Effects of extraction method, solvent and time on the bioactive compounds and antioxidant activity of Tetrigona apicalis Malaysian propolis

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ABSTRACT
Propolis, a type of resin produced by honey bees, has many medicinal properties. Various extraction methods and conditions had been studied to extract the bioactive compounds from raw propolis. However, different extraction methods and extraction conditions were reported to exhibit different extraction efficiencies. Hence, in this study, different extraction methods, namely maceration, ultrasound-assisted extraction and combination of maceration and ultrasound-assisted extraction, as well as extraction solvents and extraction times, were examined to investigate the effects on the amount of total phenolic content, total flavonoid content and antioxidant activity of Tetrigona apicalis Malaysian propolis extract. Experimental results showed that combination method of maceration and ultrasound-assisted extraction is the best method for extracting the highest amount of total phenolic content with 70% aqueous ethanol as solvent and obtained at the longest extraction time (24 h of maceration and 60 min of ultrasound-assisted extraction). While for total flavonoid content, maceration exhibited the best extraction method and the highest amount of flavonoid was obtained from 80% aqueous ethanol at the lowest extraction time (8 h). Meanwhile, antioxidant activity was found to have strong correlations with phenolic and flavonoid contents. In conclusion, it is crucial to develop effective extraction method and conditions depending on the targeted compounds and desired properties to enhance the extraction efficiency.

KEYWORDS
Antioxidant activity; Bioactive; Extraction; Propolis; Solvent

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