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ANTIMICROBIAL ACTIVITY AND CHEMICAL PROFILE OF ESSENTIAL OILS FROM Duguetia lanceolata LEAVES: A GNPS UNTARGET METABOLOMIC APPROACH

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The urgent need for novel antimicrobial agents has increased the interest in natural products, especially essential oils, as reservoirs of structurally diverse and bioactive molecules[1]. In this study, we evaluated the antimicrobial properties of essential oils from *Duguetia lanceolata* leaves collected in different seasons, and correlated their chemical profiles with biological activity. Leaves were harvested in autumn (EO-A) and winter (EO-W), and the oils were analyzed by GC–MS supported by an untargeted GNPS metabolomic workflow. Antimicrobial activity was tested against Gram-positive and Gram-negative bacteria, as well as yeast strains, by disk diffusion and minimum inhibitory concentration (MIC) assays. EO-A demonstrated the most promising results, inhibiting the growth of *Acinetobacter baumannii*, *Candida krusei*, and *Candida parapsilosis* strains, often associated with multidrug resistance and nosocomial infections[2]. MIC values ranged from 0.016 to 0.270 $\mu g \cdot mL^{-1}$, with EO-A consistently outperforming EO-W. Although both oils exhibited broad-spectrum activity, EO-W failed to inhibit several clinically relevant pathogens. These findings suggest that EO-A possesses not only a richer composition of monoterpenes, including limonene (28.5%) and (+)-β-pinene (15.0%), but also a more favorable antimicrobial profile compared to EO-W, which was enriched in sesquiterpenes such as β-bisabolene (16.4%) and β-gurjunene (6.4%)[3]. This work provides evidence that seasonal variation significantly modulates the antimicrobial efficacy of *D. lanceolata* essential oils. The superior activity of the autumn oil highlights the potential of this species as a natural source of antimicrobial agents and underscores the importance of seasonality in optimizing the collection of plant material for therapeutic applications. By combining metabolomics and bioassays, our results reinforce the value of Brazilian biodiversity in the search for new treatments targeting resistant pathogens.

Keywords: *Duguetia lanceolata; Essential oils; Seasonal variation; GC–MS; Antimicrobial activity; GNPS untargeted metabolomics*

References: *[1]Yap, P.S.X., et al. 2014. Open Microbiol J, 8:6–14. [2]Morrison, L., Zembower, T.R., 2020. Gastrointest Endosc Clin N Am, 4:619-635.[3] Novais, M.H.G., et al., 2024. Acta Trop 253: 107168.*

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