

Selection of promising clean-label antimicrobials for novel meat products

Luana Barbosa^{1,2}, Joana Bastos Barbosa¹, Teresa Bento de Carvalho¹, Maria A. Azevedo³, Paula Teixeira¹

¹ Universidade Católica Portuguesa, CBQF—Centro de Biotecnologia e Química Fina—Laboratório Associado, Escola Superior de Biotecnologia, Porto, Portugal

² Faculdade de Ciências da Universidade do Porto, Rua do Campo Alegre, 4169-007 Porto, Portugal

³ Colab4Food – Collaborative Laboratory for innovation in the Agri-food Industry, Vila do Conde, Portugal

Corresponding author: up201905421@up.pt

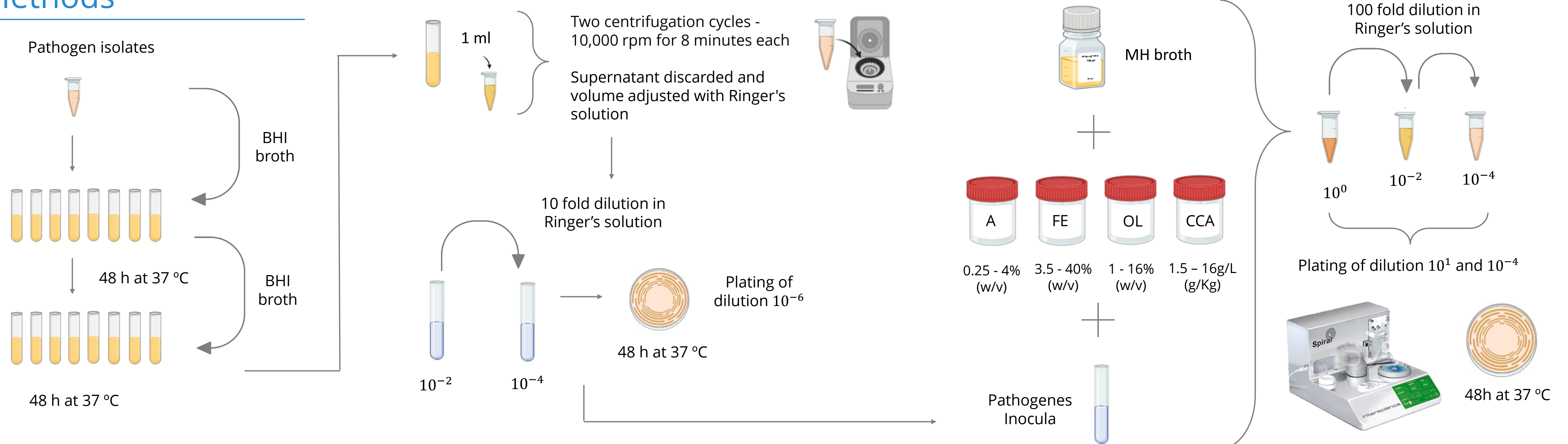
Introduction

In the current context of growing demand for healthier and transparently labeled foods, research into natural compounds as clean-label substitutes for synthetic preservatives is essential. Understanding the susceptibility of different pathogens to natural antimicrobials is crucial for the development of new effective preservation strategies. Incorporating these natural preservatives into meat products not only extends shelf life, but also increases consumer trust in products that are committed to transparency and quality [1,2].

Objective

This study assessed the antimicrobial activity of clean-label alternatives to sodium nitrite in meat products. The objective was to identify substitutes that preserve organoleptic properties and ensure microbiological safety in the development of reformulated products.

