

# Antimicrobial activity of an edible film incorporated with oregano essential oil

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## Introduction

Microbial food contamination has been the target of increasing attention. To avoid or minimize it, the use of appropriate packaging systems, which can act as a barrier and protect the food against spoiling microorganisms has been evaluated [1]. Edible films can be a way to overcome this problem due to their functional properties that allow them to extend food's shelf-life [1].

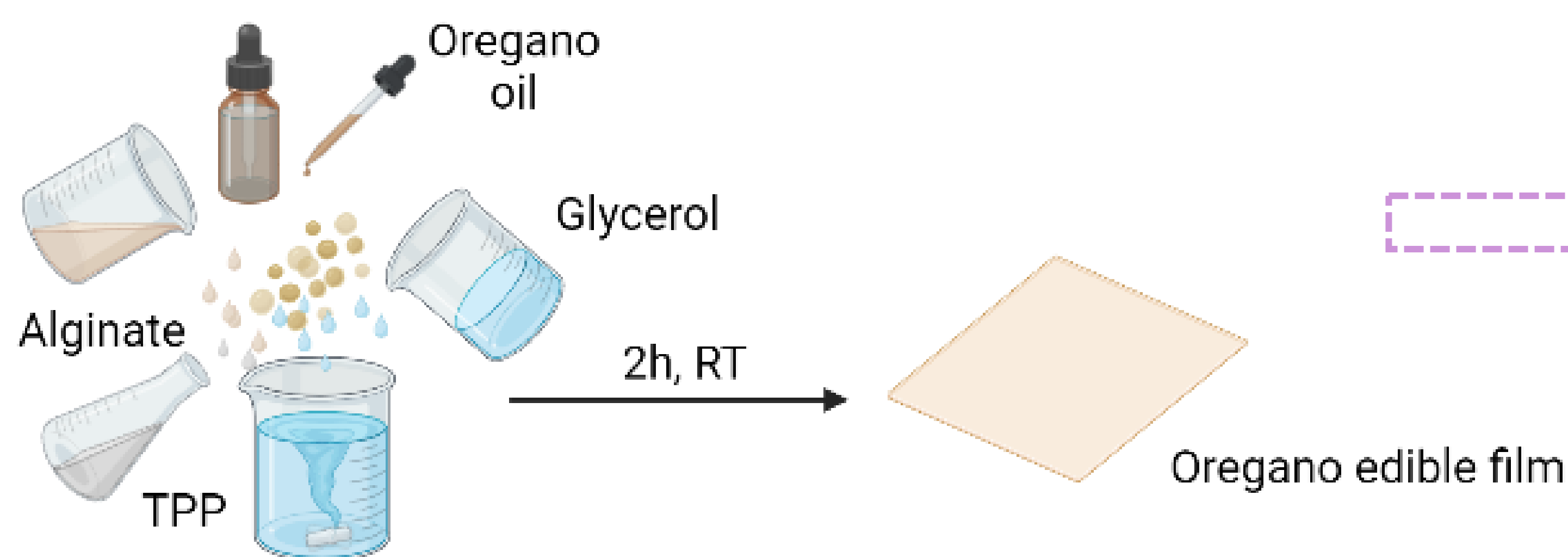
Essential oils are Generally Recognized as Safe substances and have been used in food products as natural flavoring agents. Due to their high concentration in phenolic compounds, they have antimicrobial activity against a wide range of microorganisms [2]. Oregano essential oil, in particular, possesses a strong antimicrobial activity against Gram-positive and Gram-negative bacteria [3]. However, high concentrations of oil are required for it to exert its activity, which may exceed organoleptic acceptable levels [4]. The incorporation of essential oils onto films is able to circumvent these problems.

## Objective

In this work alginate films with two concentrations of oregano essential oil (2% and 3%) were developed. The antimicrobial activity of both formulations was tested by the viable cell method against bacterial species *Escherichia coli*, *Pseudomonas aeruginosa*, *Yersinia enterocolitica*, *Salmonella enterica* serovar enteritidis, *Bacillus cereus*, *Listeria monocytogenes* and *Staphylococcus aureus*

