



UNIVERSITY OF LIFE SCIENCES  
"KING MIHAI I" FROM Timisoara  
**Multidisciplinary Conference on  
Sustainable Development**



30-31 May 2024

## **ANTIMICROBIAL ACTIVITY OF *CITRUS RETICULATA* BLANCO ESSENTIAL OIL AGAINST PLANT PATHOGEN**

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**Abstract:** *The tangerine, or Citrus reticulata Blanco, is a citrus fruit that dates back several centuries and is valued for its many nutrients and bioactive compounds that can have medicinal effects. The essential oil of C. reticulata Blanco was found to have the strongest in vitro antibacterial activity against P. megaterium. In addition, in situ monitoring of the antimicrobial activity was carried out, with the highest results obtained against P. megaterium at a concentration of 125 µg/L. According to the present investigation, C. reticulata Blanco essential oil significantly inhibited the growth of various Gram-positive and Gram-negative bacteria.*

### • Introduction

*Citrus reticulata* Blanco, also known as the mandarin, is an ancient citrus fruit valued for its nutritional content and bioactive constituents. It is necessary to develop natural antimicrobials, such as food preservatives, especially when they have positive sensory qualities, like mandarin fruit does. The aim of our study was to evaluate antimicrobial potential of *Citrus reticulata* Blanco against selected microorganisms *in vitro* and *in situ*.

### • Material and method

*Citrus reticulata* Bianco EO (CREO) used in this research was obtained from Hanus s.r.o. in Nitra, Slovakia. These strains included Gram negative (G-) bacteria, such as *Xanthomonas arboricola* CCM 1441, *Pectobacterium carotovorum* CCM 1008, *Pseudomonas putid* CCM 7156, and Gram positive (G+) *Bacillus subtilis* CCM 2217, *Priestia (Bacillus) megaterium* CCM 2007. The source of all bacteria strains was the Czech Collection of Microorganisms. The above microbial strains were used in the disk diffusion susceptibility experiment. The effectiveness of CREO as an antimicrobial substance was evaluated *in situ* against a range of bacterial species, including both G+ and G- bacteria on carrots.

### • Results and discussions

The inhibition zones of the study measured a radius of 4.33 – 7.33 mm. Among G+ bacteria, it was shown that the biggest inhibitory zone (7.33 mm) was against *P. megaterium*, followed by *B. subtilis* (5.33 mm). The most effective was CREO against *P. carotovorum* was found in G- bacteria. Investigation of the inhibitory effects on G+ bacterial strains in the carrot model found that CREO was most effective at concentration 125 µg/L against *P. megaterium* (98.89 %), while the highest levels of suppression were seen at 125 µg/L for *B. subtilis* (74.04 %). Notably, the vapor phase of CREO had the greatest efficacy against G- bacteria at the smaller dosage (62.5 µg/L), against *P. carotovorum* with reported inhibitory effects of 96.23 % and dosage at 500 µg/L 93.04% against *X. arboricola* in the carrot model.

### • Conclusions

According to this study, the EO from the fresh pericarp of *Citrus reticulata* Bianco can be used as a natural antibacterial agent in the food industry. It was also interesting to evaluate the antibacterial efficacy of *Citrus reticulata* Bianco against the diseases of interest. Further research using different food models and storage settings is recommended to maximize the use of *Citrus reticulata* Bianco EO as a natural replacement for artificial preservatives.

**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.