UNIVERSITY OF LIFE SCIENCES
"KING MIHAI I" FROM Timisoara
Multidisciplinary Conference on Sustainable Development
30-31 May 2024

LEPTOSPERMUM PETERSONII BAILEY ESSENTIAL OIL AS ANTAGONIST AGAINST PLANT PATHOGEN BACTERIA

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Abstract: *The essential oils of L. scoparium are often used as antibacterial agents. The determination of the antibacterial activity of L. scoparium essential oil against representatives of plant bacteria was the aim of our experiment. The best antibacterial activity of L. scoparium essential oil against B. subtilis was found using the disc diffusion method. This method was also used to test the antibiotic resistance of the model bacterial species, which was higher than the antibacterial activity of L. scoparium essential oil. L. scoparium essential oil showed the best antibacterial effect against Xanthomonas arboricola at a concentration of 62.5 μg/L in the carrot model.*

• Introduction

Because of their strong pharmacological activity, low toxicity, and various health benefits, phytochemicals have attracted a lot of attention in recent years for their potential medical uses. *Leptospermum petersonii* is a rare small tree that grows naturally in lowland or floodplain areas of Northern New South Wales. Researcher interest in EOs has increased recently, and efforts to create active-packaging systems that incorporate EOs into polymeric materials and release the volatile active compounds onto food surfaces gradually have been made. The objective of our study was to evaluate the antibacterial qualities of *Leptospermum petersonii* Bailey against a variety of plant infections using both *in vitro* investigation and *in situ* investigation using a carrot model.

• Material and method

Steam distillation was used to create the essential oil (EO) from *Leptospermum petersonii* Bailey (LPEO) leaves that were acquired from Hanus s.r.o. in Nitra. The antibacterial activity of the studied LPEO was evaluated using several bacterial strains. *Bacillus subtilis* CCM 2217, *Priestia* (*Bacillus*) *megaterium* CCM 2007 from the Gram-positive bacteria (G+) group. Gram-negative (G-) bacteria included *Xanthomonas arboricola* CCM 1441, *Pectobacterium carotovorum* CCM 1008, and *Pseudomonas putida* CCM 7156. In the disk diffusion susceptibility experiment, the microbial strains mentioned above were employed. The effectiveness of LPEO as an antibacterial agent was evaluated *in situ* against a range of bacterial species, including both G+ and G- bacteria on carrots.

• Results and discussions

The range of LPEO's antibacterial activity was 3.33 to 7.67 mm. The G+ bacteria's *B. subtilis* and the G- bacteria *P. carotovorum* were discovered to be the targets of LPEO's greatest antibacterial action. After analyzing the inhibitory effects on G+ bacterial strains in the carrot model, it was shown that *P. megaterium* displayed the highest levels of suppression at concentrations of 62.5 µg/L (33.43 %), and that LPEO was most effective against *B. subtilis* at concentrations of 62.5 µg/L (66.97 %). Notably, at a lower dosage (62.5 µg/L), the vapor phase of LPEO showed the maximum efficiency against G- bacteria, with reported inhibitory effects of 96.66% against *X. arboricola* in the carrot model.

• Conclusions

In summary, while direct addition of natural compounds to food remains common, alternative strategies like treating food products with active solutions before packaging are emerging. Further research is needed to optimize the use of *Leptospermum petersonii* EO as a natural preservative. Additionally, incorporating antimicrobial substances into food packaging reflects the trend towards utilizing natural resources in the food and healthcare sectors.

Acknowledgement: This research was funded by the grant APVV-20-0058 "The potential of the essential oils from aromatic plants for medical use and food preservation" and VEGA 1/0059/24 "Chemical properties and biological activity (*in vitro*, *in vivo* and *in situ*) of plant volatile mixtures, their main components and inclusion systems.