PHENOLIC COMPOUNDS AND ANTIOXIDANT ACTIVITY OPTIMIZATION OF TRIGONA HONEY AND PROPOLIS USING RESPONSE SURFACE METHODOLOGY

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ABSTRACT

The optimum combination of honey and propolis for total phenolic content (TPC), total flavonoid content (TFC), and antioxidant activity were analysed for Trigona honey and Trigona propolis aqueous extract using response surface methodology and central composite design. The influence of honey (X1:15–16.5 g) and propolis (X2:13.5–15g) on TPC (Y1), TFC (Y2), DPPH (Y3), ABTS (Y4) and FRAP (Y5) were tested. The experimental results were adequately fitted into a second-order polynomial model regarding TPC (R2 = 0.9539, p =0.0002), TFC (R2 = 0.9209, p = 0.0010), DPPH (R2 = 0.9529, p =0.0002), ABTS (R2 = 0.9817, p < 0.0001), and FRAP (R2 = 0.9363, p = 0.0005). The optimum percentage compositions of honey and propolis were 15.26g (50.43%) and 15g (49.57%), respectively. The predicted outcomes for TPC, TFC, DPPH(IC_{50}), ABTS, and FRAP were 162.46 mg GAE /100g, 2.29 mg QE/g , 14.52 mg/ml, 564.27 µMTE/g, and 3.56 mMTE/g, respectively. The experimental results were close to predicted outcomes, 152.06 ±0.55 mg GAE/100g, 2.21± 0.05 mg QE/g , 13.85 ± 0.34 mg/ml, 555.22±36.84 µMTE/g, and 3.71± 0.02mMTE/g, respectively. Therefore, the optimum combination of honey and propolis with remarkable antioxidant properties could be applied as food additives, cosmetics and pharmacological applications.

Keywords: Phenolic Compounds; Antioxidant Activity, Trigona Honey, Propolis, Response Surface Methodology