

Natural Antimicrobials for Oral Health: Formulation and Evaluation of Herbal Chewable Lozenges with Cinnamon, Honey, Lemon and Matcha Green Tea

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Structured Abstract

This study aimed to formulate and evaluate herbal chewable lozenges composed of cinnamon, honey, lemon, and matcha green tea. The formulated lozenges were tested for pH, physical appearance, disintegration time, organoleptic, and antimicrobial activity against oral pathogens using agar well diffusion, minimum inhibitory concentration (MIC), and minimum bactericidal concentration (MBC) methods. Among formulations, Formulation 3 showed the best results, with good physical properties, high consumer acceptance, and effective antimicrobial action comparable to commercial lozenges.

Background: Natural herbal ingredients are used in oral care as a safer alternative to synthetic ones because of their antimicrobial properties. Herbal chewable lozenges offer a natural option for maintaining oral health. Ingredients like cinnamon, honey, lemon, and matcha green tea can help improve oral hygiene with fewer side effects, as they contain minimal artificial additives.

Methods: A herbal extract with a 1:1:1:10 ratio of cinnamon, honey, lemon, and matcha green tea was prepared using ethanol extraction after two months of soaking. Three lozenge formulations were made by mixing the extract with pectin, gelatin, sugar, Arabic gum, and citric acid. These were tested for pH, physical properties, disintegration time, and taste. Antimicrobial activity was evaluated using agar diffusion, MIC, and MBC methods against selected oral pathogens.

Results: This study shows that Formulation 3 exhibited the most promising properties among all formulations. It had moderate antimicrobial activity, inhibition zones of 6–8 mm and was bactericidal, with MIC and MBC values of 8.87 mg/mL (MIC/MBC ratio = 1). It disintegrated in 12.10 minutes, had a pH of 4.46, and received the highest sensory scores from 20 panelists, with all attributes rated above 5.0. These findings suggest a synergistic effect of the herbal ingredients, making it comparable to commercial lozenges.

Conclusion: In conclusion, this research provides a strong foundation for developing a herbal chewable lozenge combining cinnamon, honey, lemon, and matcha green tea, showing promising potential as an effective natural alternative for antimicrobial oral care.

Keywords: Natural Antimicrobials, Herbal Lozenges, Oral Health, Phytochemical Formulation

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