

# Screening of Antibacterial Activities of Twenty-One Oxygenated Monoterpenes

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Plant essential oils are widely used as fragrances and flavours in the cosmetic, perfume, drug and food industries. Oxygenated monoterpenes are widespread components of the essential oils, usually occurring in high amount. In this paper, the antibacterial activities of twenty-one oxygenated monoterpenes (borneol, borneol acetate, camphor, carvone, 1,8-cineole, citronellal,  $\beta$ -citronellol, dihydrocarvone, fenchol, fenchone, geraniol acetate, isomenthol, limonene oxide, linalool, linalool acetate, nerol, nerol acetate, terpinen-4-ol,  $\alpha$ -terpineol, menthol and menthone) and penicillin (standard antibiotic) were determined using a disc diffusion method (*in vitro*) against 63 bacterial strains, belonging to 37 different genera and 54 species (plant, food and clinic origins). The results showed that the oxygenated monoterpenes exhibited a variable degree of antibacterial activities. These compounds also inhibited the growth of bacterial strains by producing a weak zone of inhibition from 7 to 11 mm in diameter, depending on the susceptibility of the tested bacteria. Among the tested compounds, nerol, linalool  $\alpha$ -terpineol, fenchol and terpinen-4-ol showed antibacterial activity at a broad spectrum. However, their antibacterial activities were lower than those of penicillin. In contrast to these compounds, camphor and 1,8-cineole exhibited no inhibition effects on the growth of all tested bacteria.

**Key words:** Antibacterial, Essential Oils, Oxygenated Monoterpenes