Title : Comparative Analysis of Physicochemical and Biological Activities of Meads from Five Mekong Region Honeys Pre- and Post-Fermentation

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ABSTRACT

This study investigates the physicochemical and biological activities changes in meads produced from five different honeys sourced from the Mekong region: sunflower (Myanmar, M), coffee (Vietnam, V), kapok (Cambodia, K), rubber (China, C), and mixed floral (Thailand, T). Honey musts were fermented with *Saccharomyces cerevisiae* at 25°C for two weeks. Pre- and post-fermentation samples were analyzed for color, pH, antimicrobial activity, antioxidant activity, total phenolic content, total flavonoid content, and sensory characteristics. Color analysis showed that all meads fell within the "water white" to "extra light amber" range, with meads becoming lighter post-fermentation. pH levels remained stable (3.5 to 4.5) across all samples, with no significant changes post-fermentation. Antimicrobial activity against *Escherichia coli* was observed in all meads, both pre- and post-fermentation. Activity against *Staphylococcus aureus* was detected in Vietnamese honey pre-fermentation and Cambodian honey post-fermentation, while all meads exhibited antimicrobial effects against *Klebsiella pneumoniae* post-fermentation. None of the samples inhibited *Micrococcus luteus*. Antioxidant activity ranged from 27.74% to 68.11%, with the highest activity observed in M post-fermentation and the lowest in V pre-fermentation. K showed a decline in antioxidant activity post-fermentation. Total phenolic content varied from 0.315 to 2.250 mg/mL, with the highest levels observed in T post-fermentation and the lowest in C pre-fermentation, while declines were seen in V and M post-fermentation. Flavonoid content ranged from 0.0381 to 0.2422 mg/mL, with the highest levels in K pre-fermentation and the lowest in V post-fermentation. Increases in flavonoid content were observed in M and T after fermentation. Sensory evaluation revealed that the appearance parameter scored highly across all meads. M consistently received the highest ratings across taste, mouthfeel, aftertaste, and overall liking. While other samples (T, C, V, and K) exhibited similar sensory profiles, none matched the overall preference for Sample M. These findings highlight the significant impact of honey source and fermentation on the physicochemical, antimicrobial, and sensory properties of mead.