

ABSTRACT

Melaleuca alternifolia is a powerful antimicrobial agent that could be one of the solutions to antimicrobial resistance with its wide range of antimicrobial activity, the synergistic effect to other antimicrobial substances, and little impact on the development of antimicrobial resistance. Steam distillation is used to utilize this plant to produce tea tree oil (TTO). This process has several drawbacks and studies have stated toxicity and adverse effects associated with oral administration of TTO. The usage of other extraction methods for *M. alternifolia* is not extensively studied. The bioactive compound and antibacterial activity of *M. alternifolia* obtained from conventional extraction methods (maceration, soxhletation, and hydrodistillation) was studied to allow better utilization of this plant. Compounds present within each extract were observed using thin layer chromatography (TLC), while Kirby Bauer and broth dilution to determine minimum inhibitory concentration (MIC), and minimum bactericidal concentration (MBC) were done to evaluate the antibacterial activity of each extract to *Escherichia coli* and *Staphylococcus aureus*. Analysis of compounds observed in TLC suggests that cardiac glycosides and chlorophylls could be present in maceration and soxhlet extracts, while terpene alcohols were predicted to be present in TTO. The same MIC and MBC values for all extracts (Maceration = 0.1875%; Soxhletation = 0.1875%; Hydrodistillation = 0.15625%) were observed from *E. coli*. MBC of *S. aureus* is two to more than fourfold of the MIC, with maceration having the highest MBC (MBC = >12%). This study suggests that maceration and soxhletation manage to extract different bioactive compounds from *M. alternifolia* than the one present in hydrodistillation. More importantly, these compounds also possess similar antibacterial activity to those observed in the essential oil.

Keywords: *Melaleuca alternifolia*, maceration, soxhletation, hydrodistillation, bioactive compounds, antibacterial activity.