

Antimicrobial activity of plant essential oils on *Streptococcus* spp

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During dental biofilm growth, primary colonizers are species that adhere to tooth surfaces and allow the attachment of other species known as late colonizers. Late colonizers and biofilm volume increase are usually associated with diseases such as caries and periodontal diseases. This study evaluated the antibacterial effect of plant essential oils on primary colonizers, *Streptococcus gordonii*, *Streptococcus mitis*, *Streptococcus oralis*, *Streptococcus salivarius*, and *Streptococcus sanguinis*. Essential oils from thyme, cardamom, lemongrass, cassia, oregano, cinnamon leaf, cinnamon bark, eucalyptus, cedar, birch, peppermint, and mint spicata were purchased from Sigma-Aldrich (USA). The Minimum Inhibitory Concentration (MIC) and the Minimum Bactericidal Concentration (MBC) assays were done according to the Clinical & Laboratory Standards Institute protocol. Essential oils were serially 2-fold diluted from 10 to 0.005 mg/mL in Brain Heart Infusion (BHI) media using 96-wells microplates. Plates were incubated at 37°C, 10% CO₂ during 24 hours. Essential oils of cardamom, eucalyptus, cedar, and birch had no relevant antimicrobial activity against the species tested. Essential oils of thyme, oregano, cassia, lemongrass, cinnamon bark, cinnamon leaf, peppermint and mint spicata showed Minimum Inhibitory Concentrations of 0.18 mg/mL, 0.36 mg/mL, 0.41 mg/mL, 0.7 mg/mL, 0.8 mg/mL, 1.6 mg/mL, 1.4 mg/mL, and 5.93 mg/mL, respectively. The species showed homogeneous susceptibility to essential oils. The MBC results showed the cinnamon bark and the cinnamon leaf essential oils had a bacteriostatic effect, while the others had bactericidal activity. The essential oils of thyme, oregano, and cassia had bactericidal activity even at low concentrations and could be used to inhibit bacterial growth.

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