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Evaluation of Chemical Compositions and Biological Activities of Five Essential Oils

Authors : G. Ozturk, B. Demirci

Abstract : It is well known that essential oils used for therapeutic purposes for many years. In this study, five different Pharmacopoeia grade essential oils (Achillea millefolium L., Pimpinella anisum L., Matricaria recutita L., Eucalyptus globulus L., Salvia officinalis L.) which obtained from commercial sources were evaluated for chemical compositions, synergistic antimicrobial activities, and lipoxygenase enzyme inhibitions. Volatile components were determined by gas chromatography/flame ionization detector and gas chromatography/mass spectrometer, simultaneously. The potential antimicrobial activity of essential oils was tested against oral pathogenic standard strains such as Streptococcus mutans, Streptococcus sanguinis, Staphylococcus aureus, Corynebacterium striatum, Candida albicans and Candida krusei by broth microdilution methods. Ciprofloxacin and ketoconazole were used positive controls. It has been observed that the essential oils tested have average inhibitory antimicrobial activity against oral pathogens with a Minimum Inhibition Concentration of 20-0.625 mg/mL. The active essential oils have been combined with antibiotics and synergistic effects have been evaluated by Checkerboard method. ΣFIC values were determined. In combination with antibiotics M. recutita essential oil has been shown to have a synergistic effect against S. aureus in combination with tetracycline (ΣFIC 0.46). In addition, 5-LOX inhibitory activity was measured by modifying the spectrophotometric method developed by Baylac and Racine. As a result, 5-LOX % inhibition of S. officinalis, E. globulus and M. recutita were calculated as 34.0 ± 6.66, 72.7 ± 2.78 and 27.7 ± 0.60, respectively.

Keywords : antimicrobial activity, essential oils, synergistic activity, 5-lipoxygenase inhibition
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