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Impact of Thermal Processing on the Properties of Melipona bicolor Honey

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Stingless bees (SB) collect and modify flower nectar with salivary secretions and enzymes to produce honey, a natural food product with varying chemical composition, flavor, and aroma depending on the bee species, geographic region, nectar source, processing conditions and storage. SB honey differs from *Apis mellifera* honey due to its smaller-scale production, distinct sweetness mixed with a slightly acidic taste, fluid texture, and higher market value. However, data on the influence of storage and thermal treatment on this honey are still limited. The objective of this study was to compare the physicochemical characteristics and mesophilic bacterial load of *Melipona bicolor* honey in its natural state and after thermal processing, analyzed immediately after collection and again after one year of storage. Six honey samples from the guaraipo bee were evaluated, obtained from two meliponary in Mandirituba and one in Fazenda Rio Grande. The samples were collected by producers on the same day using suction and filtration, then bottled in sterile glass jars and refrigerated until sent to the laboratory. Each sample was divided into two parts: one kept in its natural state and the other subjected to thermal processing (60°C for 3 minutes), following usual practices of the producers. Subsequently, pH, acidity, moisture content, and standard plate count of mesophilic aerobes were analyzed. The analysis of physicochemical properties between natural and heated honey revealed significant differences. The initial pH of natural honey averaged 2.91 (±0.06), while heated honey registered 2.92 (±0.03). After one year, the pH of natural honey decreased to 2.55 (±0.08), while heated honey remained slightly higher at 2.66 (±0.07). Regarding acidity, natural honey started with an average of 8.18 (±1.41) and increased significantly after a year to 13.86 (±0.77), while heated honey started with 7.89 (±1.58) and showed an average of 7.93 (±2.77) after the same period. The moisture content of freshly collected natural honey averaged 33.21% (±0.57%), compared to 32.81% (±0.17%) for heated honey. Over time, the moisture content of natural honey increased to an average of 34.00% (±0.50%), while heated honey reached 33.08% (±0.65%). Mesophilic counts in natural honey varied between 4.62 and 5.76 CFU/g, significantly decreasing in heated honey (1.91 to 4.85 CFU/g), with both showing absence of mesophiles after one year. Both natural and heated honeys exhibited changes in their physicochemical and microbiological properties over the study period. Heated honey showed greater stability, with smaller variations in pH, acidity, and moisture content. Additionally, mesophilic presence was significantly reduced after thermal processing and absent after one year of storage. For a deeper understanding of the effects of thermal treatment on natural honeys, further studies with a more representative sample set covering a diversity of native bee species are recommended.

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