Inhibition of Nitric Oxide and Free Radical Scavenging Activities of some Selected Thai Medicinal Flowers

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Introduction

Cananga odorata Hook. f. & Thomson (Annonaceae), which is commonly called "Kradang-nga",[1] is a fast-growing tree and can be found natively in tropical Asia such as Thailand, Malaysia and Indonesia. This plant is exploited at a large scale for its essential oil which has not only been used in cosmetic industry, but also in food industry. Traditionally, *C. odorata* is used to treat malaria, stomach ailments, asthma, gout, and rheumatism.[2]

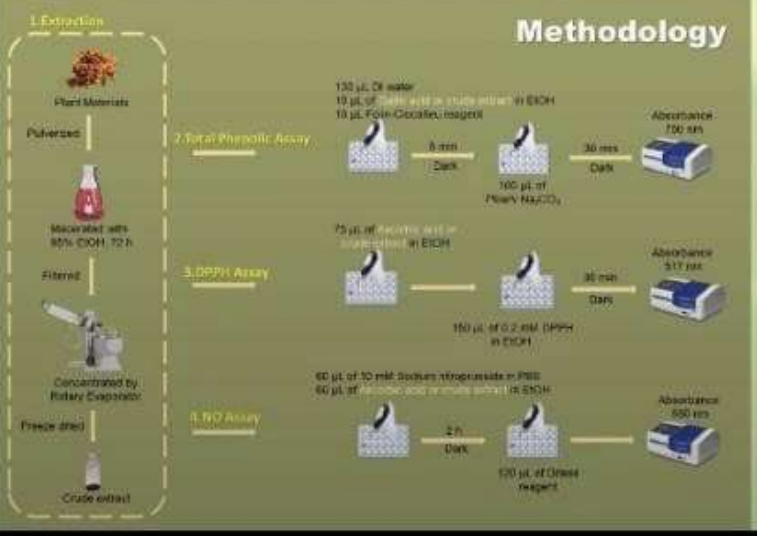
Mammea siamensis (Miq.) T. Anderson, known in Thai as "Saraphi",[1] is a species of flowering plant in the Calophyllaceae family and is widely distributed in Thailand, Laos, Cambodia, Vietnam and Myanmar. The flowers of this plant have been used for preparing a heart tonic in Thai traditional medicine.[3]

Melodorum fruticosum Lour., locally known as "Lam Duan",[1] belongs to the Annonaceae family, which is widely distributed in Southeast Asia and more specifically indigenous to Vietnam, Laos, Cambodia and Thailand. The flowers are fragrant and are used to make perfume, while dried flowers are a mild cardiac stimulant and in Thailand these are used as a blood tonic.[4,5]

Mesua ferrea L. (Clusiaceae), known in Thai as "Bun-nak", is commonly distributed in India, Sri Lanka, Myanmar, Indo-China, Thailand, Singapore and Malaysia. This plant demonstrated various biological activities such as anti-arthritic, anti-bacterial, anti-biotic, anti-cancer, anti-fungal, anti-inflammatory, anti-oxidant, cytotoxic, hepatoprotective, larvicidal and wound healing activities.[6] The flower of this plant is locally used as astringent and stomachic drugs.[7]

The aims of this study were to evaluate total phenolic contents and inhibition of nitric oxide and DPPH free radical scavenging activities of the ethanolic extracts of selected Thai medicinal flowers, *C. odorata*, *M. siamensis*, *M. fruticosum* and *M. ferrea*.

Methodology



Results, Discussion and Conclusion

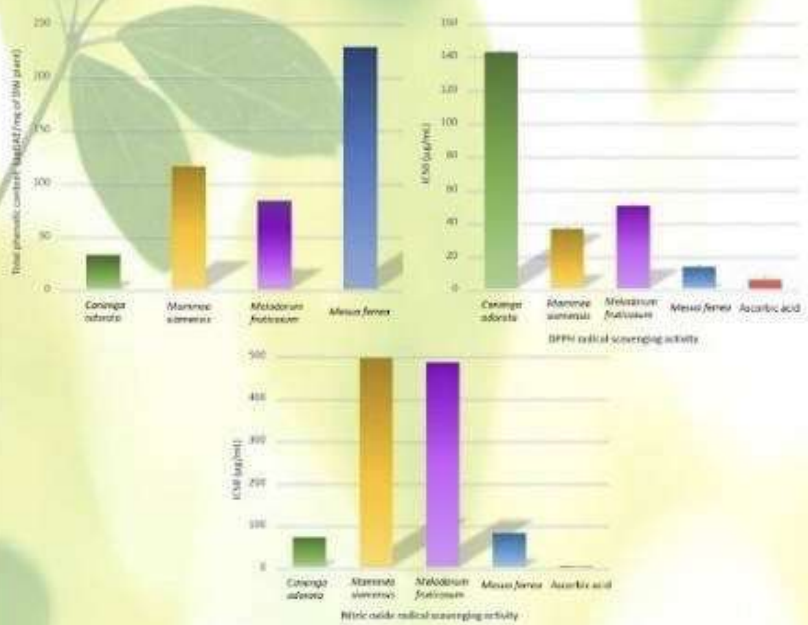
In this study, the antioxidant activity of the 95% ethanol extracts of the dried flowers of four Thai medicinal flowers, *C. odorata*, *M. siamensis*, *M. fruticosum*, and *M. ferrea* was evaluated. Antioxidant activity was determined by spectrophotometric methods using DPPH free radical, and nitric oxide radical inhibition assays. In addition, total phenolic content was also determined by using the Folin-Ciocalteu method. The extract of *M. ferrea* flowers displayed the strongest antioxidant activity with an IC_{50} value of 12.87±1.043 µg/mL, compared to the standard ascorbic acid with an IC_{50} value of 5.15±1.039 µg/mL. This extract also contained the highest total phenolic content (227.23±0.012 µgGAE/mg). Moreover, the *C. odorata* extract exhibited weak nitric oxide radical scavenging activity with an IC_{50} value of 69.68±1.097 µg/mL, whereas the standard ascorbic acid displayed an IC_{50} value of 0.35±1.247 µg/mL. The *M. ferrea* flowers may be served as an interesting source of antioxidants with their applications in different fields, for example, food, cosmetics and pharmaceuticals.

Table 1 Total phenolic content and antioxidant activity of selected Thai medicinal flower extracts

Sample	Total phenolic content (µg GAE/mg of DW plant)	IC_{50} (µg/mL)	
		DPPH radical scavenging	Nitric oxide scavenging
Cananga odorata	32.13±0.017	142.00±1.054	69.68±1.097
Mammea siamensis	115.27±0.003	35.92±1.127	493.00±1.033
Melodorum fruticosum	82.92±0.006	49.72±1.039	482.60±1.047
Mesua ferrea	227.23±0.012	12.87±1.043	79.83±1.084
Ascorbic acid[a]	-	5.15±1.039	0.35±1.247

[a]Ascorbic acid was used as positive control

Figure 1 Antioxidant activity of selected Thai medicinal flower extracts (A) total phenolic content, (B) DPPH radical scavenging activity and (C) nitric oxide radical scavenging activity



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Acknowledgements

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