

Paper ID: A174

Physicochemical and Microbiological Analysis of Stingless Bees Honey Collected from Local Market in Malaysia

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EXTENDED ABSTRACT

Honey is a sweet, viscous solution containing approximately 200 compounds, with the major content being water and sugars [1]. Due to its high nutritional value and unique taste, honey became popular as natural sweetener and medicine [2]. The growing demand for honey in the market has led to the occurrence of the tampering honey with foreign substances and increases the production of artificial honey. Thus, the study aimed to assess the quality of purely harvested honey and commercial honey available in Malaysia market with respect to the physicochemical properties and microbial profile. Six samples of stingless bees honey collected from local market in Malaysia (Fig.1) were investigated. Physicochemical parameters such as pH, free acidity, moisture content, electrical conductivity, ash content, hydroxymethylfurfural (HMF) and diastase activity were analyzed in each honey samples. For microbial profile, standard plate count, detection of total coliform, yeast and mould were examined. All analysis is carried out following the Association of Official Analytical Chemists methods and Harmonised Methods of the International Honey Commission and the result were compared with Malaysian Standard Kelulut (Stingless Bee) standard and Codex Alimentarius Commission. The physicochemical analyses show pH (2.51- 3.26), free acidity (121.1 to 318.7 meq/kg), moisture (19.4%-30.9%), electrical conductivity (0.33-0.69 mS/cm), and ash content (2.75-4.31g/100g). Hydroxymethylfurfural (HMF) content and diastase activity are varied from 35.4 to 461.7 mg/kg and 2.71 to 6.11 DN. As for microbial analyses, bacterial growth has been found in most samples, expressing poor hygienic procedures during harvesting, packaging or storage [3]. All analysed samples are within the maximum limit of the quality criteria set by Malaysian Kelulut Standard and Codex Alimentarius except for free acidity, HMF and diastase number. HMF is one of the indicators used to assess the quality of honey which literally absence in fresh honey [4]. Result shows that H4 has the lowest HMF values (35.4 ± 0.71 mg/kg) but still exceeded the limit set by Malaysian kelulut standard (< 30 mg/kg). H3, H5 and H6 exceeded the HMF limit in both international standard and kelulut standard (>400 mg/kg) which suggest that the three honey has undergone heating process or they are probably adulterate honey. Fig 2 illustrates the HMF level of six honey samples where the highest value is at 461.7 mg/kg. The high HMF suggests that the honey is either overheating or stored in poor condition [5] which confirms the low quality of the honey. Although this study was a preliminary work and only limited to six samples, more sample data is in preparation in order to be part of the process to create a more specific legislation for stingless bees honey in Malaysia that may help to protect consumer from purchasing adulterated honey. All the data obtained is vital in order to create a specific statute for stingless bees honey in Malaysia that may help to protect consumer from purchasing adulterated honey.

Sample Code	Description	Sampling Location	Time of collection
H1	Harvested honey	Pahang	July, 2017
H2	Harvested honey	Pahang	July, 2017
H3	Commercial honey	Selangor	October, 2017
H4	Commercial honey	Kedah	October, 2017
H5	Commercial honey	Kuala Lumpur	November, 2017
H6	Commercial honey	Pahang	September, 2017

Fig 1. Sampling Location, description and time collection of six sample of stingless bee honey from Malaysia

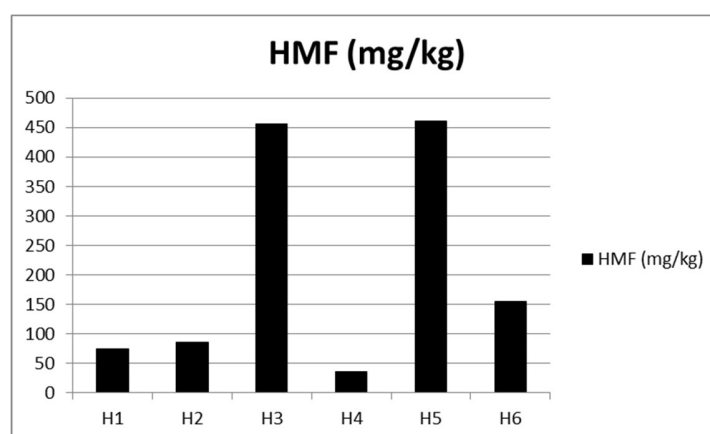


Fig. 2. Hydroxymethylfurfural (HMF) values of six honey samples collected from local market in Malaysia

Keywords: Honey; Adulteration; Physicochemical; Microbiological; Quality.

Acknowledgment

This study was financially supported by University Malaysia Pahang (Grant no: PGRS 180395). We also would like to thank meliponiculturists especially from Aqif Kelulut Farm, Pekan, Pahang for providing and assisting us in collection of stingless bee honey samples.

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