

In vitro antibacterial effects of Cinnamomum extracts on common bacteria found in wound infections with emphasis on methicillin-resistant Staphylococcus aureus

ABSTRACT

Ethnopharmacological relevance: Cinnamomum species have been widely used in many traditional systems of medicine around the world. In the Malaysian traditional system of medicine, the leaves, stem bark and stem wood of Cinnamomum iners, Cinnamomum porrectum, Cinnamomum altissimum and Cinnamomum impressicostatum have been used to treat wound infections. To study the antibacterial effects of Cinnamomum iners, Cinnamomum porrectum, Cinnamomum altissimum and Cinnamomum impressicostatum against common bacteria found in wound infections with primary focus on methicillin-resistant Staphylococcus aureus (MRSA).

Materials and methods: The crude extracts from the leaves, stem-bark and stem-wood of Cinnamomum iners, Cinnamomum porrectum, Cinnamomum altissimum and Cinnamomum impressicostatum were obtained using sequential extraction with hexane, ethylacetate, methanol and water. The volatile oils were obtained by hydro-distillation. The antibacterial activities of extracts were investigated using disk diffusion assays and broth microdilution assays.

Results: The volatile oils obtained from the stem-bark of Cinnamomum altissimum, Cinnamomum porrectum and Cinnamomum impressicostatum have shown significant antibacterial activity against a wide range of Gram positive and Gram negative bacteria including MRSA. A few test extracts have shown better activity against MRSA as compared to methicillin sensitive Staphylococcus aureus (MSSA). Amongst all the test extracts, Cinnamomum impressicostatum stem-bark water extract produced the largest inhibition zone of 21.0 mm against MRSA while its inhibition zone against MSSA was only 8.5 mm. The minimum inhibitory concentration (MIC) of this extract against MRSA was 19.5 g mL⁻¹ and the corresponding minimum bactericidal concentration (MBC) was 39.0 g mL⁻¹.

Conclusions: This study has scientifically validated the traditional use of Cinnamomum species in treating wound infections. Of high scientific interest was the observation that the antibacterial effect of Cinnamomum impressicostatum stem-bark crude water extract against MRSA was significantly higher than its effect against MSSA, suggesting that the extract contains a compound(s) with higher specific neutralising activity against the drug resistance markers of MRSA.

Keyword: Antibacterial effect; Cinnamomum; Wound pathogens; Malaysian traditional system of medicine; Methicillin resistant Staphylococcus aureus (MRSA)