

Macrominerals and Their Correlations with Ash, Electrical Conductivity and PH of Malaysian Trigona and Tualang Bee Honey

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ABSTRACT

Introduction: Honey is mainly composed of a complex mixture of carbohydrates and other minor substances, such as organic acids, amino acids, proteins, minerals, and vitamins.

Materials and Method: In this study, four honey samples were collected from four different locations. TB1 (Trigona bee honey from Kedah), TB2 (Trigona bee honey from Kelantan), TU1 (Wild Tualang bee honey from Pahang) and TU2 (Tualang bee honey collected from a farm in Pahang). Four elements, potassium (K), sodium (Na), calcium (Ca) and magnesium (Mg) were detected by inductively coupled plasma mass spectrometry (ICP-MS).

Results and Discussion: The amounts of macrominerals were in range as follows (in ppm): K (136.97±2.30 - 5162.93±23.17), Na (406.63±3.33 - 514.70±6.27), Ca (37.03±1.84 - 214.80±2.76) and Mg (1.53±0.06 - 364.23±2.8). However, TB2 exhibited significantly ($p<0.05$) the highest values of K, Ca and Mg. Electrical conductivity (EC) values ranged from 0.197±0.005 to 1.473±0.018 mS/cm, while ash values ranged from 0.034±0.003 to 0.766±0.010 g/100g. TB2 recorded significantly ($p<0.05$) the highest values for both EC and ash values. pH value ranged from 3.080±0.020 for TB1 to 4.037±0.030 for TB2. However, considering the correlation between the macromineral with EC, ash and pH values, there were several strong positive correlations. Potassium, calcium and magnesium exhibited significantly ($p<0.05$) positive strong correlations with both ash and EC values at correlation coefficients of 0.987, 0.886 and 0.978, respectively. However, no significant correlations were observed for pH values with macrominerals.

Conclusion: The correlations between macrominerals and both electrical conductivity and ash content are suggesting that, EC and ash values could be used as good indicators of macrominerals in honey samples.

KEYWORDS: Trigona, tualang, macromineral, electrical conductivity, pH

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