

ULTRASOUND AND ENZYMATIC MEDIATED  
EXTRACTION OF VITEXIN AND ISOVITEXIN  
COMPOUNDS FROM *FICUS DELTOIDEA*  
LEAVES

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## **SUPERVISOR'S DECLARATION**

We hereby declare that we have checked this thesis and in our opinion, this thesis is adequate in terms of scope and quality for the award of the degree of Master of Engineering in Chemical.

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I hereby declare that the work in this thesis is based on my original work except for quotations and citation which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Universiti Malaysia Pahang or any other institutions.

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AND ISOVITEXIN COMPOUNDS FROM *FICUS DELTOIDEA* LEAVES

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Thesis submitted in fulfilment of the requirements  
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**Dedicated to my parents and siblings  
for always standing by my side and nurturing me with love and support**

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## LIST OF SYMBOLS

$\mu$	micro
A	Ampere
eV	Electron volts
Hz	Hertz
m/z	Mass-to-charge ratio
Pa	Pascal
s	seconds
V	Volt
W	Watt



## LIST OF ABBREVIATIONS

AE	Aqueous extraction
ANOVA	Analysis of Variance
ASTM	American Society for Testing and Materials
ATCC	American Type Culture Collection
BEH	Ethylene Bridged Hybrid
DAD	Diode Array Detector
EC	Enzyme Commission
EnAE	Enzymatic-assisted extraction
FE-SEM	Field Emission-Scanning Electron Microscopy
HPLC	High Performance Liquid Chromatography
i.d.	Inner diameter
MS	Mass Spectrometry
RPC	Reversed-phase column
rpm	Revolutions per minute
sp.	species
UAE	Ultrasound-assisted extraction
UAEnE	Ultrasound-assisted enzymatic extraction
UPLC	Ultra-Performance Liquid Chromatography
UV-Vis	Ultraviolet-visible
var.	variety
WHO	World Health Organization