The in vitro antimicrobial activity of Lavandula angustifolia essential oil in combination with other aroma-therapeutic oils

Stephanie de Rapper,¹ Guy Kamatou,² Alvaro Viljoen,² and Sandy van Vuuren¹

¹Department of Pharmacy and Pharmacology, Faculty of Health Sciences, University of the Witwatersrand, Parktown, Johannesburg 2193, South Africa
²Department of Pharmaceutical Sciences, Faculty of Science, Tshwane University of Technology, Pretoria 0001, South Africa

Received 26 February 2013; Accepted 8 April 2013

Academic Editor: Jenny M. Wilkinson

Copyright © 2013 Stephanie de Rapper et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Abstract

The antimicrobial activity of Lavandula angustifolia essential oil was assessed in combination with 45 other oils to establish possible interactive properties. The composition of the selected essential oils was confirmed using GC-MS with a flame ionization detector. The microdilution minimum inhibitory concentration (MIC) assay was undertaken, whereby the fractional inhibitory concentration (ΣFIC) was calculated for the oil combinations. When lavender oil was assayed in 1:1 ratios with other oils, synergistic (26.7%), additive (48.9%), non-interactive (23.7%), and antagonistic (0.7%) interactions were observed. When investigating different ratios of the two oils in combination, the most favourable interactions were when L. angustifolia was combined with Cinnamomum zeylanicum or with Citrus sinensis, against C. albicans and S. aureus, respectively. In 1:1 ratios, 75.6% of the essential oils investigated showed either synergistic or additive results, lending in vitro credibility to the use of essential oil blends in aroma-therapeutic practices. Within the field of aromatherapy, essential oils are commonly employed in mixtures for the treatment of infectious diseases; however, very little evidence exists to support the use in combination. This study lends some credence to the concomitant use of essential oils blended with lavender.
Interestingly, phenolic monoterpenes and phenylpropanoids (typically showing strong antimicrobial activities) in combination with other components were found to increase the bioactivities of these mixtures. Out of 21 essential oils tested, 19 oils showed antibacterial activity against one or more strains. Cinnamon, clove, geranium, lemon, lime, orange and rosemary oils exhibited significant inhibitory effect. On the other hand, aniseed oil, eucalyptus oil and camphor oil failed to inhibit any of the tested strains. Both gram-positive and gram-negative bacteria were sensitive to the potent essential oils. The antimicrobial activity of many essential oils has been previously reviewed and classified as strong, medium or weak [26]. In our study, cinnamon, clove, geranium, lemon, lime, orange and rosemary oils exhibited strong activity against the selected bacterial strains.