

Antibacterial Effects of Natural Cinnamon Leaf Oil and Clove Oil Compared to Eugenol Against *Streptococcus Mutans*

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Dental caries is the most prevalent infectious disease affecting the oral cavity, and *Streptococcus mutans* is recognised as the principal pathogen for the development of dental caries. Eugenol, a natural compound derived from clove and cinnamon, has gained attention in dentistry for its antibacterial, anti-inflammatory, and analgesic properties. Eugenol is a main constituent in Zinc oxide-Eugenol, a dental material used to stabilise dental caries. Even though the antibacterial activity of cinnamon oil, clove oil and eugenol has been examined in several studies, comparative analysis of these three components is scarce in scientific literature. Furthermore, with economic uncertainties, there is a growing need to investigate sustainable healthcare alternatives. Locally sourced cinnamon and clove oils could serve as viable substitutes for imported eugenol, potentially enhancing the sustainability and affordability of dental care while promoting local entrepreneurship. Hence, this study aimed to comparatively analyse the anti-bacterial activity of commercial eugenol, natural oils extracted from clove buds (*Syzygium aromaticum*) and Ceylon cinnamon leaves (*Cinnamomum verum*) against *S. mutans*. Natural oils, extracted by steam distillation from clove buds (cultivated and commercial), cinnamon leaves, and commercial Eugenol, which is commonly used in dental clinics, were used. Antibacterial activity against standard *S. mutans* (ATCC 700610) was analysed using a disc diffusion assay. One-way ANOVA was employed to compare their antibacterial efficacy. The mean zone of inhibition of commercial eugenol, clove oils (commercial and cultivated) and cinnamon leaf oil were 20.33 ± 0.94 mm, 20.5 ± 1.48 mm, 20.31 ± 1.56 mm and 20.61 ± 1.11 mm, respectively. There was no significant difference in the antibacterial activity of the tested compounds ($P \leq 0.05$). *S. mutans* inhibitory effects of natural oils from Ceylon cinnamon leaves and clove buds were comparable to those of commercial eugenol. Further research is necessary to explore their broader therapeutic potential and the possibility of using these oils as alternatives to commercial eugenol in dental care.

Keywords: Eugenol, Ceylon cinnamon, clove, *streptococcus mutans*