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Volatile composition and bioactive properties of lemon verbena (*Aloysia citrodora Palau*) essential oil: comparison of two extraction methods

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Several aromatic plants and spices commonly used for food purposes due to their aromatic and flavoring characteristics have also played an important role in traditional medicine for their beneficial properties. Those are frequently associated to the essential oils (EOs) present in these plants, whose antimicrobial and antioxidant activities have been described in numerous studies [1]. These properties have gained prominence in recent decades since an increasing number of consumers are seeking for food products that include natural preservatives in substitution of synthetic additives. Additionally, EOs have been described as promising ingredients in active packaging towards the shelf-life extension of food products. Therefore, several studies have been conducted in the last years focusing on different aspects including on their applications (packaging materials, films, nanoemulsions, etc), on solving their applicability limitations (low solubility, organoleptic properties) but also on their characterization and novel extraction approaches.

In this work, the essential oil of *Aloysia citrodora Palau* (lemon verbena) well known for its antiseptic properties [2,3], was extracted by using two methods: Clevenger hydrodistillation and microwave assisted extraction (MAE). The extractions were carried out using the same sample and a ratio plant:water of 1:20. Hydrodistillation was performed in a 5L system for 3 hours according to the European Pharmacopoeia instructions. MAE extractions were performed on a NuWav-Uno microwave (NuTech, India), operating 15 min at 98 °C and 600 W. The obtained EO was characterized for its chemical composition using gas chromatography coupled with mass spectrometry (GC-MS) and for its bioactive potential regarding antioxidant and antimicrobial activity. The analysis of volatile compounds was carried out on a GC-2010 Plus (Shimadzu) with AOC-20iPlus automatic injector (Shimadzu), and SH-RXi-5ms column (30 m x 0.25 mm x 0.25 µm; Shimadzu, USA), multi-resistant clinical bacterial strains were used to screen the antimicrobial activity of the essential oil and the antioxidant activity was evaluated by two different methods, namely DPPH (2,2-diphenyl-1-picrylhydrazyl) and Reducing Power.

A slightly higher extraction yield of EO from lemon verbena leaves was obtained using MAE when compared to hydrodistillation method. The EOs extracted by the two methods showed the same qualitative profile, with a total of 71 compounds identified. However, some differences were observed in quantitative terms (relative % of individual compounds). Oxygen-containing monoterpenes was the main group (53.1% MAE vs 49.6% hydrodistillation) with the isomers geranial and neral being the major compounds. Monoterpene hydrocarbons group (6.8% MAE vs 6.9% hydrodistillation) was the only group that did not showed statistically significant differences ($p > 0.05$) in the quantitative composition of the essential oil, contrary to the oxygen-containing monoterpenes, sesquiterpene hydrocarbons and oxygen-containing sesquiterpenes groups. Regarding the results of antioxidant activity, both Eos presented interesting antioxidant properties, showing values between 9.58 µg/mL (Clevenger) and 8.63 µg/mL (MAE) for DPPH and 1.88 µg/mL (Clevenger) and 2.04 µg/mL (MAE) for Reducing Power. In general, both Eos performed well against foodborne bacteria, inhibiting all tested gram-positive bacteria and 4 out of 5 gram-negative bacteria. *Yersinia enterocolitica* and *Bacillus cereus* were the most sensitive gram-negative and gram-positive bacteria, both presenting a MIC of 0.07 %. By the contrary, no inhibition was observed for *Pseudomonas aeruginosa* at the maximum concentration tested (2.5%).

Overall, MAE showed to be a promising alternative to the traditional hydrodistillation method being faster and thus spending less energy, at the same time allowing obtaining an EO richer in neral and geranial, which have been associated with interesting properties such as antimicrobial and anti-inflammatory [4,5].

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References:

- [1] S. Burt, International Journal of Food Microbiology, 94 (2004) 223.
- [2] Medicinal and aromatic plantas of South America. J. A. Hurrell, Dordrecht, Springer, 2018.
- [3] S. M. B. Hashemi, A.M. Khaneghah, M. Koubaa, et al., Process Biochemistry, 65 (2018) 197.
- [4] I. Yoplac, L. Vargas, P. Robert, et al., Heliyon 7 (2021) 4.
- [5] P.C. Liao, T.S. Yang, J.C. Chou, et al., Journal of Functional Foods, 19 (2015), 248.