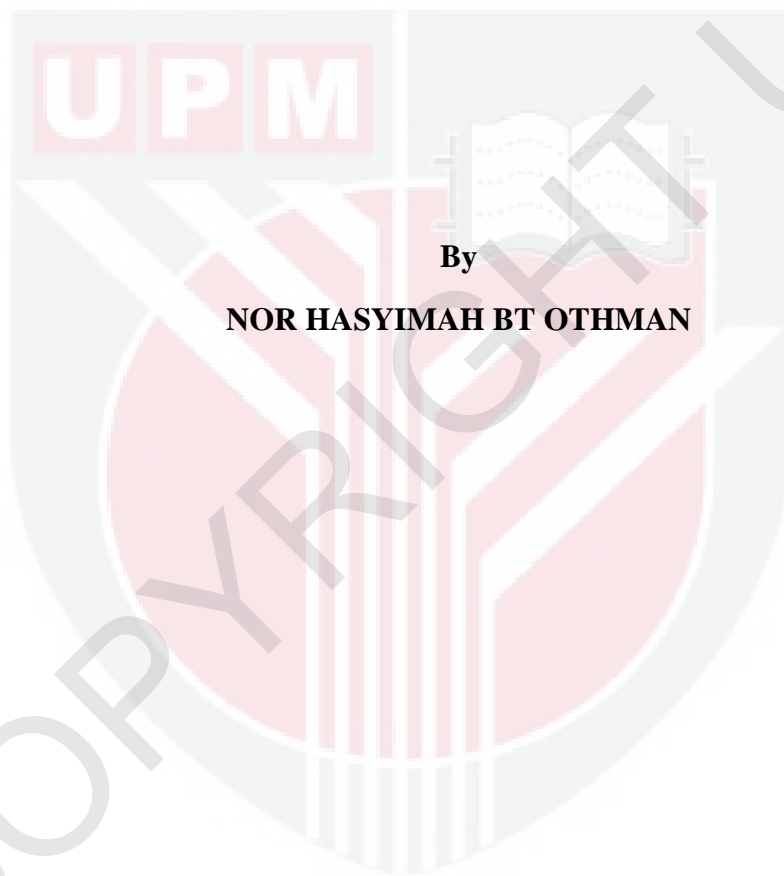


***EFFECT OF ANTHRAQUINONE ON BULUH MADU SODA PULPING
PROPERTIES***

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**EFFECT OF ANTHRAQUINONE ON BULUH MADU SODA PULPING
PROPERTIES**



By

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**A Project Report Submitted in Partial Fulfilment of the Requirements for the
Degree of Bachelor of Wood Science Technology in the Faculty of Forestry
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ABSTRACT

The effect of anthraquinone on the Buluh Madu soda pulping properties was analysed. Bamboo chips were pulped in pulping digester with 14% active alkali at 170°C cooking temperature for 90 minutes. In this study, the 0, 0.5 and 1.0% of AQ are added. The soda pulping shows the significant effect of all pulp to pulp yield. However, the ISO Standard hand sheet properties from Buluh Madu soda pulp not show a significant effect in the mechanical properties.



ABSTRAK

Kesan anthraquinone pada Buluh Madu pemulpaan soda pulpa telah dikaji. Gentian buluh dimasak menggunakan mesin pencerna dengan 14% aktif alkali pada suhu 170 °C selama 90 minit masa memasak. Dalam kajian ini, 0, 0.5 dan 1.0% AQ telah ditambah. Kajian menunjukkan kesan yang signifikan untuk semua pulpa pada hasil pulpa. Walau bagaimanapun, kertas Buluh Madu yang dihasilkan dari pulpa Buluh Madu mengikut standart ISO tidak menunjukkan kesan yang ketara pada sifat-sifat mekanikal.



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APPROVAL SHEET

I certify this research project report entitled “**Effect of Anthraquinone on Buluh Madu Soda Pulping Properties**” by **Nor Hasyimah Bt Othman**, has been examined and approved as a partial fulfilment of the requirements for the Degree of Bachelor of Wood Science Technology in the Faculty of Forestry, Universiti Putra Malaysia.

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LIST OF ABBREVIATIONS

AD	Air dry weight
ANOVA	Analysis of variance
AQ	Anthraquinone
CTMP	Chemi-Thermomechanical Pulping
DP	Degree of Polymerization
FAO	Food and Agriculture Organisation
H ₂ SO ₄	Sulphuric acid
ISO	International Organization for Standardization
MC	Moisture content
MT	Million tonnes
NaOH	Sodium hydroxide
OD	Oven dry weight
RSM	Response Surface Methodology

CHAPTER 1

INTRODUCTION

1.1 Background

The total world paper consumption increased from 324 million tons in 2002 to 389 million tons 2008 and is expected to grow steadily in next decade reaching above 500 million tons (FAO, 2011).

The growth is also expected to be much stronger in the developing countries. The main source of raw material for pulp and paper production is softwood and hardwood species. Approximately 5-10% of this raw material is coming from non-wood lignocellulosic resource including cotton stalks, cereal straws, canes, grasses, and hemp. With increasing demand for paper production non-woody species and agricultural residues are getting more popular as resource to fill the gap between production and its demand in paper industry in many countries. (Nassier et al., 2015).

Bamboo made its greatest contribution in the past, while also having the capacity to revolutionize paper production in the future. It's a super producer yielding two to six times more cellulose per acre than pine and can be cropped annually, but its capacity to provide paper pulp has gone largely unrecognized outside India, China, Thailand, and Brazil (Yuqun, 2008).

Fifty percent of the world's timber is used to make paper, while in India two-thirds of the paper is made from bamboo with more than 40 factories making 600,000 tons of paper annually. If this use of bamboo were extended worldwide, the saving of old

growth forest currently used in wood chip production would be greatly reduced (Turnbull, 2008).

On the other hand, soda-AQ pulping is a modified chemical process for wood pulp production with sodium hydroxide as the cooking chemical and anthraquinone (AQ) as a pulping additive to decrease the carbohydrate degradation (Prinsen, 2013).

The advantages of using the soda-AQ method are not only having high pulp yield, but also resulting in better mechanical strength properties of the yield comparable to Kraft pulp along with its environment friendly approach as well as its reduced active alkali consumption. The use of soda pulping can constitute an alternative method for producing pulps from Buluh Madu. Besides Buluh Madu, other non-woods it tends to respond better on soda pulping.

1.2 Problem Statements

Buluh Madu has a lot of potential as new fiber source because of the nature of plant that can grow quickly and capable of producing a large amount of fiber. In addition the bamboo are used produced higher quality fiber than wood. In particular previous study on bamboo have proved that bamboo has approximately higher content of cellulose 66% and has lower content of lignin 21%, it is also has a long and high strength fiber properties range which is suitable for pulp and paper making (Husna et al., 2010). Other than that, it is important to determine the pulp and paper properties strength and the effect of AQ on Buluh Madu soda pulping.

1.3 Objectives

The main objective of this study is to investigate the effect of AQ on Buluh Madu soda pulping.

There are two specific objective of this study:

- i. To determine the pulp properties on Buluh Madu soda pulping at different AQ conditions.
- ii. To analyse the paper properties of Buluh Madu soda pulp at different AQ additions.



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