

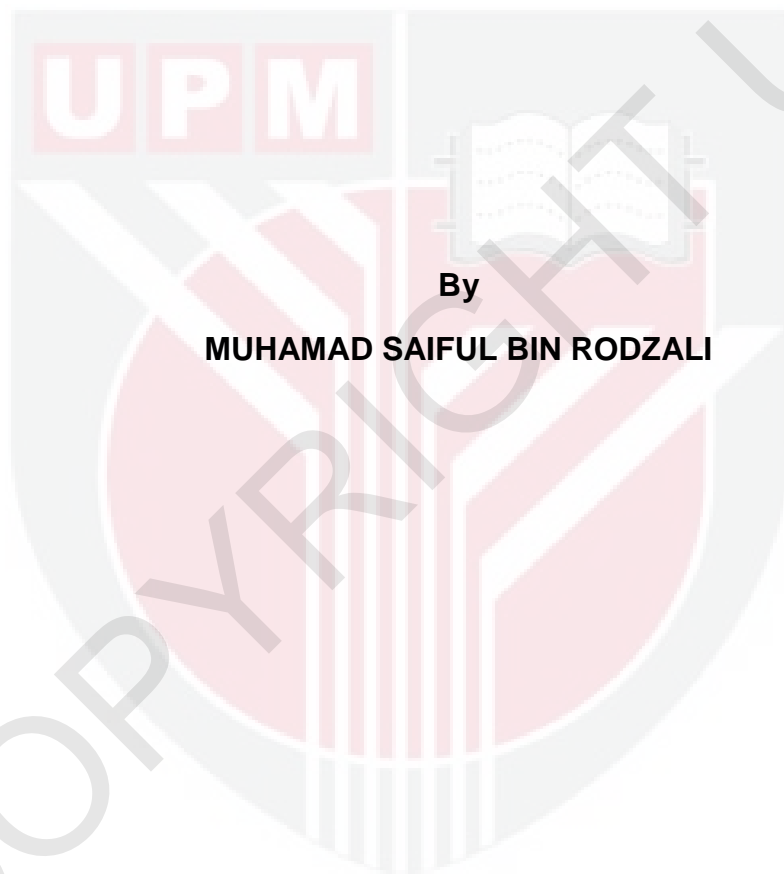


FINISHING PROPERTIES OF ACACIA MANGIUM

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FINISHING PROPERTIES OF ACACIA MANGIUM



By

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the Degree of Bachelor of Wood Science Technology in the
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DEDICATION

Special thanks to my beloved parents and family

Who always support me in whatever I do in my life and also always guide

me in

where I am today



ABSTRACT

The paper discusses the effect of bleaching agent and concentration on the wettability of *Acacia mangium* and effect of finishing system on finishing properties of *Acacia mangium*. The study consists of two phases. Contact angle was calculated in the first phase. Adhesion test and impact test were conducted in the second phase. The wettability was studied to assess the effects on the wettability of *Acacia mangium* surface bleaching agents i.e. sodium hydroxide, methanol and control. There were seven levels of concentration of bleaching agent which 2%, 4%, 6%, 8%, 10%, 12% and 14%. It seems that the concentration of bleaching agent affect the wettability of *Acacia mangium*. Methanol was the only bleaching agent that gave effects on the samples. The finishing properties of *Acacia mangium* was tested at the second phase involve three type of coating system which are acid catalyst (AC), nitrocellulose (NC), and polyurethane (PU). Adhesion test (cross-cut) was conducted based on BS: EN ISO 2409:2013 and impact test based on BS 3962: PART 6:1980.

ABSTRAK

Kertas ini membincangkan kesan agen pelunturan dan kepekatan pada kebolehbasahan *Acacia mangium* dan kesan sistem penamat pada penamat sifat *Acacia mangium*. Kajian ini terdiri daripada dua fasa. Sudut kenalan dihitung pada fasa pertama. Ujian lekatan dan ujian impak dijalankan pada fasa kedua. Kebolehbasahan itu dikaji untuk menilai kesan dua agen pelunturan yang berbeza, natrium hidroksida, metanol dan kawalan. Terdapat tujuh peringkat kepekatan ejen pemutihan yang mana 2%, 4%, 6%, 8%, 10%, 12% dan 14%. Nampaknya kepekatan ejen pemutihan menjejaskan kelembapan *Acacia mangium*. Methanol adalah satu-satunya agen pelunturan yang memberi kesan kepada sampel. Ciri-ciri kemasan *Acacia mangium* diuji pada fasa kedua melibatkan tiga jenis sistem salutan iaitu pemangkin asid (AC), nitrocellulose (NC), dan poliuretana (PU). Ujian lekatan (salib) dilakukan berdasarkan BS: EN ISO 2409: 2013 dan ujian kesan berdasarkan BS 3962: BAHAGIAN 6: 1980.

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APPROVAL SHEET

I certify that this research project entitled “Finishing Properties of *Acacia mangium*” by Muhamad Saiful Bin Rodzali has been examined and approved as a fulfilment of the requirements for the degree of Bachelor of Wood Science and Technology in the Faculty of Forestry, Universiti Putra Malaysia.

