



[Back](#)

Deciphering the Composition and Bioactivity of Malaysian Syzygium Essential Oils: Insights from Multivariate Chemometrics and Molecular Docking Studies

[Letters in Applied NanoBioScience](#) • Review • 2025 • DOI: 10.33263/LIANBS143.180

[Rahim, Faezatul Alwani Mohd^a](#) ; [Salleh, Wan Mohd Nuzul Hakimi Wan^a](#) ;
[Salihu, Abubakar Siddiq^{a,b}](#) ; [Arzmi, Mohd Hafiz^{c,d,e}](#) ; [Garzoli, Stefania^f](#) ; [+1 author](#)

^a Department of Chemistry, Faculty of Science and Mathematics, Universiti Pendidikan Sultan Idris, Perak, Tanjong Malim, 35900, Malaysia

[Show all information](#)

0

Citations

[Full text](#) [Export](#) [Save to list](#)

Document

Impact

Cited by (0)

References (55)

Similar documents

Abstract

The genus *Syzygium*, an important member of the Myrtaceae family, comprises over 1200 species, primarily found in the tropical regions of Asia. *Syzygium* species are valued throughout their range for their medicinal and economic importance. Characterized by aromatic shrubs and trees, these species are prolific producers of essential oils that are widely used for their natural therapeutic effects in food, medicine, and cosmetics. In recent years, studies have focused on the essential oils of Malaysian *Syzygium* species, many of which have reported interesting pharmacological activities. This review attempts to summarize the information on the essential oils of Malaysian *Syzygium* species in terms of their medicinal uses, chemical composition, and bioactivity. The information on *Syzygium* species was collected through electronic searches (PubMed, SciFinder, Scopus, Google

Scholar, and Web of Science) and a library search for articles published in peer-reviewed journals. Our results cover eight *Syzygium* species in Malaysia and highlight eugenol, caryophyllene, α -pinene, α -humulene, and viridiflorol as the predominant components. Multivariate chemometric analyses, including hierarchical cluster analysis (HCA) and principal component analysis (PCA), were used to discriminate the essential oils based on their chemical profiles. Antibacterial and cytotoxic activities were the most frequently reported bioactive properties. In addition, molecular docking simulations provided insights into the binding interactions of the major components with the active sites of enzymes related to these bioactivities. This review aims to provide comprehensive information on the chemical components and biological properties of the essential oils of Malaysian *Syzygium* species and provide guidance for the selection of accessions or species with optimal chemical profiles. © 2025 by the authors.

Author keywords

binding affinity; essential oil; molecular dynamics; multivariate; Myrtaceae; *Syzygium*

Funding details

Details about financial support for research, including funding sources and grant numbers as provided in academic publications.

Funding sponsor	Funding number	Acronym
UPSI		
Department of Chemistry, Faculty of Science and Mathematics		
Universiti Pendidikan Sultan Idris See opportunities 		
Geran Penyelidikan Universiti	2025-0012-103-01	

Funding text

This research was supported by the Geran Penyelidikan Universiti (Kecemerlangan@UPSI) under grant number 2025-0012-103-01, funded by Universiti Pendidikan Sultan Idris. The authors would also like to thank the Department of Chemistry, Faculty of Science and Mathematics, UPSI, for its research facilities.

Corresponding authors

Corresponding
author

W.M.N.H.W. Salleh

Affiliation

Department of Chemistry, Faculty of Science and Mathematics, Universiti
Pendidikan Sultan Idris, Perak, Tanjong Malim, 35900, Malaysia

Email address

wmnhakimi@fsmt.upsi.edu.my

© Copyright 2025 Elsevier B.V., All rights reserved.

Abstract

Author keywords

Funding details

Corresponding authors

About Scopus

[What is Scopus](#)

[Content coverage](#)

[Scopus blog](#)

[Scopus API](#)

[Privacy matters](#)

Language

[日本語版を表示する](#)

[查看简体中文版本](#)

[查看繁體中文版本](#)

[Просмотр версии на русском языке](#)

Customer Service

[Help](#)

ELSEVIER

[Terms and conditions](#) ↗ [Privacy policy](#) ↗ [Cookies settings](#)

All content on this site: Copyright © 2025 [Elsevier B.V.](#) ↗, its licensors, and contributors. All rights are reserved, including those for text and data mining, AI training, and similar technologies. For all open access content, the relevant licensing terms apply.

We use cookies to help provide and enhance our service and tailor content. By continuing, you agree to the [use of cookies](#) ↗.

