

Introduction

Listeria monocytogenes is a Gram-positive pathogenic bacterium that can cause listeriosis in humans [1,2]. A primary cause of human listeriosis is the consumption of food contaminated with *L. monocytogenes*. This rare yet severe foodborne illness results in high rates of hospitalization and mortality, particularly in vulnerable groups: the elderly, immunocompromised individuals, and pregnant women [3,4,5]. It exhibits resistance to desiccation and has been shown to persist for months on stainless steel at 15 °C [6]. This persistence has been related to its ability to resist cleaning. Despite advances in manufacturing processes and hygiene, the food industry still finds positive environmental samples for *L. monocytogenes*, indicating potential colonization and the risk of recurrent food contamination [7].

Purpose

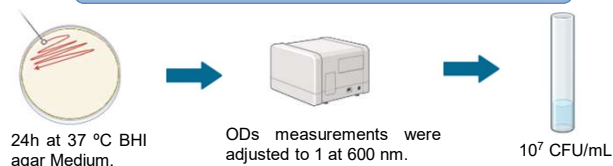
The purpose of our study was to provide valuable insights into bacterial persistence for enhanced food safety strategies by analyzing the desiccation survival dynamics of *Listeria monocytogenes* on stainless steel surfaces under controlled environmental conditions.

Methods

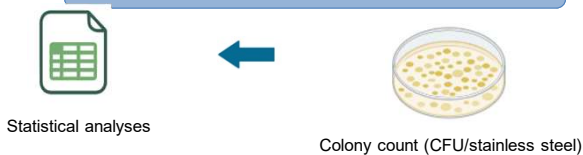
Bacterial strains

The selected strains are part of the *GenoPheno4Trait* project culture collection and are representative of the top five clonal complexes in Portugal, including strains previously classified as persistent and non-persistent.

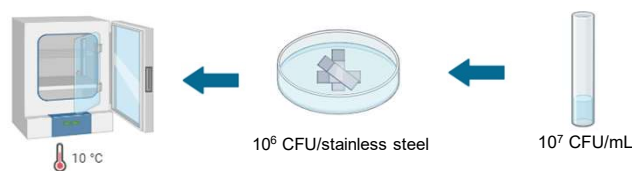
Inoculum



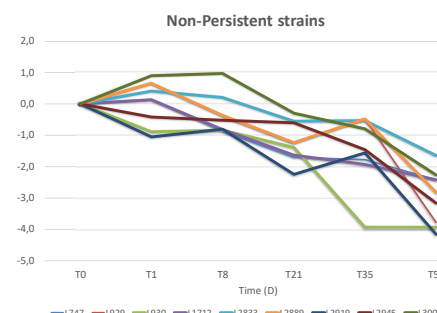
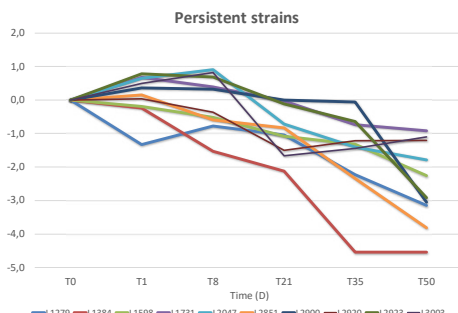
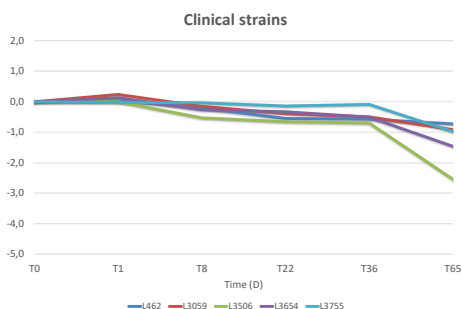
Analyses of results



Inoculation stainless steel



Results



Conclusion

- Under controlled conditions, *L. monocytogenes* strains have demonstrated the ability to survive on stainless steel surfaces.
- Compared to persistent and non-persistent strains of food origin, the clinical strains had a higher viability rate over time.
- Understanding these dynamics is essential for developing effective food safety strategies, given the ongoing challenge of *L. monocytogenes* contamination in the food industry.
- The variation observed between strains suggests the need for a more controlled and specific assessment in the food industry.

References

- [1] Wiktorczyk-Kapischke, N., Skowron, K., & Walecka-Zacharska, E. (2023). Genomic and pathogenicity islands of *Listeria monocytogenes*-overview of selected aspects. *Frontiers in Molecular Biosciences*, 10, 1161486. doi: 10.3389/fmolb.2023.1161486.
- [2] Saavedra, L., Baborita, A., Haber, E. M., Mirnik, C., Suarez, N., & Sesma, F. (2012). *Listeria*: Epidemiology, pathogenesis and novel potential treatments. In A. Romano & C. F. Giordano (Eds.), *Listeria Infections: Epidemiology, Pathogenesis and Treatment* (pp. 67-98). New York: Nova Science Publishers, Incorporated.
- [3] European Food Safety Authority & European Centre for Disease Prevention and Control. (2021).
- [4] Farber, J. M., & Peterkin, P. I. (1991). *Listeria monocytogenes*, a food-borne pathogen. *Microbiological Reviews*, 55(3), 476-511. doi: 10.1128/mr.55.3.476-511.1991.
- [5] McLauchlin, J., Mitchell, R. T., Smerdon, W. J., & Jewell, K. (2004). *Listeria monocytogenes* and listeriosis: a review of hazard characterization for use in microbiological risk assessment of foods. *International Journal of Food Microbiology*, 92(1), 15-33. doi: 10.1016/S0168-1605(03)00326-X.
- [6] Vogel, B. F., Hansen, L. T., Mordhorst, H., & Gram, L. (2010). The survival of *Listeria monocytogenes* during long term desiccation is facilitated by sodium chloride and organic material. *International Journal of Food Microbiology*, 140(2-3), 192-200. doi: 10.1016/j.ijfoodmicro.2010.03.035.
- [7] Melero, B., Stessi, B., Manso, B., Wagner, M., Esteban-Carbonero, O. J., Hernández, M., Rovira, J., & Rodríguez-Lázaro, D. (2019). *Listeria monocytogenes* colonization in a newly established dairy processing facility. *International Journal of Food Microbiology*, 289, 64-71. doi: 10.1016/j.ijfoodmicro.2018.09.003

Acknowledgements

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