

Fractionation and evaluation of the antimicrobial activity of *Baccharis dracunculifolia* DC. essential oil against the pathogens *Escherichia coli* and *Staphylococcus aureus*

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Essential oils are volatile substances produced by flowers, stems, and leaves and stored in secretory structures such as ducts or glandular trichomes. These are produced through the secondary metabolism of medicinal and aromatic plants and have been extensively studied as natural antimicrobials in the control and inhibition of pathogenic bacteria. In this context, *E. coli* and *S. aureus* are an important treatment target as they are pathogens commonly associated with infectious diseases. The present work described the chemical composition and antimicrobial activity of *B. dracunculifolia* (Asteraceae) essential oil (crude and four fractions) against *E. coli* and *S. aureus*. To obtain the essential oil, fresh and chopped leaves (528.21g) were extracted by hydrodistillation in Clevenger type apparatus. The fractions were obtained by fractionation of the oil by dry column chromatography and analyzed by gas chromatographer coupled to a selective mass detector (GC-MS). For the determination of antimicrobial activity, the microdilution method in 96-well plates was used against *E. coli* ATCC 11775 and *S. aureus* ATCC 6538 strain. GC-MS chromatographic analyses showed the presence of trans-nerolidol (25.27%), limonene (10.23%), β -cubebene (5.52%) and α -pinene (4.94%) as major compounds, which corresponded to 46.0% of the total oil. Evaluation of antimicrobial activity showed that *B. dracunculifolia* crude oil was active at a concentration of 0.12 mg/mL only for *S. aureus*, while no activity was observed in fractions for both microorganisms. Thus, it was possible to observe that the oil of *B. dracunculifolia* in crude form showed antimicrobial potential only against *S. aureus*. However, this result was not observed for the fractions. This difference observed for *B. dracunculifolia* oil activity in relation to its fractions, suggests a synergistic action between the crude oil components, which in fractional form do not show activity, under the evaluated conditions.

1. Kaper et al., Nature Reviews Microbiology, 2006, 2, 123-140.
2. Tariq et al., Microbial Pathogenesis, 2019, 134, 1-20.
3. Tong et al., Clinical Microbiology Reviews, 2015, 28, 603-661.
4. Zago et al., Brazilian Journal of Pharmacognosy, 2009, 19, 828-833.

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