

Chapter 7

Dehydration Treatment Effect on the Physicochemical Properties and Microbial Population of Stingless Bee Honey From Three Different Species

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ABSTRACT

Honey is a natural product produced from the nectar of a variety of plants by stingless bees. Honey has been utilized for nutritional food for ages, and in recent years,

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*stingless bee honey has been exploited as a food supplement for excellent health, cosmetic maintenance, and culinary enjoyment. Stingless bee honey has a higher moisture content (30-40%) and acidity than honeybee honey due to the presence of organic acid, mineral, and other trace components. Honey's moisture content is a key aspect that affects its stability and shelf life. The current study aimed to access the quality of dehydrated stingless bee honey from three different species namely, *Heterotrigona itama*, *Geniotrigona thoracica*, and *Tetrigona apicalis*. The dehydration treatment of T1 (20% moisture content at 60°C in 6 hours) and T2 (15% moisture content at 60°C in 8 hours) honey samples were subjected to physicochemical properties and microbial population studies.*

INTRODUCTION

Stingless bee is known as a non-stinger bee and there are about 500 species of stingless bee that could be found across the globe. They are distributed in Latin America (Melipona, Tetragonisca, Scaptotrigona and Plebeia), the mainland of Australia (Tetragonula), Africa (Meliponula) and tropical parts of Asia (Lepidotrigona, Tetrigona, Homotrigona, Lisotrigona) (Nordin et al., 2018). In tropical countries like Malaysia, Thailand, Mexico, Venezuela, Brazil, and Australia stingless beekeeping practice is a better-known tradition. In Malaysia, more than 30 species of stingless bees locally known as “Kelulut” were found (Shamsudin et al., 2019). *Geniotrigona thoracica*, *Heterotrigona itama*, *Lepidotrigona Terminata*, *Tetragonula fuscobalteata*, and *Tetraponera laeviceps* are the most popular species for bee raising and economic value (Kelly et al., 2014). However, stingless bee honey has good quality and is reported to have antitumoral, antimicrobial, and antioxidant activities (Lani et al., 2017).

Honey is a complex food substance with around 200 distinct ingredients, including fructose, glucose, water, proteins, vitamins, minerals, polyphenolic chemicals, and plant derivatives (Nolan et al., 2019). Stingless bee honey is an astounding ‘miracle liquid’ with countless medicinal properties for various diseases such as gastroenteritis, and cataracts, as well as for wound healing (Rosli et al., 2020). It has been long recognized that the quality of honey is influenced by seasonal variations, post-harvest handling of honey, and storage condition. Due to the enormous demand for stingless bee honey and its therapeutic potential, quality and authenticity are still key considerations in its consumption and marketing (Gela et al., 2021). Because of its short shelf life, stingless bee honey has a limited global distribution (Moo-Huchin et al., 2015).

The physical and chemical properties of honey are qualitative parameters that are essential to determine its suitability for processing into a commercial product. The

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