



UNIVERSITY OF LIFE SCIENCES "KING MIHAI I" FROM
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"YOUNG PEOPLE AND MULTIDISCIPLINARY RESEARCH
IN APPLIED LIFE SCIENCES"



"Young people and multidisciplinary
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ANTIBIOFILM ACTIVITY OF *ORIGANUM VULGARE*

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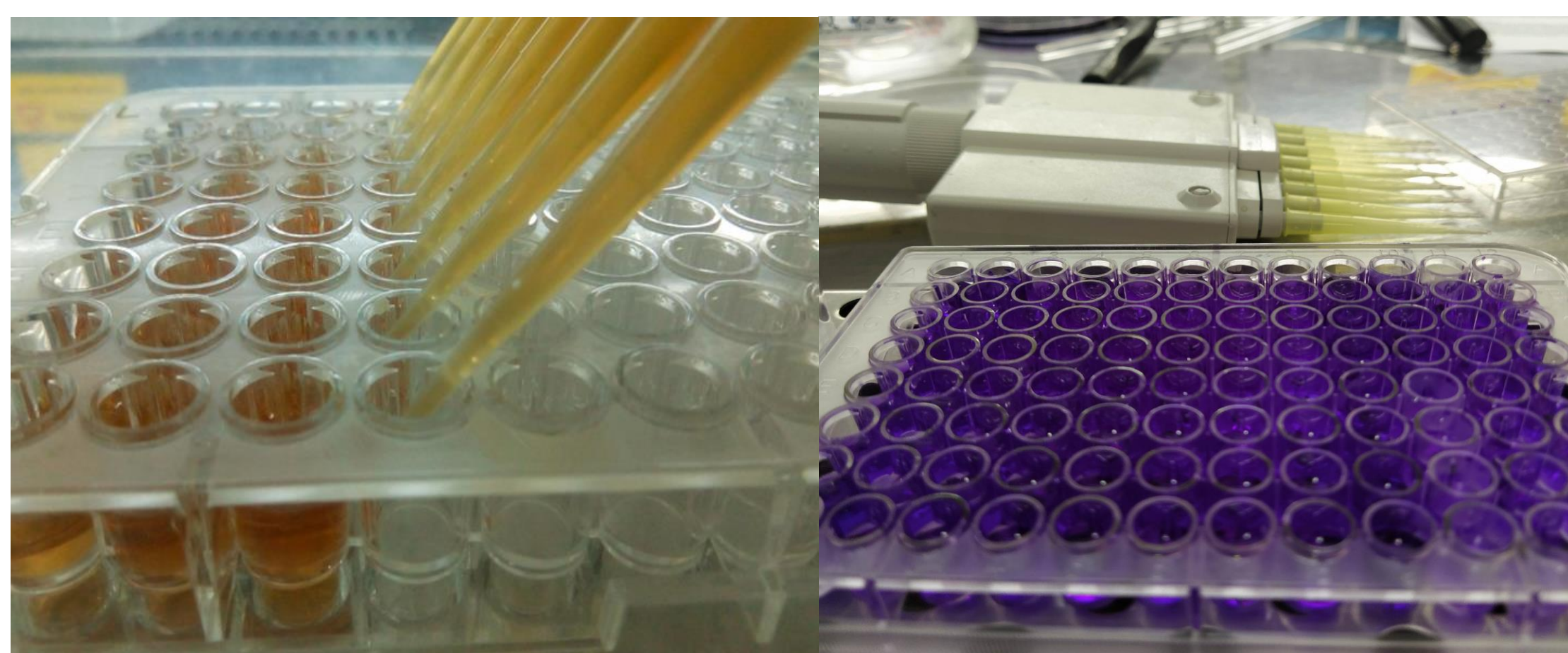
Abstract: A growth in microbial biofilm resistance in recent years has presented significant issues for the food business in terms of contamination and shelf-life loss, as well as for the medical community in terms of treating diseases. This paper evaluates the antibacterial efficiency against the biofilm generated by *Staphylococcus aureus* (ATCC 25923) and *Escherichia coli* (ATCC 25922), as well as the Minimum Biofilm Inhibitory Concentration (MBIC) of the essential oil of *Origanum vulgare*. The evaluation was performed by measuring the microbial biofilm using the microdilution assay, crystal violet staining, and reading of OD by spectrophotometry per ISO 20776-1:2019. Confocal microscopy was used to capture the images of *S. aureus* biofilm before and after treatment with the tested essential oil. The statistically evaluated results suggest a very good efficacy against *S. aureus* bacteria and a more limited activity against *E. coli*.

• Introduction

Microorganism assemblage comprised of extracellular polymeric substance (EPS) and other biological elements represents the bacterial biofilm. Even though biofilm formations might help with some soil and wastewater treatment procedures, they might also put patients at risk for long-term infections and poor personal hygiene in both clinical and industrial settings. It has been noted that adding certain essential oils or extracts directly to various goods has an antibacterial and/or antioxidant impact.

