

Phytochemical, antioxidant and antimicrobial characterization of *Lavandula angustifolia* extract

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ABSTRACT

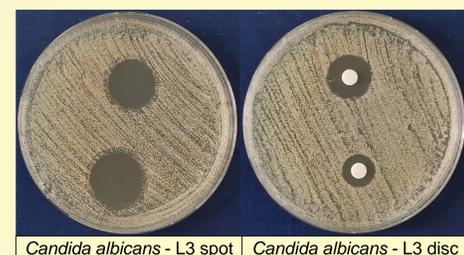
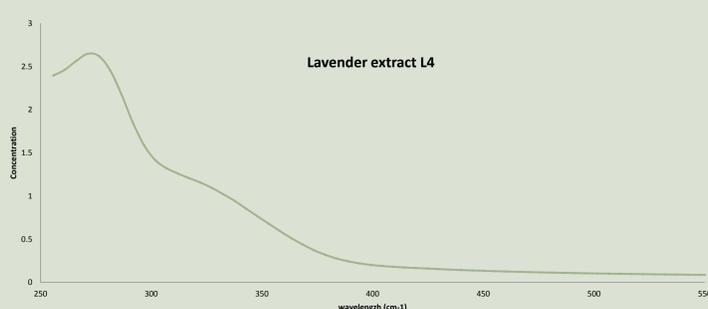
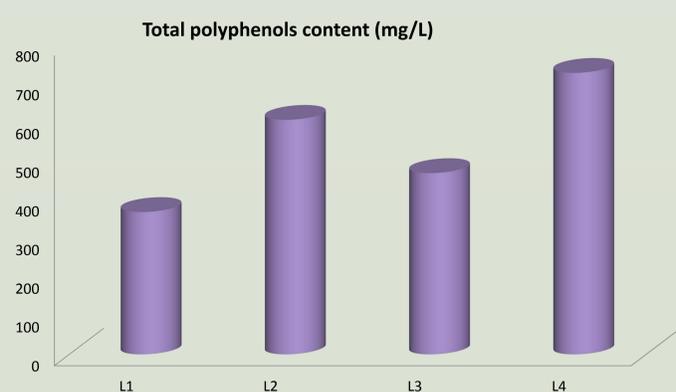
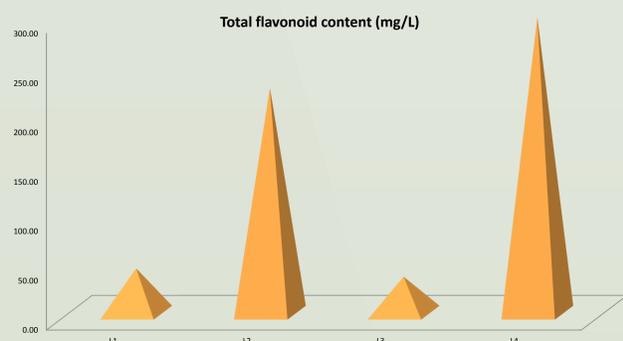
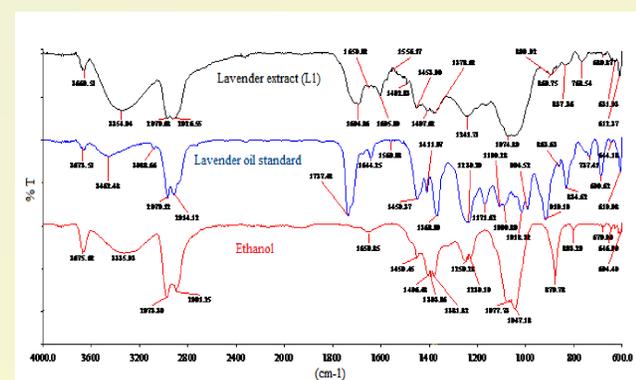
The present research describes the components of the lavender (*Lavandula angustifolia*) plant extract. Lavender is a shrub native from Mediterranean region and belongs to the family *Lamiaceae*¹. The scientific literature^{2,3} detailed the fact that lavender flowers content anthocyanins, polyphenols, flavonoids, sugars, minerals, and tannins and essential oil (approx. 3%), which have a lot of health benefits (antioxidant, antibacterial, antimicrobial properties)^{4,5}, due to their components. Also, lavender oil is one of the most valuable aromatherapy oils, its anti-bacterial and anti-fungal activities due to his main components (linalool, geraniol, eucalyptol, etc)^{6,7}. The aim of our study was to characterize qualitative (tannins, saponins, alkaloids) and quantitative (polyphenols, flavonoids, anthocyanins) screening for phytochemical compounds and antioxidant activity of the ethanolic and hydroalcoholic extracts obtained from lavender flowers at 2 different temperatures (20°C and 45°C) using ultrasound bath and magnetic agitation. The samples were analyzed by FTIR and UV-VIS techniques. The antioxidant activity was evaluated using DPPH method. The antioxidant activity of hydroalcoholic extracts shows higher results than ethanolic extracts, regardless of the extraction temperature used. The antimicrobial activity of lavender extract was demonstrated on *Candida albicans*, *Escherichia coli* and *Staphylococcus aureus*. The results indicated the fact that for *E. coli* and *C. albicans* extracts 1 and 3 proven similar efficiency, but higher by spot application than disc.



Code sample	Extraction method	Extraction solvent	Temp. (°C)	Time (h)
L1	Magnetic agitation	EtOH	20	24
L2	Magnetic agitation	Hydroalc. mixture	20	24
L3	Ultrasound bath	EtOH	45	2
L4	Ultrasound bath	Hydroalc. mixture	45	2

RESULTS

Ultrasound method (U) + EtOH(E)/hydroalcoholic mixture(H)	temp. (°C)	AA %
L4+ UE	45	62.04
L3+UE	20	54.85
L3+UH	45	89.02
L4+UH	20	84.28



Phytochemical test	Sample L1
Anthraquinones	Yellow solution (-)
Anthocyanosides	Light yellow solution (-)

Phytochemical test	Sample L2
Tannins	Green solution (-)
Phlobatannins	Pale pink solution (-)

Phytochemical test	Sample L3
Steroids	Colorless layer, brown ring, colorless upper layer (-)
Terpenoids	Colorless (-)

Phytochemical test	Sample 4
Proteins and aminoacids - Millon	Opalescent orange solution (+)
Aminoacids - Ninhydrin test	Opalescent white-yellow solution (+)
Aminoacids - test for cysteine	Red-brown solution, black precipitate (+)

CONCLUSIONS

The research detailed the antioxidant and antimicrobial activity of lavender extract. Antioxidant activity (AA%) presented better results on lavender extracted in hydroalcoholic mixture. The results of antimicrobial activities showed that the lavender flowers extract had the remarkable inhibition of the all tested microorganisms. UV-VIS absorption spectrum of extracts was made in the range of 250–550nm. FTIR results presented specific functional groups of lavender oil. In conclusion, the described experiments confirmed the efficacy of tested compounds as natural antimicrobials and antioxidants.