

ANTIOXIDANT ACTIVITY OF AQUEOUS EXTRACT OF TRIGONA SPP. PROPOLIS USING RESPONSE SURFACE METHODOLOGY

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ABSTRACT

Trigona spp. propolis (Propolis Lebah Kelulut) previously has been reported as an antioxidant property, anti-fungal, anti-inflammatory and antiviral. Propolis or known as bee glue is a complex resinous substance and has gained many attentions recently due to its medicinal and health purposes and also high in price market value. In this study, the extraction of antioxidant activities was evaluated and Response Surface Methodology (RSM) with central composite design (CCD) was employed in determining the optimal conditions towards total phenolic content (Y_1 = TPC), ascorbic acid equivalent antioxidant content (Y_2 = AEAC) and ferric reducing ability power (Y_3 = FRAP). The optimization parameters tested were extraction temperature (X_1 = 30 - 60 °C) and time (X_2 = 24 - 72 hrs). The CCD generated eight experimental points and five replications at the centre points. A polynomial model developed a satisfactory fitting of the experimental data with respected to the TPC ($R^2= 0.8431$, $p = 0.0098$), AEAC ($R^2= 0.8976$, $p = 0.0024$) and FRAP ($R^2= 0.8780$, $p = 0.0042$). The optimum conditions of extraction temperature and time were obtained at 49.0 °C and 24.0 hrs with a maximum yield of antioxidant properties were achieved. In conclusion, the establishment of this model can provide a robust experimental foundation using RSM for optimizing the extraction temperature and time for aqueous extract of *trigona spp.* propolis.

Keywords: Antioxidants, Trigona, bee, propolis, response, surface, methodology, optimization, central composite design

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