Methods



Results

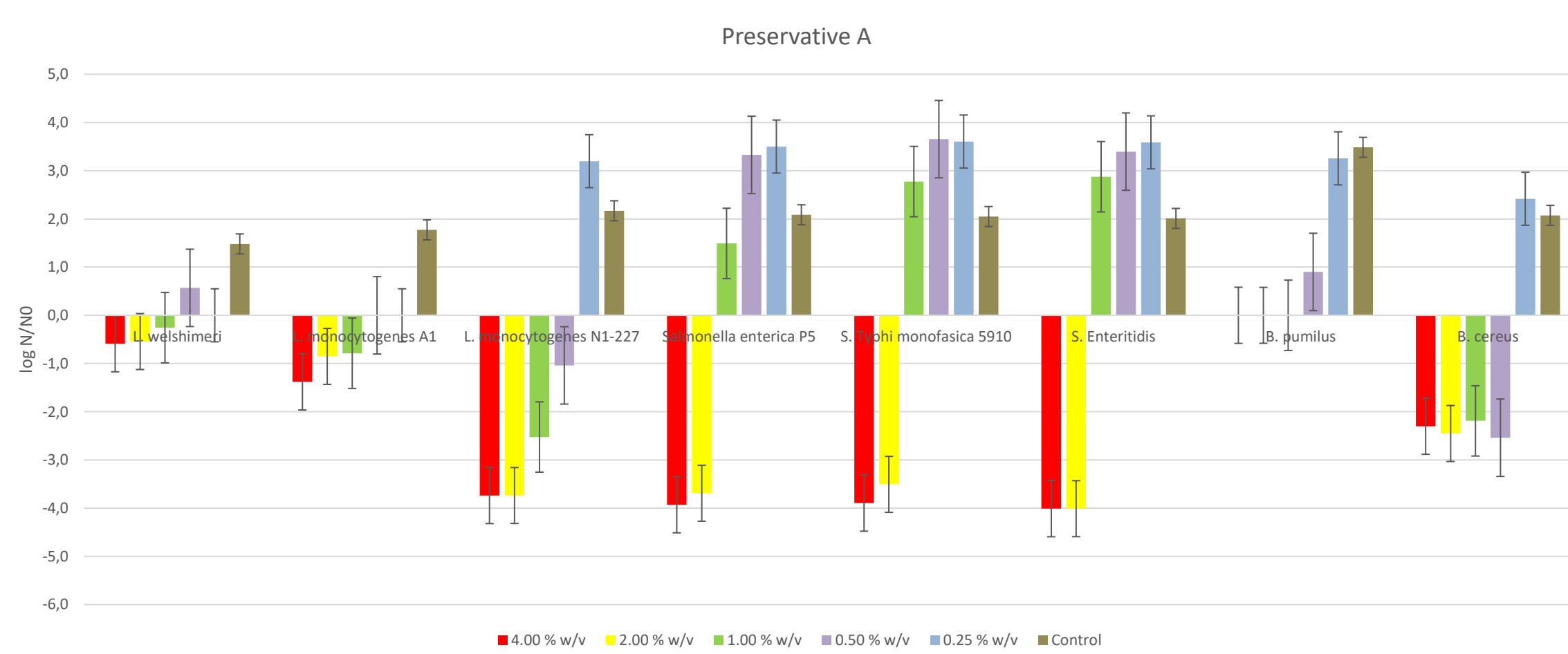


Figure 1: Susceptibility of different pathogens to preservative A.

