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Unleashing the Antioxidant Potential of Local Indonesian Bay Leaf, *Syzgium polyanthum*

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ABSTRACT

Daun salam, or Indonesian bay leaf with the scientific name *Syzygium polyanthum,* is a traditional medicinal plant rich in bioactive compounds. The plant is almost unknown and unrecognised by local people. The leaf was actually more popular in Indonesia due to the wide usage in cooking and was even drunk as tea. This study aimed to evaluate the antioxidant activity and phenolic composition of its leaf extracts. The bay leaf drink was prepared by boiling it until the final volume was reduced to two-thirds of its initial volume. Antioxidant capacity was assessed using the Ferric Reducing Antioxidant Power (FRAP) and 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging assays, and quantification of total phenolic content (TPC) was measured via the Folin–Ciocalteu method. Ultra-Performance Liquid Chromatography (UPLC) was also employed to profile individual phenolic constituents. The extracts demonstrated the scavenging effect of the DPPH radical in bay leaf was 71.18% inhibition, while the FRAP was 0.148 mM$FeSO_4$, and total phenolic content (TPC) was 177µgGAE/ml. Based on the results, DPPH showed strong free radical activity and high TPC associated with high DPPH scavenging. UPLC profiling identified compounds such as gallic acid, catechin, and ellagic acid as major phenolics. The bay leaf aqueous extract exhibited notable antioxidant activity, evidenced by high DPPH, moderate total phenolic content, indicating its potential as a natural source of antioxidants.

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INTRODUCTION

Antioxidants play a vital role in combating oxidative stress, a major contributor to chronic diseases such as cardiovascular disorders, neurodegeneration, and cancer. Among natural sources, plant-based antioxidants are

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preferred for their safety and efficacy (Sharma et al., 2021). *Syzygium polyanthum* (Wight) Walp., commonly known as Indonesian bay leaf or *daun salam*, is a tropical species of the Myrtaceae family native to Southeast Asia, including Malaysia, Indonesia, Thailand, Vietnam, and the Philippines (Quattrocchi, 2012; Wilson, 2011). Despite its resemblance to the Mediterranean bay laurel (*Laurus nobilis*), it is taxonomically distinct (Dalimartha, 2005; Renfrew & Sanderson, 2005).

In Malaysia, particularly in Kelantan and Terengganu, *S. polyanthum* is an integral part of traditional leaf used to flavor dishes such as *nasi kerabu* and herbal soups (Anuar, 2019) and traditional medicine for ailments like diarrhea, fever, and skin irritation. Recent studies have begun to validate its pharmacological potential: ethanolic extracts exhibit strong antioxidant activity (Yunarto et al., 2022), while essential oils show antimicrobial properties (Universiti Putra Malaysia, 2020). Halim et al. (2022) further identified it among Malaysia's top antioxidant-rich herbs.

This study, therefore, investigates the antioxidant activity and phenolic composition of *S. polyanthum* aqueous leaf extract to scientifically support its traditional uses and explore its potential for functional food and nutraceutical development.

PROBLEM STATEMENT

Although *S. polyanthum* (Indonesian bay leaf or *daun salam*) is widely used in Southeast Asian cuisine and traditional medicine, its scientific evaluation in Malaysia remains limited. While previous studies have shown antioxidant and antimicrobial properties in ethanolic and essential oil extracts, data on its aqueous extract reflecting traditional preparation are scarce. The absence of detailed profiling of its phenolic compounds and antioxidant capacity hinders its development as a functional food or nutraceutical. This study, therefore aims to evaluate the antioxidant activity and phenolic composition of *S. polyanthum* aqueous leaf extract using validated analytical methods.

RESEARCH QUESTIONS

This study aimed to evaluate the antioxidant capacity of *S. polyanthum* aqueous leaf extract through DPPH, FRAP, and TPC assays, and to characterise its phenolic composition using UPLC (Table 1). Additionally, the research sought to establish the relationship between its phenolic profile and potential applications in functional food and nutraceutical formulations.

Table 1
Antioxidant activity and total phenolic content of Syzygium polyanthum *aqueous extract*

Daun Salam	DPPH	FRAP	Total Phenolic Content
	71.18%	0.148 mM$FeSO_4$	177µgGAE/mL

Note. Values are the mean and standard deviation of triplicate independent runs

This study evaluated the antioxidant capacity of *Syzygium polyanthum* (Indonesian bay leaf) aqueous extract using DPPH, FRAP, and TPC assays, and identified its phenolic profile via UPLC. The extract showed strong antioxidant potential, consistent with traditional use and earlier findings. DPPH radical scavenging activity reached 71.18%, indicating high free radical neutralisation, while the FRAP value of 0.148 mM $FeSO_4$ equivalents reflected moderate reducing power. The total phenolic content (177 µg GAE/mL) correlated well with antioxidant performance, confirming phenolics as key contributors (Poojary et al., 2021). UPLC detected eleven phenolic acids, with gallic acid (12.38 ± 0.46 ppm) as the most abundant, followed by chlorogenic and 2,5-dihydroxybenzoic acids. These compounds, known for their antioxidant, anti-inflammatory, and antimicrobial properties (Chen et al., 2020; Upadhyay & Dixit, 2015), collectively enhanced the extract's bioactivity. The presence of gallic, caffeic, ferulic, and p-coumaric acids suggests synergistic effects that strengthen antioxidant efficacy (Chung et al., 1998; Pereira et al., 2009). Overall, the diverse phenolic composition underscores the strong antioxidant potential of *S. polyanthum* and confirms its ethnomedicinal use, highlighting its promise as a natural antioxidant source for functional food and nutraceutical applications. Table 2. Phenolic acid composition of local *Indonesian* bay leaf, *S. polyanthum* aqueous leaf extract, as determined by UPLC.