## Methods

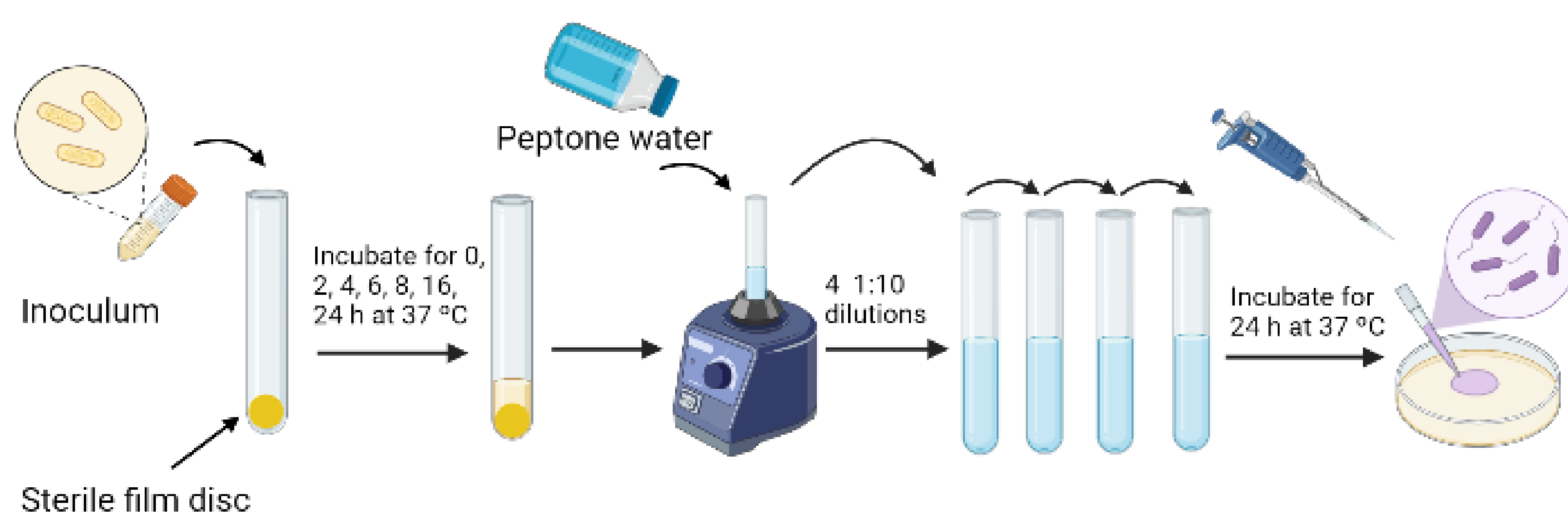
### Film production



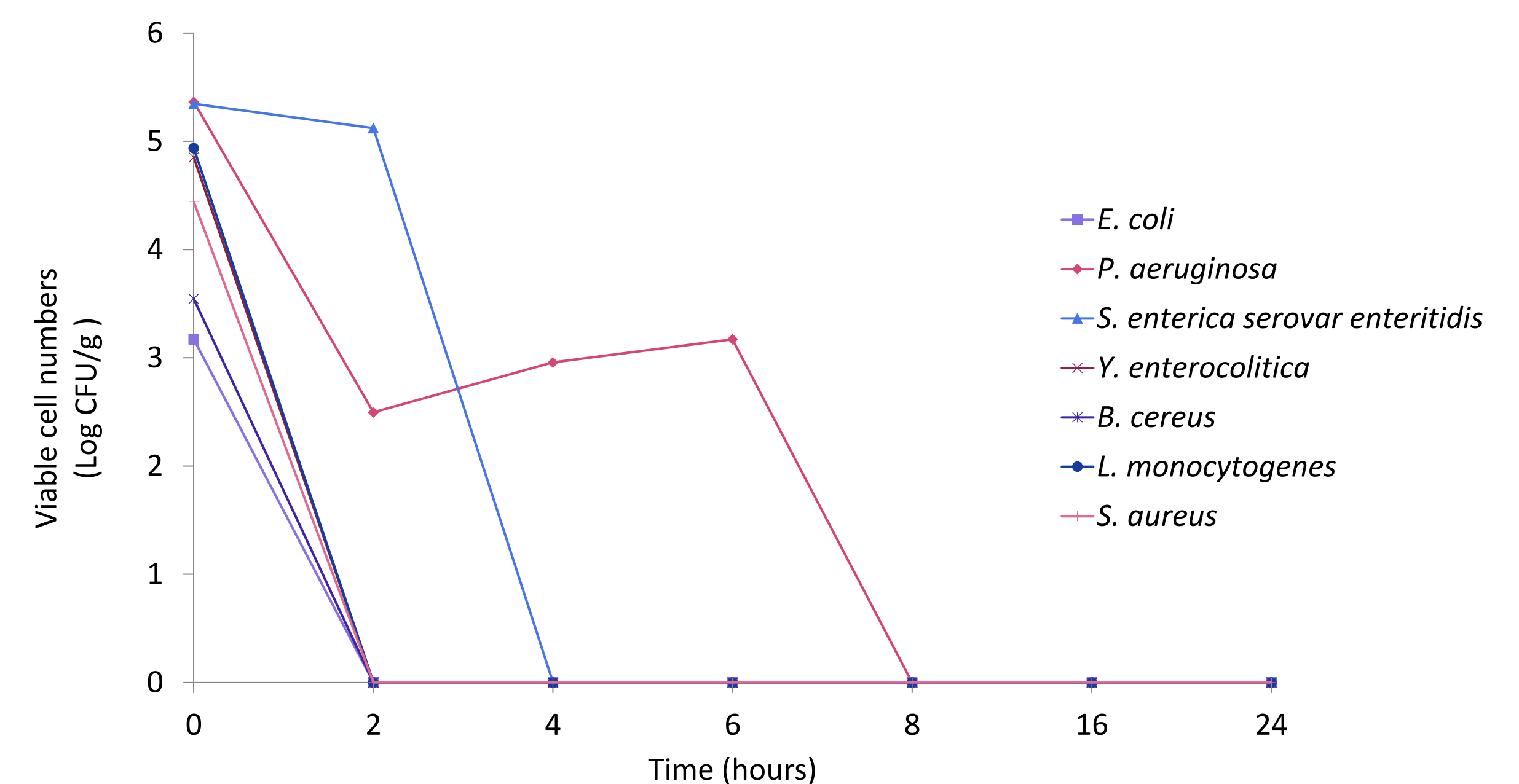
## Results



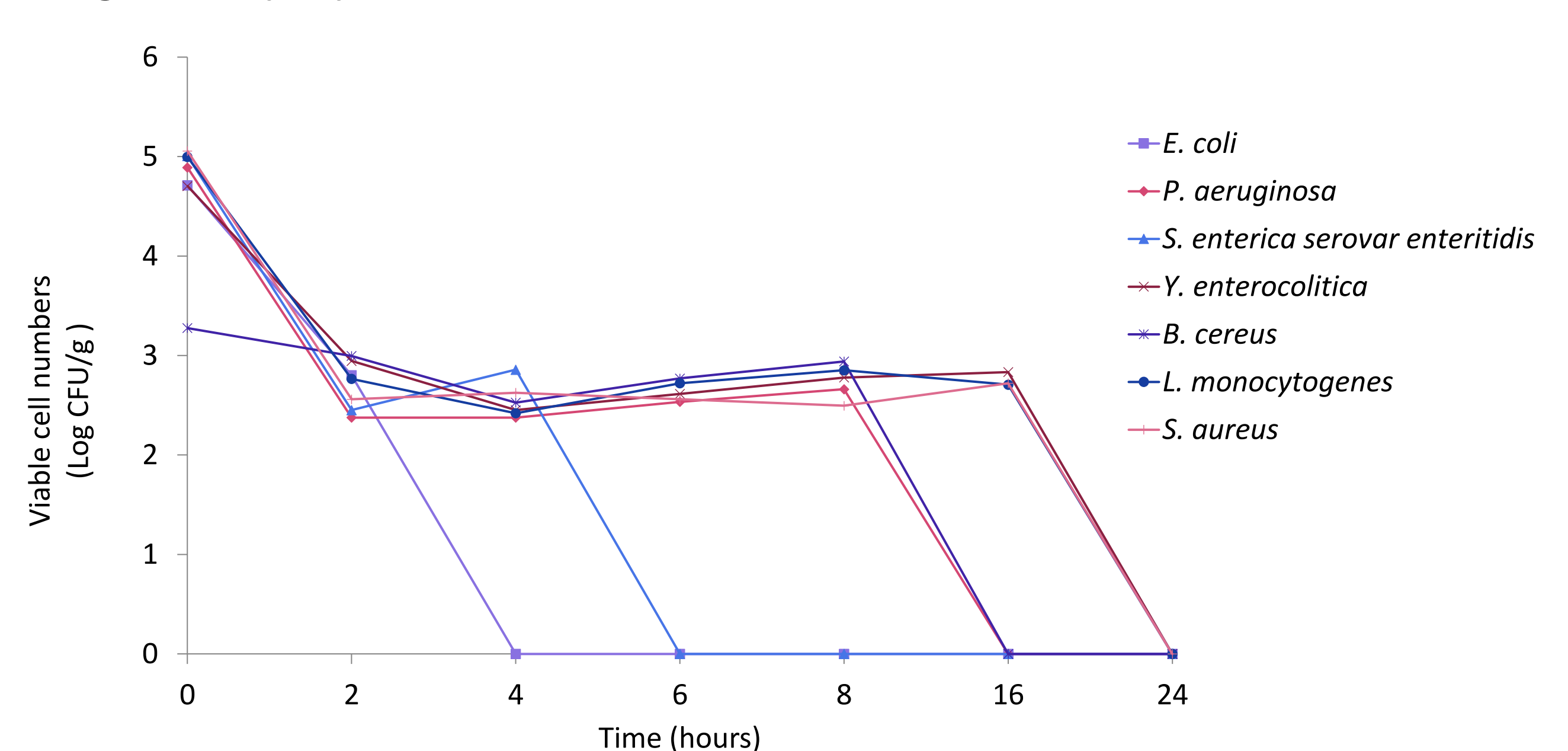
### Antimicrobial activity



#### Oregano 3% (v/v)



#### Oregano 2% (v/v)



## Conclusions

Both films were able to inhibit the growth of all studied bacteria. However, more time was needed to completely inhibit the growth of all studied bacteria when exposed to the film with the lower concentration of essential oil (for example, *E. coli*'s growth was completely inhibited after 2h of incubation when exposed to the film with 3% of oil but, when exposed to the film with 2% oil, the same bacteria required 4h to be completely inhibited). So, the developed edible films are potential natural solutions to prevent microbial growth in food products and extend shelf-life.

## References

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