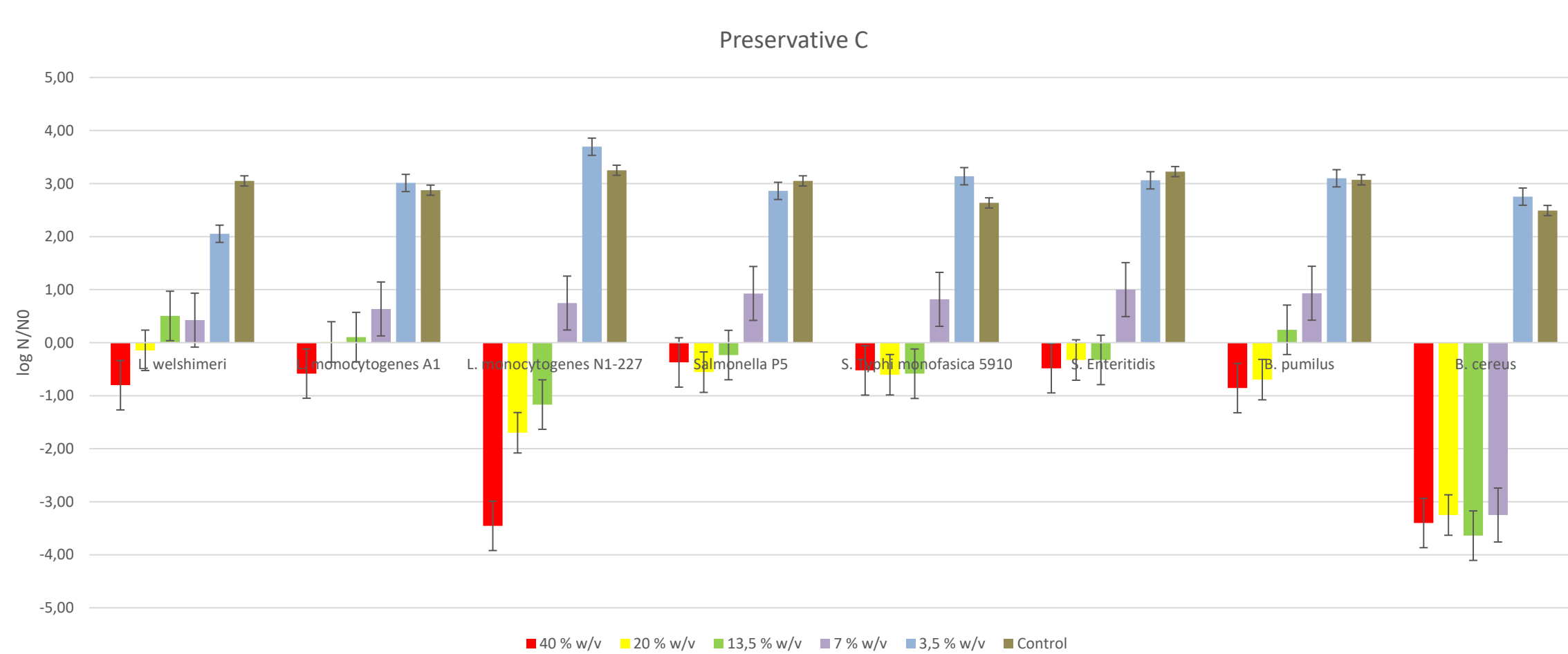


Figure 3: Susceptibility of different pathogens to preservative C

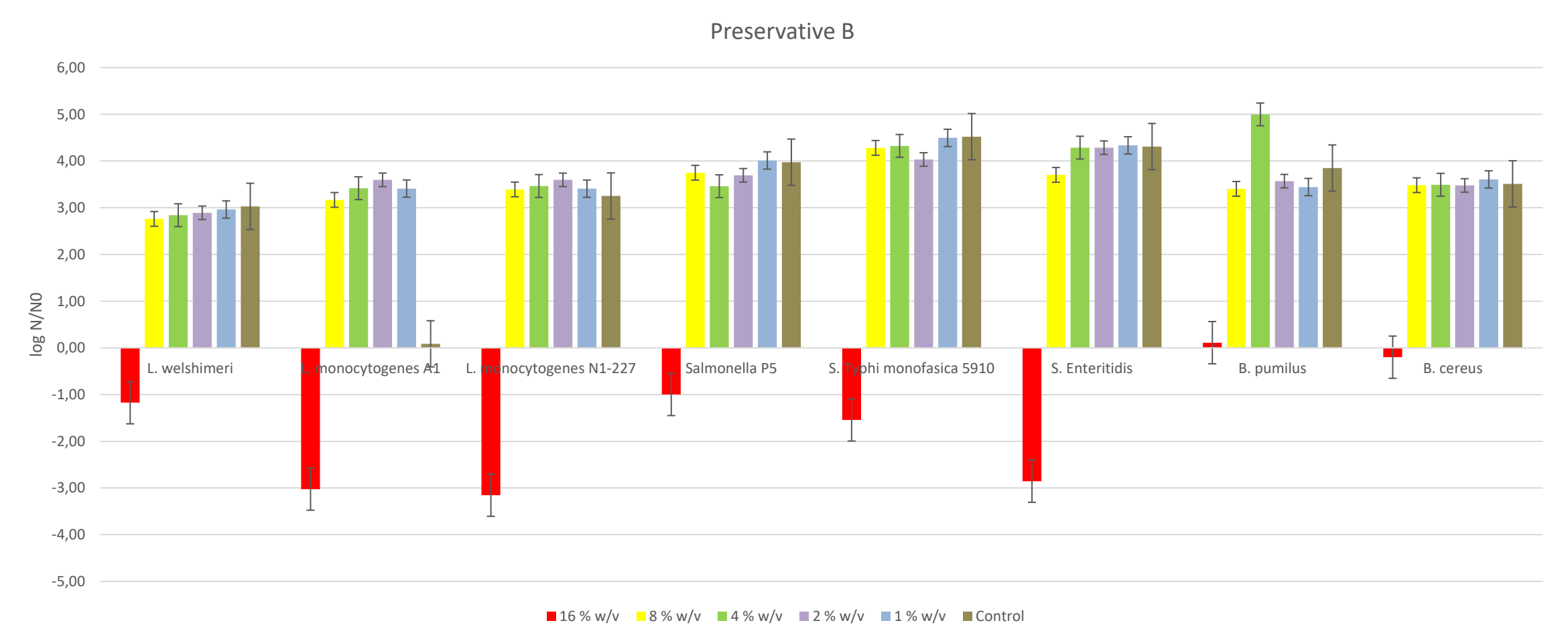


Figure 2: Susceptibility of different pathogens to preservative B.

