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

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UNIVERSITI MALAYSIA PAHANG

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Thesis submitted in fulfillment of the requirements
for the award of the degree of
Bachelor of Applied Science (Honor) Material Technology

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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.

Signature

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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

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| | | |
|---|---|---|
| % | - | percent |
| µ | - | micron ($10^{-6}$) |
| $^{o}$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 |