

SYNTHESIS AND CHARACTERIZATIONS OF  
BIO-PHENOLIC FURFURAL RESINS VIA  
LIQUEFACTION AND RESINIFICATION OF  
EMPTY FRUIT BUNCH FIBRES

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PHENOLIC FURFURAL RESINS VIA LIQUEFACTION AND  
RESINIFICATION OF EMPTY FRUIT BUNCH FIBRES

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for the award of the degree of  
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## **SUPERVISORS' DECLARATION**

I hereby declare that I have checked the thesis and in my opinion, this thesis is adequate in terms of scope and quality for the award of the degree of Bachelor of Applied Science (Honor) Material Technology.

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## **STUDENT'S DECLARATION**

I hereby declare that the work in this thesis is my own except for quotations and summaries which have been duly acknowledged. The thesis has not been accepted for any degree and is not concurrently submitted for award of other degree.

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## **DEDICATION**

This thesis is dedicated to my parents,  
Mr. Anuar bin Ibrahim and Mrs. Rashidah binti Mohd Som

## **ACKNOWLEDGEMENTS**

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## LIST OF SYMBOLS

%	-	percent
$\mu$	-	micron ( $10^{-6}$ )
$^{\circ}\text{C}$	-	degree celcius
g	-	grams
h	-	hour

## LIST OF ABBREVIATIONS

EFB	-	empty fruit bunch
POME	-	palm oil mill effluent
MF	-	mesocarp fiber
PKS	-	palm kernel shell
OPT	-	oil palm trunks
OPF	-	oil palm fronds
OPL	-	oil palm leaves
OPEFB	-	oil palm empty fruit bunch
MPOB	-	Malaysian palm oil board
FTIR	-	fourier transform spectroscopy
TGA	-	thermogravimetric analysis
DSC	-	differential scanning calorimetry
GDP	-	gross domestic product
PF	-	phenol-formaldehyde
DTG	-	differential thermogravimetric
MC	-	moisture content
RPM	-	rotation per minute