Table 2
Phenolic acid composition of local Indonesian bay leaf, Syzygium polyanthum *aqueous leaf extract as determined by UPLC*

Phenolic Acid	Amount (ppm)
Quercetin	0.0564±0.0
2,5-dihyrobenzoic acid	0.66±0.03
Chlorogenic acid	0.93±0.07
Caffeic acid	0.1255±0.01
p-coumaric acid	0.28±0.02
Ferulic acid	0.31±0.06
Sinapic acid	0.1442±0.004
Gallic acid	12.38±0.46
Protocatechic acid	0.54±0.01
4-Hydroxybenzoic acid	0.18±0.001
Vanillic acid	0.08±0.004

Note. Values are the mean and standard deviation of triplicate independent runs

CONCLUSION

This study confirmed the antioxidant potential of the local Indonesian bay leaf, *S. polyanthum*. The aqueous extract exhibited strong DPPH radical scavenging activity (71.18%), moderate ferric reducing power (0.148 mM $FeSO_4$), and a high total phenolic content (177 µg GAE/mL). UPLC analysis identified gallic acid as the major phenolic compound, along with chlorogenic, caffeic, and ferulic acids as key bioactive constituents. These results validate the traditional use of *S. polyanthum* in food and medicine and highlight its promise as a natural antioxidant source for functional foods, dietary supplements, and therapeutic formulations. Further studies should examine its bioavailability, in vivo efficacy, and synergistic interactions among its phytochemicals to enhance its application potential.

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REFERENCES

Anuar, N. (2019). *Traditional culinary uses and ethnobotanical significance of local herbs in Kelantan and Terengganu* [Unpublished undergraduate thesis]. Universiti Malaysia Kelantan.

Chen, Y., Xie, M. Y., & Gong, X. F. (2020). Identification and quantification of phenolic acids in traditional Chinese herbs using UPLC–MS/MS. *Journal of Pharmaceutical and Biomedical Analysis, 177*, Article 112805. https://doi.org/10.1016/j.jpba.2019.112805

Chung, K. T., Wong, T. Y., Wei, C. I., Huang, Y. W., & Lin, Y. (1998). Tannins and human health: A review. *Critical Reviews in Food Science and Nutrition*, *38*(6), 421-464. https://doi.org/10.1080/10408699891274273

Dalimartha, S. (2005). *Atlas tumbuhan obat Indonesia* (Vol. 3). Puspa Swara.

Halim, N. R. A., Aziz, A. A., & Ismail, A. (2022). Antioxidant profiling of Malaysian herbal plants. *Malaysian Journal of Health Sciences, 20*(1), 30-38.

Pereira, D. M., Valentão, P., Pereira, J. A., & Andrade, P. B. (2009). Phenolics: From chemistry to biology. *Molecules*, *14*(6), 2202-2211. https://doi.org/10.3390/molecules14062202

Poojary, M. M., Passamonti, P., & Piccinelli, A. L. (2021). Application of DPPH assay for antioxidant activity determination in food matrices. *Food Chemistry, 359*, 129910. https://doi.org/10.1016/j.foodchem.2021.129910

Quattrocchi, U. (2012). *CRC world dictionary of medicinal and poisonous plants: Common names, scientific names, eponyms, synonyms, and etymology* (Vol. 5). CRC Press.

Renfrew, J. M., & Sanderson, J. (2005). *Pictorial guide to herbs and spices of the world*. New Holland Publishers.

Sharma, P., Jha, A. B., Dubey, R. S., & Pessarakli, M. (2021). Reactive oxygen species, oxidative damage, and antioxidative defense mechanism in plants under stressful conditions. *Journal of Botany, 2021*, Article 9994035. https://doi.org/10.1155/2021/9994035

Universiti Putra Malaysia. (2020). *Essential oils from selected Malaysian herbs as potential antimicrobial agents*. UPM Research Bulletin.

Upadhyay, R., & Dixit, M. (2015). Role of phenolic compounds in human health. In M. Soto-Hernandez, M. Palma-Tenango & M. Garcia-Mateos (Eds.) *Phenolic compounds – Biological activity* (pp. 1-15). IntechOpen. https://doi.org/10.5772/59929

Wilson, E. O. (2011). *The diversity of life*. Harvard University Press.

Yunarto, N., Putri, I. K., & Susanti, M. (2022). Antioxidant activity of ethanolic extract from *Syzygium polyanthum* leaves. *Asian Journal of Pharmaceutical and Clinical Research, 15*(1), 130-134.