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Physicochemical, Phytochemical, and Shelf-Life Studies of a Functional Jelly from Banana (Musa Paradisiaca) and Malaysian Stingless Bee Honey (Trigona sp.)

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Abstract
With rising interest in health and nutrition, the demand for functional food is increasing. Therefore, M. paradisiaca and Trigona sp. honey jelly (MTJ) was formulated in the present study to introduce a healthy ready-to-eat product into the market. The MTJ was assessed for proximate analyses, pH, total soluble solids (TSS) and texture profile analysis (TPA). Total phenolic content (TPC) and total flavonoid content (TFC) were also measured. Shelf life was estimated for five months with different packaging materials (aluminum and polypropylene)and storage conditions (4°C and 26°C). The results showed that MTJ has a high carbohydrate content (79.01 ± 0.23%), adequate amount of protein (7.07 ± 0.37%), low-fat content (0.1 ± 0.03%), and supplied 345.22 kcal/100g of gross energy. Other results found moisture content (14.09 ± 0.95%), ash content (0.38 ± 0.03%), fiber (not detected), pH 5.07 ± 0.12 and TSS (78.33 ± 0.29°Brix). The TPA revealed valuable insights into physical properties of MTJ which are hardness (15.27 ± 1.11 N), adhesiveness (-416.14 ± 82.98 g.sec), cohesiveness (0.88 ± 0.00), springiness (0.85 ± 0.02 mm), chewiness (11.54 ± 1.13 N), gumminess (13.48 ± 0.94 N) and resilience (0.69 ± 0.02). The TPC was 18.30 ± 2.67 (mg GAE/100g), and the TFC was 0.35 ± 0.02 (mg CEQ/100g), showing that the MTJ contains a comparable antioxidant content. Shelf-life study showed that the CFU values of SPC for the MTJ were significantly higher ($p < 0.05$) than the control jellies. For YMC, the CFU values for MTJ were also significantly higher than the control jellies ($p < 0.05$) from month 0 to 3 but started to decrease from month 4 to 5. Although the colonies were detected in the MTJ, the CFU values were still within the limit allowed and safe to be consumed for up to five months. Overall results reveal the prospective of MTJ as a functional jelly based on its sufficient nutritional properties with satisfactory shelf life. Further benefits from this study could contribute to the commercial valorization of the local fruit and honey, thereby preventing post-harvest losses, improving local income, and promoting sustainable food development. © 2022 The Author(s). Published by Enviro Research Publishers.

Author Keywords
Functional jelly; M. paradisiaca; Phytochemical; Proximate analysis; Shelf life; Trigona sp.honey

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