

**ANALYSES OF MINERAL CONTENT AND HEAVY METALS OF
STINGLESS BEE HONEY FROM MARA UNIVERSITY OF
TECHNOLOGY JENGA, PAHANG**

RAJA NUR ERNASHAHIDA BINTI RAJA JAAFAR

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ABSTRACT

ANALYSES OF MINERAL CONTENT AND HEAVY METALS OF STINGLESS BEE HONEY FROM MARA UNIVERSITY OF TECHNOLOGY JENGA, PAHANG

Chemical characterization has been carried out on stingless bee honey samples in total from five species which are *Heterotrigona erythogastra*, *Heterotrigona itama*, *Tetrigona melanoleuca*, *Tetrigona binghami* and *Tetrigona apicalis* from UiTM Jengka, Pahang. The concentration of 14 elements were determined by Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES). Its divided into three groups elements which were four major element or mineral content (Ca, K, Mg and Na), seven trace elements (Co, Cr, Cu, Fe, Mn, Ni and Zn) and three heavy metals (Al, Cd and Pb) were determined in the stingless bee honey samples. Ca, K, Mg and Na were the most abundant elements in all five species of stingless bee honey. The trace elements for Co, Cr and Ni mostly not detected in all samples. Among the heavy metals, only lead and Aluminium were detected in low concentration. Next, the water and sugar content was identified by using Fourier-Transform Infrared Spectroscopy (FTIR) to determine the stretching vibration frequency to detect the functional group of the compound. The greatest stretching vibration of the O-H in H₂O bands with the maximum at 3275.70 cm⁻¹ was in the *Heterotrigona itama* honey species, followed by *Tetrigona apicalis* at 3271.64 cm⁻¹, *Tetrigona melanoleuca* at 3271.42 cm⁻¹, *Tetrigona binghami* at 3271.31 cm⁻¹ while the lowest for *Heterotrigona erythogastra* honey species at 3270.65 cm⁻¹. Stretching vibrations for both C-O in C-OH and C-C groups in the carbohydrate structure was seem very fascinating that clearly shows various sugar composition of the stingless bee honey samples. Thermogravimetric Analysis (TGA) was used to determine the honey decompose at a certain temperature by observing at a mass loss. The percentage mass loss for *T. apicalis* which was about 78.25%, for *T. binghami* species sample was 88.86% and for *T. melanoleuca* species sample was 79.22%. The highest percentage mass loss was about 96.50% in *H. erythogastra* species of stingless bee honey sample and the lowest percentage mass loss in *H. itama* species was about 76.70%.