Evaluation and characterization of physico-chemical quality parameters of stingless Bee (*Apidae Meliponini*) honey in Amhara Region

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ABSTRACT

This study aimed to evaluate the physicochemical parameters of honey samples of stingless bees (Meliponinae). Following the honey flow season, the honey samples were collected from 9 potential districts in the Amhara region. About 41 honey samples were evaluated for physicochemical parameters of pH, free acidity, electrical conductivity, hydroxymethylfurfural, moisture content, specific rotation, ash content, color, reducing sugars, and sucrose. The Melissopalynological and sensory analysis had been used as a complement to physicochemical analysis. The composition analysis showed that the mean values of moisture content were 29.69±3.53; electric conductivity, 0.78±0.14; pH, 3.38±0.19; ash, 0.5±0.17; free acidity, 67.47±23.85; HMF, 8.38±4.47; specific rotation, 2.24±4.79; total reducing sugar, 55.27±4.24 and Sucrose, 3.17±1.5. The color of honey ranges from amber (97.6%) to dark amber (2.4%). The values compared against the standard Apis mellifera honey quality parameters and varied for some parameters based on botanical origin. The parameters pH, electric conductivity, sucrose, ash and HMF in the honey samples comply with the requirements of the previous global reports. The moisture content, reducing sugar, and free acidity do not comply with the limit compared to Apis mellifera honey, implying that this product can undergo fermentation quickly if not properly stored after harvesting. This fact showed the necessity of proper honey harvesting, creating specific legislation for stingless bee honey, and justifies the need for a more harmonized standard of the product. The sensory evaluation result also revealed that on average the judges slightly like the stingless bee honey, which is slightly above the neutral score 5 (neither like nor dislike). The result of the melissopalynological analysis also confirmed the presence of three predominant plant species and important pollen types that confirm the honey botanical and its real geographical origin.

Keywords:

INTRODUCTION

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MATERIAL AND METHODS

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Determination of moisture content

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Determination of pH and acidity

Determination of electrical conductivity

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Determination of hydroxymethylfurfural (HMF)

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Determination of specific rotation

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Determination of ash content

$$\frac{\mathrm{m3}-\mathrm{m1}}{\mathrm{m2}} * 100$$

Reducing sugar and apparent sucrose determination

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Pollen analysis

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Predominant pollen type
Secondary pollen type E
Important minor pollen type E
Minor pollen type

Color

Physical characterization using sensory analysis

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Statistical analyses

RESULTS AND DISCUSSION

Moisture content

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pH and free acidity

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Electrical conductivity

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Ash content

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HMF

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Total reducing sugar and sucrose

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Specific rotation

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Correlation among some physicochemical parameters

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Sensory evaluation

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Melissopalynological analysis

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Guizotia abyssinica	*Asteraceae*
Bidens pachyloma	*Asteraceae*
Eucalyptus camaldulensis	*Myrtaceae*
Total	

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Bidens pachyloma	*Asteraceae*
Caesalpinia decapetala	*Fabaceae*
Echinops	*Asteraceae*
Eucalyptus camaldulensis	*Myrtaceae*
Gravillea robusta	*Proteaceae*
Guizotia abyssinica	*Asteraceae*
Hypericum quartinianum	*Guttiferae*
Hypoestes trifolia	*Acanthaceae*
Sorghum bicolor	*Poaceae*
Vicia faba	*Fabaceae*

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Gravillea robusta	*Proteaceae*
Bersama abyssinica	*Francoaceae*
Bidens pachyloma	*Asteraceae*
Caesalpinia decapetala	*Fabaceae*
Croton macrostachyus	*Euphorbiaceae*
Echinops spps	*Asteraceae*
Eucalyptus camaldulensis	*Myrtaceae*
Hypericum quartinianum	*Guttiferae*
Hypoestes trifolia	*Acanthaceae*
Zea mays	*Poaceae*
Schinus molle	*Anacardiaceae*
Sorghum bicolor	*Poaceae*
Viciafaba	*Papilionaceae*

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Acacia brevispica	*Fabaceae*
Acacia senegal	*Fabaceae*
Acacia seyal	*Fabaceae*
Becium grandiflorum	*Lamiaceae*
Bersama abyssinica	*Francoaceae*
Caesalpinia decapetala	*Fabaceae*
Echinops spps	*Asteraceae*
Zea mays	*Poaceae*
Ocimum bacilicum	*Lamiaceae*
Sorghum bicolor	*Poaceae*
Vernonia spps	*Asteraceae*

CONCLUSION AND RECOMMENDATION

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REFERENCES

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