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Volume 26, Issue 1, 2015, Pages 71-81[Open Access](#)

Chemical composition and antibacterial activity of essential oils from three aromatic plants of the zingiberaceae family in Malaysia (Article)

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Abstract

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The essential oils of *Boesenbergia rotunda* (Temu Kunci), *Curcuma mangga* (Temu Pauh) and *Kaempferia galanga* (Cekur) were extracted using steam distillation, and the main constituents of the essential oils were analysed using gas chromatography-mass spectrometry (GC-MS). More than 10 constituents were identified in each essential oil. The main compounds in *B. rotunda* were nerol (39.6%) and L-camphor (36.0%), whereas ethyl-(E)-3-(4-methoxyphenyl)prop-2-enoate (57.2%) and ethyl cinnamate (39.1%) were identified in *K. galanga*. *C. mangga* contained mainly L-beta-pinene (95.6%). Antibacterial activity was assessed using the disc diffusion method and the minimum inhibitory concentration (MIC) was determined. The most active essential oil for all selected Gram-positive (*Staphylococcus aureus* and *Bacillus cereus*) and Gram-negative bacteria (*Pseudomonas aeruginosa* and *Escherichia coli*) was *B. rotunda* (inhibition zone of 10.3-16.0 mm), followed by *C. mangga* (inhibition zone of 7.33-12.3 mm). The essential oil extracted from *K. galanga* exhibited no antibacterial activity against any of the bacteria tested. *B. rotunda* showed higher antibacterial activity than *C. mangga*, with MIC values of $1.3 \times 10^{-2} \mu\text{l ml}^{-1}$ (*S. aureus*), $2.6 \times 10^{-2} \mu\text{l ml}^{-1}$ (*P. aeruginosa* and *E. coli*) and $0.66 \times 10^{-2} \mu\text{l ml}^{-1}$ (*B. cereus*) compared to MIC values of $2.6 \times 10^{-2} \mu\text{l ml}^{-1}$ (*S. aureus* and *B. cereus*) and $5.3 \times 10^{-2} \mu\text{l ml}^{-1}$ (*P. aeruginosa* and *E. coli*) for *C. mangga*. © Penerbit Universiti Sains Malaysia, 2015.

Author keywords

Boesenbergia rotunda *Curcuma mangga* Essential oil *Kaempferia galanga* Zingiberaceae

Indexed keywords

Engineering controlled terms: *Bacillus cereus* Bacteria Bacteriology Chromatography Distillation *Escherichia coli*
Gas chromatography Gas oils Mass spectrometry Monoterpenes

Compendex keywords: Anti-bacterial activity *Boesenbergia rotunda* *Curcuma mangga*
Gas chromatography-mass spectrometries (GC-MS) *Kaempferia galanga*
Minimum inhibitory concentration *Pseudomonas aeruginosa* Zingiberaceae

Engineering main heading: Essential oils

ISSN: 16753402
Source Type: Journal
Original language: EnglishDocument Type: Article
Publisher: Universiti Sains Malaysia

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