

**METABOLITE PROFILING OF AVICENNIA MARINA ROOT EXTRACT
AND THEIR MEDICINAL POTENTIAL USING GAS
CHROMATOGRAPHY-MASS SPECTROMETRY**

By

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BACHELOR'S DEGREE

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BIOMEDICAL ENGINEERING

FACULTY OF LIFE SCIENCE AND TECHNOLOGY



SWISS GERMAN UNIVERSITY

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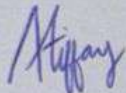
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STATEMENT BY THE AUTHOR

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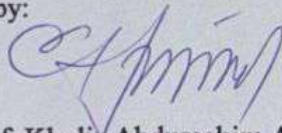
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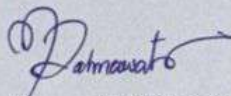


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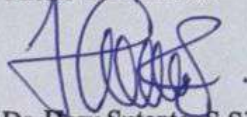


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ABSTRACT

METABOLITE PROFILING OF AVICENNIA MARINA ROOT EXTRACT AND THEIR MEDICINAL POTENTIAL USING GAS CHROMATOGRAPHY- MASS SPECTROMETRY

By

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Avicennia marina is one of the most commonly found mangrove species in Indonesia and is known for its pharmacological potential. This study aimed to profile the metabolites in *A. marina* root extract using Gas Chromatography–Mass Spectrometry (GC-MS). Root samples were dried, ground, sieved, and extracted using three solvents with varying polarity: a mixed solvent (methanol:chloroform:water), ethanol, and ethyl acetate. After derivatization, the samples were analyzed using a GC-MS TQ8040 NX instrument. The data were processed using MS-DIAL, and compound identification was performed by spectral matching with a reference library. Out of 110 suggested compounds, only 35 were selected based on high spectral similarity. Key metabolites identified include epicatechin (antioxidant), chlorogenic acid (anti-inflammatory), kynurenate (neuroprotective), and spermine (cell regulator). Principal Component Analysis (PCA) using SIMCA was conducted to compare profiles among the three solvents. This study successfully identified several metabolites from *A. marina* roots and highlights its potential as a source of pharmacologically active compounds.

Keywords: Avicennia marina, GC-MS, Metabolite Profiling, Principal Component Analysis, Medicinal Potential.

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DEDICATION

I dedicate this work to myself and my family.



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Greatest thanks to the Almighty Jesus Christ who had given me this great opportunity to expand my knowledge and experiences under the scope of the selected study program.

First of all, I would like to express my deepest gratitude to Assoc. Prof. Kholis Abdurachim Audah, M.Sc., Ph.D., as my advisor; Della Rahmawati, S.Si, M.Si, Ph.D., as my co-advisor; and Ms. Amalda Siti Anisa, who has given me the opportunity to conduct this research and provided valuable assistance during the completion of my thesis. I would also like to extend my sincere thanks once again to Assoc. Prof. Kholis and Ms. Della for their continuous support, encouragement, and guidance throughout the entire thesis process.

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