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TABLE OF CONTENTS

	PAGES
DEDICATION	i
ABSTRACT	ii
ABSTRAK	iii
ACKNOWLEDGEMENT	iv
APPROVAL SHEET	v
TABLE OF CONTENTS	vi
LIST OF TABLES	vii
LIST OF FIGURES	viii
LIST OF ABBREVIATIONS	ix
CHAPTER 1	1
INTRODUCTION	1
1.1 Background of Study	1
1.2 Problem Statement and Justification	1
1.3 Objectives	2
CHAPTER 2	3
LITERATURE REVIEW	3
2.1 <i>Acacia mangium</i>	3
2.2 Properties of <i>Acacia mangium</i> Wood	5
2.3 Surface Modification of <i>Acacia mangium</i> Wood	6
2.4 Finishing of <i>Acacia mangium</i>	6
CHAPTER 3	8
METHODOLOGY	8
3.1 Determination of Contact Angle	8
3.2 Finishing Process	9
3.3 Evaluation Finished Surfaces	11
3.3.1 Adhesion Test	11
3.3.2 Impact Test	13
3.4 Statistical Analysis	15
CHAPTER 4	16
RESULT AND DISCUSSION	16
4.1 Wettability of <i>Acacia mangium</i> Wood	16
4.2 Adhesion Test	22
4.3 Impact Test	23
CHAPTER 5	25
CONCLUSION	25
5.1 Recommendations	26
REFERENCES	27

LIST OF TABLES

Table		Page
Table 2.1	Comparison between <i>Acacia mangium</i> and rubber wood	5
Table 2.2	Different time for coating system to curing	10
Table 2.3	Classification of test result for cross cut test based on ISO2409:2013(E)	12
Table 2.4	Classification of test result for impact resistance based on BS 3692: Part 6: 1980	13
Table 2.5	Summary of wettability of <i>Acacia mangium</i> wood	21
Table 2.6	The adhesion (cross cut) of the finished films for <i>Acacia mangium</i> samples	22
Table 2.7	Impact test of the finished films for <i>Acacia mangium</i> wood	24
Table 2.8	Effect of bleaching towards <i>Acacia mangium</i> wood	25

LIST OF FIGURES

Figure		Page
Figure 3.1	Experimental design for the determination of contact angle of <i>Acacia mangium</i> wood	9
Figure 3.2	Experimental design for treated <i>Acacia mangium</i> wood for finishing	10
Figure 3.3	Adhesion tape (ASTM D 3359)	13
Figure 3.4	Impact testing machine	14
Figure 4.1	Wettability of sodium hydroxide treated wood on the sapwood surface	17
Figure 4.2	Wettability of sodium hydroxide treated wood on the heartwood surface	18
Figure 4.3	Wettability of methanol treated wood on the sapwood surface	18
Figure 4.4	Wettability of methanol treated wood on the heartwood surface	19
Figure 4.5	(a) Untreated (b) Sodium hydroxide, and (c) Methanol treated <i>Acacia mangium</i> woods	19
Figure 4.6	Adhesion test (cross-cut)	22
Figure 4.7	Adhesion tape during cross cut test	23
Figure 4.8	Cross-cut test tools	23
Figure 4.9	Impact resistance test	24
Figure 5.1	Appearance of <i>Acacia mangium</i> after bleaching at 8% concentration (a) control, (b) methanol, and (c) sodium hydroxide.	26

LIST OF ABBREVIATIONS

AC	Acid catalyst
FAO	Food and Agriculture Organization
NC	Nitrocellulose
NFT	Nutrient film technique
PU	Polyurethane
RF	Resorcinol formaldehyde



CHAPTER 1

INTRODUCTION

1.1 Background of Study

Acacia mangium has a high yielding plantation forest ; producing 20 to 30 cubic metre/hectare/year. *Acacia mangium* is a significant forest plantation in Malaysia with a total of 320,015 ha. A part of the total number belongs to Sabah which is 76,738 ha, Peninsular Malaysia 28,814 ha and Sarawak has the highest yielding plantation about 214,463 ha (Jabatan Perhutanan Semenanjung Malaysia, 2017; Jusoh & Adam, 2007; Cienciala et al., 2000). *Acacia mangium* is a prominent fast-growing plantation species (Pinto, 2005) and has the ability to exhibit a relatively high wood quality even though the recovery rate is low.

1.2 Problem Statement and Justification

Basically, *Acacia mangium* is used in pulp and paper industry. It is also an important source of timber; the wood is used for construction, boat building, furniture and cabinet making, and veneer (Orwa et al., 2009). The density of *Acacia mangium* varies greatly around 290-675kg/m³ compared to rubberwood which is about 480-650 kg/m³ (Lim et al., 2010). *Acacia mangium* has low wettability, large contact angle, poorer bonding quality compared to *Paraserianthes falcataria* and *Pinus merkusii* (Alamsyah et al., 2007).

However, none of the study reported the finishing properties of *Acacia mangium*.

Similarly with bonding, the finishing ability of *Acacia mangium* may be difficult due to the low wettability of the surface (personal communication with Kraft Nusantara Sdn. Bhd.). However, the surface wettability of *Acacia mangium* can be improved by surface treatment. Some of the surface treatments that have been used are Sodium hydroxide, Hydrogen peroxide, Lime (natural) and Ethanol (Ayeni et al., 2013; Li et al., 2007; Ichazo, 2001). These treatments are reported to be effective in improving the wettability of wood through reactivation of wood surface for glue-wood bonds formation (Aydin, 2004). In wood finishing, the surface must be well adhered to the finish material and forming an anchor to cell wall. Such bonding would help a good formation of coating film onto the wood surface. However, if the wettability of the *Acacia mangium* is poor, minimal adhesion may occur thus coating of the surface may become weak. Hence, surface treatment is required in order to improve the wettability of *Acacia mangium* wood surface consequently the finished surface will be of good quality.

1.3 Objectives

The objectives of this research are:

1. To evaluate the effect of bleaching agents and concentration on the wettability of *Acacia mangium*.
2. To determine the effect of finishing system on finishing properties of *Acacia mangium*.

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