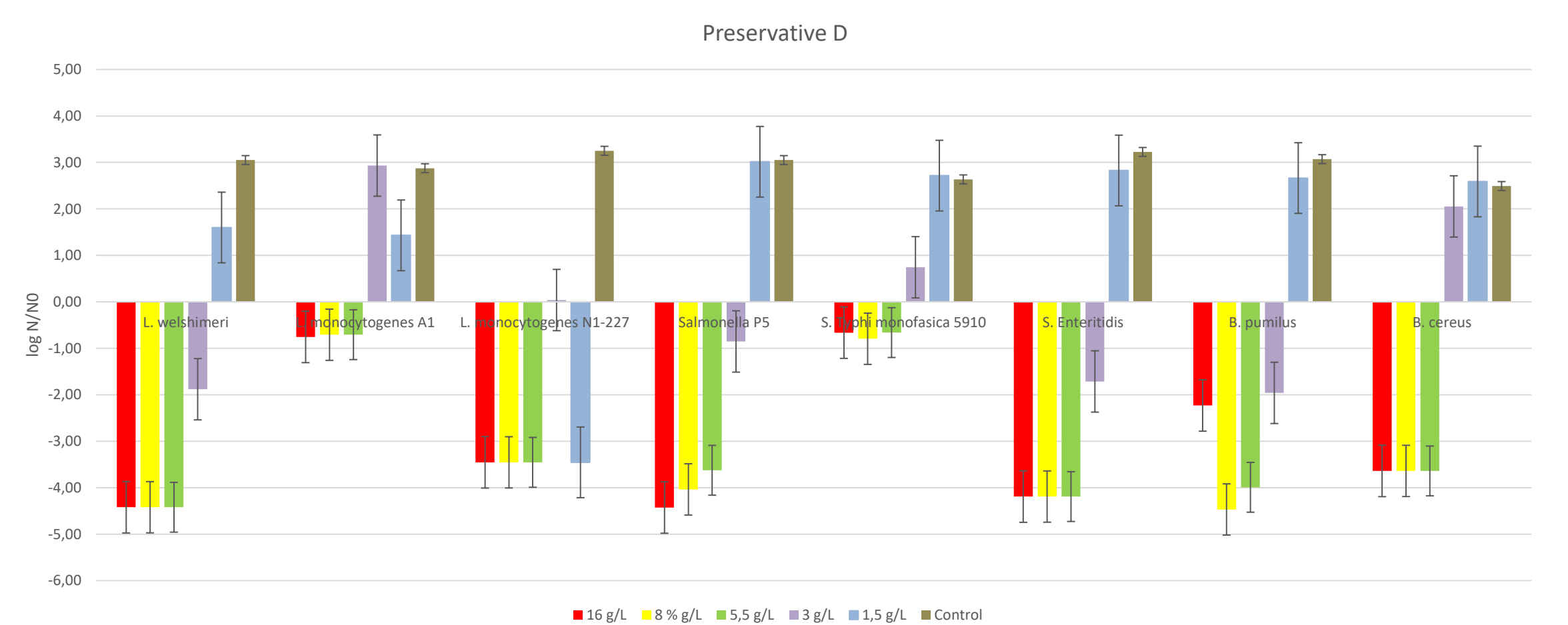


Figure 4: Susceptibility of different pathogens preservative D

Discussion and conclusions

- At a 1% (w/v) concentration, Preservative A inhibited four out of eight pathogen isolates, while all isolates were inhibited at 2% (w/v).
- Preservative B showed inhibitory effects on most pathogens only when used at concentrations higher than the maximum recommended concentration of 8% (w/v).
- Preservative C showed inhibition against most pathogens at the recommended concentration of 13.5% and above.
- Preservative D exhibited inhibitory behavior for all pathogens at and above the recommended concentration of 5.5 g/L.

In conclusion, preservatives A, C, and D showed promising results for future applications in clean-label meat products. This experiment highlights the significance of exploring alternative, clean-label preservatives for ensuring food safety and quality.

References

[1] Zapašnik, A., Sokołowska, B., & Bryła, M. (2022). Role of Lactic Acid Bacteria in Food Preservation and Safety. *Foods* (Basel, Switzerland), 11(9), 1283. <https://doi.org/10.3390/foods11091283>

[2] Inguglia, E. S., Song, Z., Kerry, J. P., O'Sullivan, M. G., & Hamill, R. M. (2023). Addressing Clean Label Trends in Commercial Meat Processing: Strategies, Challenges and Insights from Consumer Perspectives. *Foods* (Basel, Switzerland), 12(10), 2062. <https://doi.org/10.3390/foods12102062>

Acknowledgements

This work was supported by agenda V1IAFOOD – Plataforma de Valorização, Industrialização e Inovação Comercial para o setor Agroalimentar (C644929456-0000040), funded by PRR – Plano de Recuperação e Resiliência e pelos Fundos Europeus NextGeneration EU/Financial. This work was also supported by National Funds from FCT - Fundação para a Ciência e a Tecnologia through project UIDB/50016/2020.