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Short communication

Chemical composition, antioxidant and antimicrobial effect of *Lavandula* essential oil used as a natural antioxidant for cold-pressed oils

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Introduction

Pure lavender infused with sunflower oil become a very popular new product for treating skin and hair. The base of this product is usually sunflower oil, extremely rich in Vitamin E, known to be a very efficient skin antioxidant (Badr et al., 2021). Several lavender essential oils are largely used in aromatherapy as antioxidant, antimicrobial, carminative, spasmolytic, sedative, antiseptic, anti-inflammatory, analgesic properties, antioxidant activity tonic, and anti-depressive agents. The cold-pressed sunflower or flaxseed oils are excellent mediums for *Lavandula* essential oils due to the high level of mono and polyunsaturated fatty acids and Vitamin-E-active compounds such as tocopherols and tocotrienols. This mixture is a powerful antioxidant agent for treating dry skin and hair and can be used for many cosmetic purposes (Sharafabad et al., 2022).

Materials and methods

This scientific work is a short review paper in which we investigated the chemical composition, antioxidant and antimicorobial activity of *Lavandula* essential oils. The percentage of monoterpenes, sesquitepenes, esters, alcohols, aldehydes and other volatile compounds was analyzed using GC technique coupled with GCMS. The Trolox equivalent antioxidant assay (TEAC) and potential against DPPH radical employed in many studies give a measure of the antioxidant activity. "*In vitro*" antibacterial properties against Gram-positive bacterial strains such *Staphylococcus aureus*, and Gram-negative bacterial strains such *Escherichia coli*, and antifungal activity against *Candida albicans* is usually performing using a disk-diffusion method in Petri dishes.

Results and discussion

The most common compounds of *Lavandula* varieties are linalool, linalyl acetate, 1,8-cineol, *trans*-β-ocimene, camphor and terpinene-4-ol (Rai et al., 2020). Furthermore, the species *L. stoechas* presented a chemical composition quite different from other species like *L. dentata*, *L. angustifolia*, *L. latifolia* and *L. hybrida* (Kucukyumuk et al., 2015). The linalool, linalyl acetate, camphor, α-pinene, camphene, γ-terpinene, and 1,8 cineol were the most abundant compounds. However, the chemical composition of lavender essential oils is significantly influenced by abiotic (climatic, soil, topographic, agronomic and post-harvest techniques) and biotic factors (plant age, stage of development, genetic characteristics) (De Elguea-Culebras et al., 2017).

The level of some esters and monoterpenes in lavender oils displayed a remarkable antioxidant potential followed in the descending order by α-terpinyl acetate, camphene, and α-terpinyl acetate (Badr et al., 2022). Relatively low amounts of phenolic compounds are explained due to the fact that those natural antioxidants are concentrated mainly in the plant residue material (El Hassouni et al., 2019). Although most of the authors compared the antioxidant potential of lavender essential oils by DPPH and ABTS radicals, the work of Lilia et al.

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(2018), examined samples of essential oils of *L. stoechas* that were very powerful in the case of the reference ascorbic acid which is a strong antioxidant.

Cytotoxic activities have been attributed to the preeminence in many lavender oils of some monoterpenoids, including linalool, linalyl acetate, 1,8-cineole, β-ocimene, terpinen-4-ol, and camphor. They had a strong antibacterial effect against *S. aureus*, *E. coli*, and *P. aeruginosa* (Imen et al., 2021). The lack of correlation between the major oil components and antifungal activity suggested that the different susceptibilities of the fungi may be related to either the minor components of the oil or differences in the cell wall/cell membrane of the fungi themselves (El Hassouni et al., 2019).

Conclusion

Pure lavender infused in sunflower oil or other cold-pressed oils makes a powerful mixture for any skin type. According to the findings of the research group of Kostadinović Veličkovska wt al. (2015), cold-pressed sunflower oil is the richest source of α-tocopherol with an amount of over 20 mg/100g, while polyphenols as powerful bioactive compounds were presented at over 60 mg/kg oil (Kostadinović Veličkovska et al., 2015). Phytosterols, primarily β-sitosterol, campesterol, and stigmasterol are membrane constituents of plants that exhibit strong UV protection. A combination of monoterpenes, sesquiterpenes, esters, and other valuable components from *Lavandula* essential oil and unsaturated fatty acids, vitamin-E-active compounds, polyphenols, and phytosterols from cold-pressed edible oils can be a promising mixture for dry skin with powerful anti-aging effect, in the treatment of atopic eczema and the protection of baby skin.

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