

Dental Caries: Evaluating the Therapeutic Potential of Propolis for Prevention and Management

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Structured Abstract

Background: Dental caries remains a significant global oral health issue, often resulting in pain, tooth loss, and decreased quality of life. While conventional treatments such as fluoride therapy and dental restorations are widely used, concerns about antimicrobial resistance and high treatment costs drive the search for natural alternatives. Propolis, a resinous substance produced by bees, is gaining attention due to its antimicrobial, anti-inflammatory, and remineralization properties. The objective of this study is to evaluate the potential of propolis in managing and preventing dental caries.

Methods: A critical literature review approach was used to analyse relevant studies from 2014 to 2024, sourced from databases including PubMed, ScienceDirect, and Scopus. The review focuses on three core questions: the antimicrobial mechanism of propolis against cariogenic microbes, the safety and side effects of propolis in oral care, and the key components responsible for its antibacterial activity.

Results: Findings reveal that propolis effectively inhibits the growth of cariogenic bacteria such as *Streptococcus mutans* and *Lactobacillus spp.*, disrupts biofilm formation, and reduces acid production. Its bioactive compounds such as flavonoids (e.g., apigenin, galangin), phenolic acids (e.g., caffeic acid), and terpenoids that contribute to cell membrane disruption and metabolic inhibition in bacteria. While generally biocompatible and safe, allergic reactions can occur, particularly in individuals sensitive to bee products. Additionally, variation in propolis composition due to geographical and botanical differences poses a challenge for standardization.

Conclusion: In conclusion, propolis demonstrates significant therapeutic promise as a natural agent in the prevention and treatment of dental caries. It can serve as an effective and sustainable alternative to conventional oral antimicrobials, particularly in underserved populations. However, more clinical studies and standardization efforts are required to ensure its safe and consistent application in dentistry.

Keywords: Dental caries, Propolis, Antimicrobial, Oral health, Natural therapy

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