

**Effect of the Resin Content and Density on the
Properties of three layer Particleboard from
Kelempayan (*Neolamarckia cadamba*) and Wood
Shaving**

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Abstract

Particleboard are composite panel product consisting of cellulosic particle of various size that are bonded together with a binder or synthetic resin under heat and pressure. The species of kelempayan (*Neolamarckia cadamba*) with diameter 40 cm at breast height (DBH) 25 m height, from 1 log diameter was converted into particle by using scale knife ring flaker. The target density were 500 kgm⁻³, 600 kgm⁻³ and 700 kgm⁻³. The particle used in this process were unscreening and was further dried to a certain moisture content. The particleboard were produced in different densities, resin contents; 8%, 10% and 12% with addition of 1% wax with using adhesive urea formadehyde (UF). The particleboards were tested to determine the physical properties of particleboard according to JIS 2003. From the variance densities shows highly significant on modulus of rupture (MOR), internal bonding (IB) and water absorption (WA). Meanwhile, for modulus of elasticity (MOE) and thickness swelling (TS) were significant. Source of variance from resin content showed the highly significant on internal bonding and thickness swelling but for modulus of rupture, modulus of elasticity (MOE) and water absorption (WA) that are only significant. The mechanical properties, from particleboard on density 700 kgm⁻³ with resin content 8%, 10% and 12% were achieved the standard. On physical properties, particleboard density 500 kgm⁻³ with resin content 10% and 12% were achieved the JIS 2003 specification. Whereas, for resin content, impact can be observed only on modulus of rupture (MOR), thickness swelling (TS) and water absorption (WA).

TABLE OF CONTENT

ACKNOWLEDGEMENTS	i
TABLE OF CONTENT	ii
LIST OF ABBREVIATIONS	v
LIST OF TABLES	vi
LIST OF PLATES	vii
LIST OF FIGURES	viii
Abstract	ix
ABSTRAK	x
CHAPTER 1	1
INTRODUCTION	1
1.1 Background of study	1
1.2 Problem of Statement	2
1.3 Justification	3
1.4 Objectives	3
CHAPTER 2	5
LITERATURE REVIEW	5
2.1 Malaysian Wood Composite Industry	5
2.1.1 History and Development of Particleboard	7
2.1.2 Composite	8
2.1.3 Application	8
2.2 Raw Material in the Particleboard Industry	9
2.2.1 Rubber wood (<i>Hevea brasiliensis</i>)	9
2.2.2 Kelempayan (<i>Neolamarckia cadamba</i>)	10
2.2.3 Shaving	13
2.3 Effect of resin content	13
2.4 Effect of Board Density	14
CHAPTER 3	16

MATERIALS AND METHODS	16
3.1 Field procedure	16
3.1.1 Kelempayan	16
3.1.2 Wood shaving	17
3.2 Particleboard making	17
3.2.1 Board making.....	17
3.2.2 Glue Mixing and Blending.....	18
3.2.3 Mat Forming	18
3.2.4 Hot Pressing.....	18
3.2.5 Conditioning	19
3.2.6 Sample Cutting and Testing	19
3.3 Board Evaluation	20
3.3.1 Bending Strength Test	20
3.3.2 Internal Bonding (IB)	21
3.3.3 Thickness Swelling (TS).....	22
3.3.4 Water Absorption (WA).....	22
3.4 Experimental Design.....	23
3.5 Statistical Analysis	23
CHAPTER 4.....	24
RESULTS AND DISCUSSION	24
4.1.1 Properties of particleboard	24
4.2 Statistical significance.....	25
4.2.1 Bulk Density	26
4.2.2 Effect of density on mechanical properties.....	27
4.2.3 Effect of density on physical properties	28
4.2.4 Effect of resin on mechanical properties	29
4.2.5 Effect solid resin content on physical properties.....	30
CHAPTER 5.....	32
CONCLUSION AND RECOMMENDATIONS	32
REFERENCES	34
APPENDICES	37
PUBLICATION OF THE PROJECT REPORT UNDERTAKING	48
PERMISSION FOR REFERENCES AND PHOTOCOPYING	49

CHAPTER 1

INTRODUCTION

1.1 Background of study

Wood is a valuable natural can be refurbished material that has helped countries lead a sustainable development over hundred years. The plywood, as an alternative to natural wood, was devised in the 19th century, but by the end of the 1940s there was lacking lumber around to manufacture plywood affordably. Particleboard was intended to be a replacement composite as any combinations of two or more materials, in any forms and for any use (Carll, 1986).

The industrial development of the particleboard has been characterized by large and dramatic change in equipment, resins, and levels of automation since its inception in the early forties. Particleboard is wood composite make from wood particles such as chips, saw mill shavings, or even sawdust, and a synthetic resin or other suitable binder, which is pressed. It applications as furniture, flooring, table, counter and desktops, office dividers, wall and ceiling, stair treads, interior signs, home constructions, bulletin boards, and other industrial products (Tabarsa, Ashori, & Gholamzadeh, 2011).