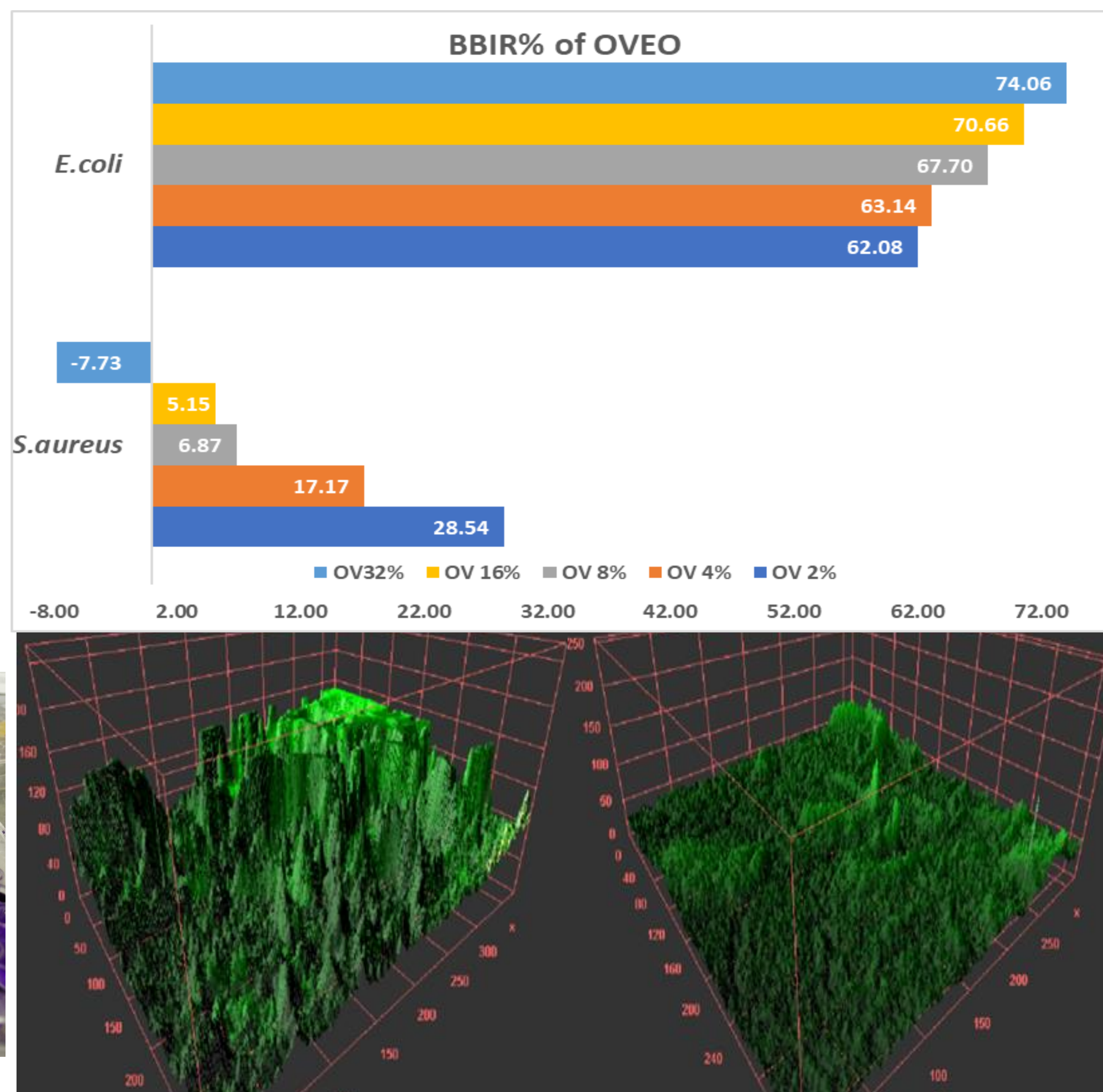
• Material and method

To estimate the antibiofilm capacity of *Origanum vulgare* the microdilution dilution assay was performed. The tested concentration against *S. aureus* and *E. coli* of OVEO was 2%, 4%, 8%, 16% and 32%. The biofilm evaluation was done using the crystal violet method.



For the values obtained consecutive to the reading, the formulas for inhibited biofilm content rate (BBGR%) and biofilm content growth rate (BBIR%) were used. Confocal laser scanning microscopy (CLSM - Leica DM 2500) was performed to compare the effect of OVEO on the biofilm structure of *S. aureus*.

• Results and discussions



• Conclusions

OVEO proved *in vitro* anti-biofilm activity against *S. aureus* starting at 2% with evolution in a positive correlation to the increase in concentration compared to *E. coli* in which OVEO demonstrated a strain-boosting effect, with a negative evolution correlated to the increase in concentration.

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