



Antioxidant and antioxidant activity of ethanolic extract from *Mitrephora* sp. leaves

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Abstract

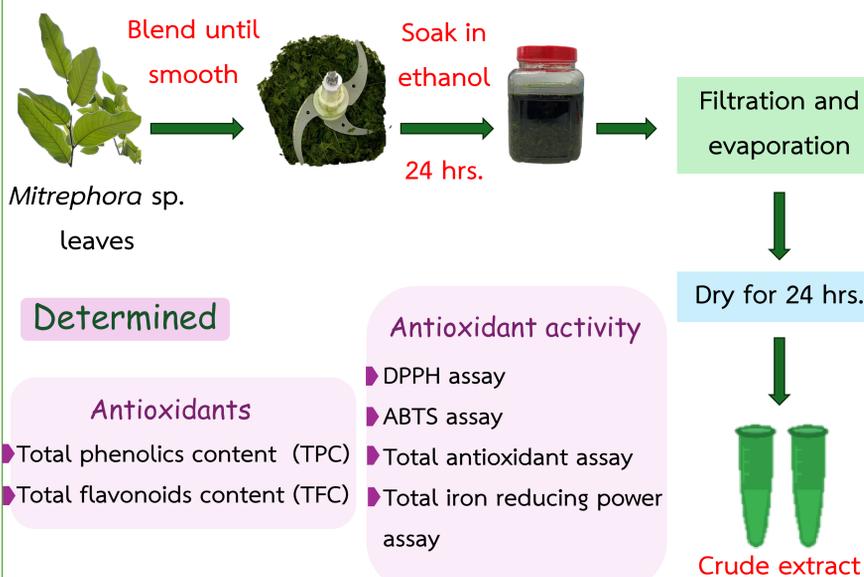
Free radicals are key factors that trigger the aging process and various degenerative diseases. The consumption of medicinal plants rich in antioxidants has gained considerable attention due to their potential to mitigate oxidative damage caused by free radicals. Therefore, discovering new plant species with high antioxidant properties remains a challenge for researcher worldwide. In Thailand, *Mitrephora* sp. belongs to the Annonaceae family. However, no studies have reported on the antioxidant efficacy of this plant species. Thus, the objective of this study was to investigate the antioxidant content and activity of ethanolic extract from *Mitrephora* sp. leaves. The total phenolic content (TPC) and total flavonoid content (TFC) were examined, while antioxidant activities were assessed using the total antioxidant assay, 2,2'-azino-bis (3-ethylbenzthiazoline-6-sulphonic acid) (ABTS) assay, 2,2-Diphenyl-1-picrylhydrazyl (DPPH) assay, and ferric reducing power assay. It was found that the ethanolic extract of *Mitrephora* sp. contained TPC and TFC values of 74.6 mg gallic acid equivalent/g extract and 166.8 mg quercetin equivalent/g extract, respectively. The total antioxidant capacity was 177.6 mg ascorbic acid equivalent/g extract, while the median effective concentration for reduction of Fe³⁺ to Fe²⁺ was 9.0 mg/ml. Additionally, the extract exhibited strong antioxidant activity against ABTS and DPPH radicals, with the median inhibitory concentrations of 10.7 mg/ml and 4.2 mg/ml, respectively. These finding suggest that *Mitrephora* sp. leaf extract has strong antioxidant potential, making it a promising natural source for health-promoting applications. It may serve as an ingredient in food and pharmaceutical industries to reduce the risk of oxidative stress-related degenerative diseases.

Results and Discussion

Introduction

Free radicals are unstable molecules with unpaired electrons that triggering chain reactions, damaging cells, membranes, and DNA (Herzberg, 1971), and contributing to aging and chronic diseases. Excessive free radicals cause oxidative stress, leading to cellular damage. Plants in the Annonaceae family, such as *Annona muricata*, *Annona squamosa* and *Mitrephora* sp., contain flavonoids with potential antioxidant properties. However, research on *Mitrephora* sp. remains limited. This study aims to assess the antioxidant activity of its leaf extract, potentially contributing to the development of natural antioxidants

Materials and Methods



Conclusion

Mitrephora sp. leaf extract effectively scavenges free radicals, highlighting its potential to inhibit oxidative processes. This suggests that the extract could serve as a natural source of antioxidants for the future development of health products.

References

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Contents of phenolics and flavonoids

Table 1 Phenolics and flavonoids contents of ethanolic extract from *Mitrephora* sp. leaves.

Sample	Phenolic content (mg GAE/g extract)	Flavonoid content (mg QE/g extract)
extract	74.64	166.8

Antioxidant activity

The DPPH assay yielded an IC₅₀ value of the extract at 10.73 mg/ml, which is higher than the IC₅₀ of gallic acid with the value of 4.99 mg/ml, indicating a lower antioxidant efficacy. Conversely, in the ABTS assay, the extract exhibited a lower IC₅₀ value of 4.20 mg/ml compared to 4.39 mg/ml for gallic acid, suggesting superior antioxidant activity. The extract had higher performance in the ABTS assay may be due to differences in the testing mechanisms. The ABTS assay evaluates antioxidants in a more stable and diverse environment, allowing the extract to perform better. In contrast, the DPPH assay measure only specific types of antioxidants, which may explain the lower results observed in that method (Jonas *et al.*, 2014).

The total antioxidant assay results showed that the extract had a total antioxidant capacity of 177.62 mg AAE/g extract, based on the absorbance comparison with the standard ascorbic acid calibration curve. This indicates that the extract possesses antioxidant activity, highlighting its potential as an antioxidant source. In the total iron- reducing power assay (Table 2), the extract had an EC₅₀ value of 9.04 mg/ml, significantly higher than that of ascorbic acid (0.20 mg/ml), indicating a lower iron-reducing ability, likely due to differences in active compound concentration and composition.

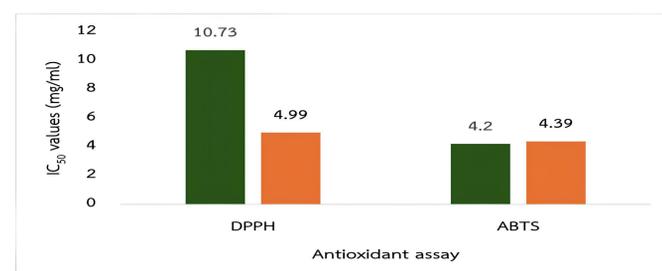


Figure 1 The IC₅₀ values of the extract and the standard gallic acid obtained from the DPPH and ABTS assays. The green bars represents the extract, and the orange bars represents the standard gallic acid.

Table 2 The EC₅₀ values of the standard ascorbic acid and the ethanol extract from *Mitrephara* sp. leaves when tested using the total iron reducing power assay.

Samples	EC ₅₀ values (mg/ml)
ascorbic acid	0.20
extract	9.04

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