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RSST003 - UNVEILING ANTIOXIDANT PROPERTIES OF *RHODOMYRTUS TOMENTOSA* (KEMUNTING): A COMPARISON BETWEEN ITS LEAF AND FRUIT

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ABSTRACT

Rhodomyrtus tomentosa (kemunting), a native plant of Southeast Asia, has long been used in traditional medicine and is now attracting attention for its antioxidant potential. This study compared the antioxidant properties of its leaves and fruits through the determination of total phenolic content (TPC), total flavonoid content (TFC), total anthocyanin content (TAC), and antioxidant activity using DPPH and FRAP assays. The leaf extract exhibited significantly higher TPC (115.90 ± 1.72 mg GAE/g), DPPH activity ($84.10 \pm 1.43\%$), and FRAP value (121.96 ± 1.42 mg TE/g), indicating stronger antioxidant capacity. In contrast, the fruit extract showed higher TFC (316.52 ± 6.79 mg QE/g) and TAC (86.11 ± 4.40 mg/L), reflecting its richness in flavonoids and anthocyanins. These findings highlight the distinct antioxidant profiles of kemunting leaves and fruits and emphasize the potential of this underexplored native plant for functional applications in Malaysia.

Keywords –*Rhodomyrtus tomentosa* (Kemunting), Antioxidant activity, DPPH, FRAP, anthocyanin

INTRODUCTION

Rhodomyrtus tomentosa (Ait.) Hassk, locally known as kemunting, belongs to the Myrtaceae family and is native to southern and Southeast Asia, including Malaysia, Sulawesi, southern China, and the Philippines (Zhao et al., 2020). Traditionally, it has been used in treating gynecopathy, heartburn, abscesses, wounds, and colic diarrhea due to its broad pharmacological applications (Lai et al., 2015). Natural antioxidants play the main role in preventing oxidative stress-related diseases by neutralizing free radicals and reactive oxygen species (Wu et al., 2015). Previous studies have confirmed that *R. tomentosa* contains significant levels of phenolics, flavonoids, and anthocyanins that contribute to its strong antioxidant properties (Cui et al., 2013; Abd Hamid et al., 2017).

OBJECTIVE

This study aimed to determine the phenolic, flavonoid, and anthocyanin contents of *Rhodomyrtus tomentosa* leaves and fruits, and to evaluate their antioxidant capacity using DPPH and FRAP assays.

METHODOLOGY

Fresh leaves and fruits of *R. tomentosa* were collected, freeze-dried, ground into fine powder, and extracted using 80% methanol. TPC was determined using the Folin–Ciocalteu method (Abd Hamid et al., 2017), TFC was measured with the aluminum chloride colorimetric method, and TAC evaluated using the pH differential method (Cui et al., 2013). Antioxidant capacity was assessed using the DPPH radical scavenging assay and the FRAP assay. Data were analyzed using independent t-tests, with results expressed as mean $\pm$ standard deviation.

RESULTS AND DISCUSSION

Total Phenolic Content (TPC)

The total phenolic content (TPC) of *Rhodomyrtus tomentosa* was determined using gallic acid standards (0–500 ppm) at 725 nm. The leaf extract showed the highest TPC (115.90 ± 1.72 mg GAE/g) compared to the fruit extract (58.02 ± 2.00 mg GAE/g), indicating a significant difference. This aligns with Zhao et al. (2020), who reported that the leaves generally accumulate more phenolics than fruits. Phenolic compounds play an important role in antioxidant defense by protecting plants against stressors and contributing to their strong radical scavenging activity (Idris et al., 2022; Abd Hamid et al., 2017).

Total Flavonoid Content (TFC)

The total flavonoid content (TFC) of *R. tomentosa* was determined using quercetin standards at 510 nm. The fruit extract showed significantly higher flavonoid levels (316.52 ± 6.79 mg QE/g) compared to the leaf extract (140.96 ± 7.80 mg QE/g). Wu et al. (2015) similarly reported that *R. tomentosa* berries have exceptionally high flavonoid levels, exceeding those in cranberries and other fruits.

Total Anthocyanin Content (TAC)

Fruit extracts recorded significantly higher TAC (86.11 ± 4.40 mg C3G/100g DW) than leaves (3.06 ± 0.35 mg C3G/100g DW). This is consistent with Cui et al. (2013), who identified cyanidin-3-O-glucoside as the dominant anthocyanin in *R. tomentosa* fruits.

DPPH Radical Scavenging Activity

The antioxidant capacity of *R. tomentosa* was evaluated using the DPPH assay with ascorbic acid as the standard at 517 nm. The leaf extract exhibited significantly higher radical scavenging activity ($84.10 \pm 1.43\%$) compared to the fruit extract ($58.61 \pm 1.56\%$), indicating stronger antioxidant potential in the leaves. This result is aligned with Idris et al. (2022), stated the potent antioxidant activity in *R. tomentosa* leaf extracts. Comparative studies of extracts with different solvent systems have also reported similar observations, indicating the role of leaves as a rich source of bioactive compounds contributing to free radical scavenging (Abd Hamid et al., 2017).

Ferric Reducing Antioxidant Power (FRAP)

The FRAP values of leaf extracts (121.96 ± 1.42 mg TE/g) were significantly higher than those of fruits (75.79 ± 1.90 mg TE/g), suggesting greater reducing power due to higher phenolic and flavonoid contents. These findings support previous evidence linking phytochemical content to antioxidant activity in *R. tomentosa* (Wu et al., 2015; Lai et al., 2015).

CONCLUSION

This study investigated the antioxidant properties of *Rhodomyrtus tomentosa* leaves and fruits using freeze-dried samples. The leaf extract showed higher total phenolic content with value 115.90 ± 1.72 mg GAE/g, $84.10 \pm 1.43\%$ of DPPH activity, and 121.96 ± 1.42 mg TE/g of FRAP value indicating stronger antioxidant capacity. In contrast, the fruit extract had higher total flavonoid content and anthocyanin with value 316.52 ± 6.79 mg QE/g and 86.11 ± 4.40 mg C3G/100g DW, respectively. To conclude, the leaf exhibited greater antioxidant activity, while the fruit was richer in flavonoids and anthocyanins.

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