



Influence of seasonality on the content, chemical composition and antibacterial activity of the essential oil of *Lippia alba* (Mill.) N. E. Brown grown in Santarém-PA

Antônio Q. S. Júnior^{1,2}, Rosiele L. Santana^{1,2}, Sandra L. F. Sarrazin^{1,2}, Juliana D. A. Raposo^{1,2}, José G. S. Maia^{2,3}, Rosa H. V. Mourão^{1,2,3}

¹ Universidade Federal do Oeste do Pará – Santarém-PA, Brasil

² Laboratório de Bioprospecção e Biologia Experimental – Santarém-PA, Brazil

³ Programa de Pós-Graduação em Recursos Naturais da Amazônia–Santarém-PA, Brazil
antoniojuniort6@hotmail.com

Keywords: *Lippia alba*, essential oil, seasonality, Amazon.

Lippia alba(Mill.) N. E. Brown (Verbenaceae), is an aromatic specie of a real pharmacological importance and is used in phytotherapy programs for several countries, including Brazil, where it is widely used because of its calming properties, spasmolytic, analgesic, sedative, anxiolytic and expectorant (1). Studies of the chemical composition of the essential oil of *L. alba* show a wide genetic diversity of the species, with the occurrence of a variety of chemotypes (2) that can be attributed to environmental factors such as the influence of climate and soil, as well as the harvest season (3). Thus, in order to contribute to the study of this species grown in Santarém and used in the city phytotherapy programs, the objective of this study was to evaluate the influence of seasonality on the content, chemical composition and antibacterial activity of *L. alba* collected in dry and rainy seasons at Santarém-PA, in 2014. Samples (aerial parts) were collected in the planting of Ponta de Pedras community at 8 am and exsiccates were deposited in the Herbarium of the Federal University of Juiz de Fora, under registration number CESJ 65,276. The material was dried at 40 °C followed by hydrodistillation in a Clevenger type apparatus for 3 h. The content of the EO was calculated based on fresh biomass and the chemical components were analysed and identified by gas chromatography coupled to mass spectrometry (GC/MS). The antibacterial activity was evaluated against Gram-positive bacterium *Staphylococcus aureus* - ATCC 25923 and tested in triplicate using the disk diffusion method in agar and broth micro dilution. The OE content obtained was 3.1 ± 0.3 % in the dry season and 4.3 ± 0.2 % in the rainy season. Approximately 96 % of the OE constituents were identified during the rainy season, with the major compounds geranial (25.8 %), neral (17.0 %), *p*-cymene (8.1 %), carvone (8.0 %), geraniol (7.0 %) and hedycariol (10.2 %). Major compounds in the essential oil collected in the dry season were geranial (41.3 %), neral (27.7 %), limonene (7.6 %), elemol (3.0 %), *p*-cymene (2.7 %) and carvone (2.5 %). Average inhibition zones for *S. aureus* growth were higher than 40 mm for 10 µL of pure oi, in both seasonal periods, superior to standard gentamicin (19.3 ± 0.1 mm) highlighting strong activity, while minimal inhibitory concentration (MIC) was approximately 1.25 mg mL⁻¹ in the rainy season and 2.50 mg mL⁻¹ in the dry season. These results show that the collection period influenced the chemical composition and yield of *L. alba* OE, and significantly interfere with the antibacterial activity. Thus, the yield of the EO from *L. alba* grown in Santarém-PA is above 2 % and the considerable antibacterial activity for *S. aureus* may become a promising source of bioactive compounds against this microorganism.

1. Mattos, S.H.; Innecco, R.; Marco, C.A. Série BNB – Ciência e Tecnologia, 2007, 61-63.

2. Castro, D.M.; Ming, L.C.; Marques, M.O.M. Rev. Br. Pl. Med., 2002, 4, 75-79.

3. Mattos, F.J.A. Rev. Bras. Farm., 1996, 77, 137-141.

Acknowledgements: UFOPA, APL-FITO, CNPq, CAPES.