

VARIABILITY IN *Listeria monocytogenes* SUSCEPTIBILITY TO BENZALKONIUM CHLORIDE



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PORTO



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Introduction

Listeria monocytogenes is a gram-positive pathogenic bacterium that causes severe foodborne listeriosis in humans, transmitted through contaminated foods, with high hospitalization and mortality rates, particularly affecting vulnerable groups: the elderly, immunocompromised individuals, and pregnant women [1]. Quaternary ammonium compounds, such as benzalkonium chloride, are widely used as biocides for surface disinfection in various settings, including food processing environments. These compounds have the capability to disrupt the charge distribution of microbial membrane bilayers, thereby leading to their deregulation [2].

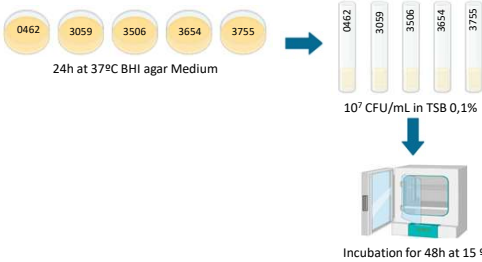
Objective

The aim of this study was to evaluate the variability in the tolerance of different strains of *L. monocytogenes* to benzalkonium chloride, reflecting the growing interest in understanding microbial resistance to disinfectants. To achieve this, minimum inhibitory concentrations (MICs) of this disinfectant were determined under controlled conditions.

Methodology

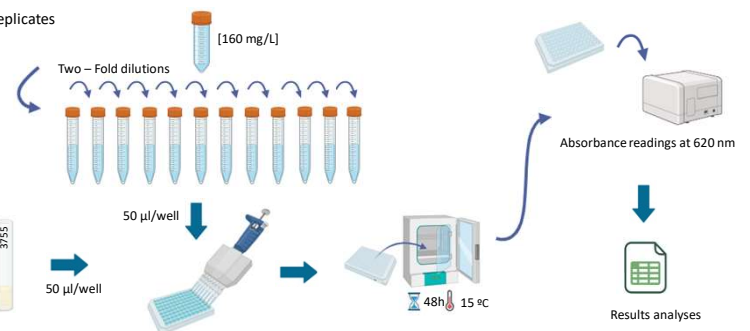
Bacterial strains

The selected strains are part of the *GenoPheno4Trait* project culture collection and are representative of the top 5 strains Portugal in terms of clonal complexes.

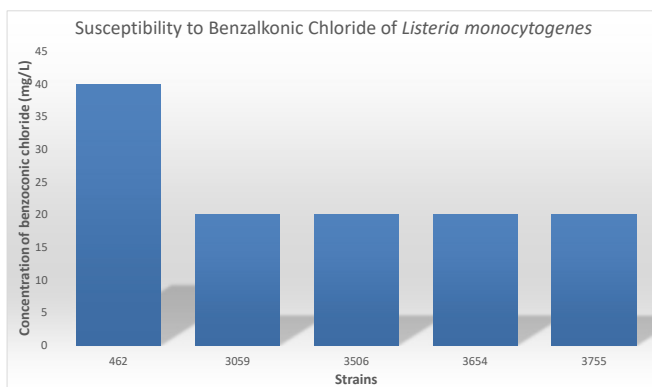


MICs determination [3]

3 independent replicates



Results



Evaluation of the tolerance of different strains to benzalkonic chloride by determining minimum inhibitory concentrations (MICs).

The MICs were defined as the lowest concentration of disinfectant that inhibited the visible growth of the strain. Our results demonstrated significant variability between strains, with MICs ranging from 10 to concentrations set at 40 mg/L. This variability highlights the heterogeneous nature of *L. monocytogenes* populations with some strains showing greater tolerance to benzalkonium chloride.

Conclusions

Our study reveals the varying susceptibility of *Listeria monocytogenes* strains to benzalkonium chloride, highlighting differences among the strains. However, we are using lower concentrations compared to those in standard disinfection protocols in food processing environment. Nonetheless, this approach provides us with data to correlate the persistence and non-persistence among the strains, as understanding and addressing microbial tolerance patterns is crucial for improving food safety measures. In future studies, it will be important to expand our study by using persistence and non-persistence strains and applying new disinfectants.

Acknowledgements

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References

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