

Selection of promising clean-label antimicrobials for novel meat products

Luana Barbosa^{1,2}, Joana Bastos Barbosa¹, Teresa Bento de Carvalho¹, Maria A. Azevedo³, Norton Komora⁴, 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

⁴ R&D Department, Primor Charcutaria Prima – S.A., Avenida Santiago de Gavião, n° 1142, Gavião, 4760-003, Vila Nova de Famalicão, Portugal

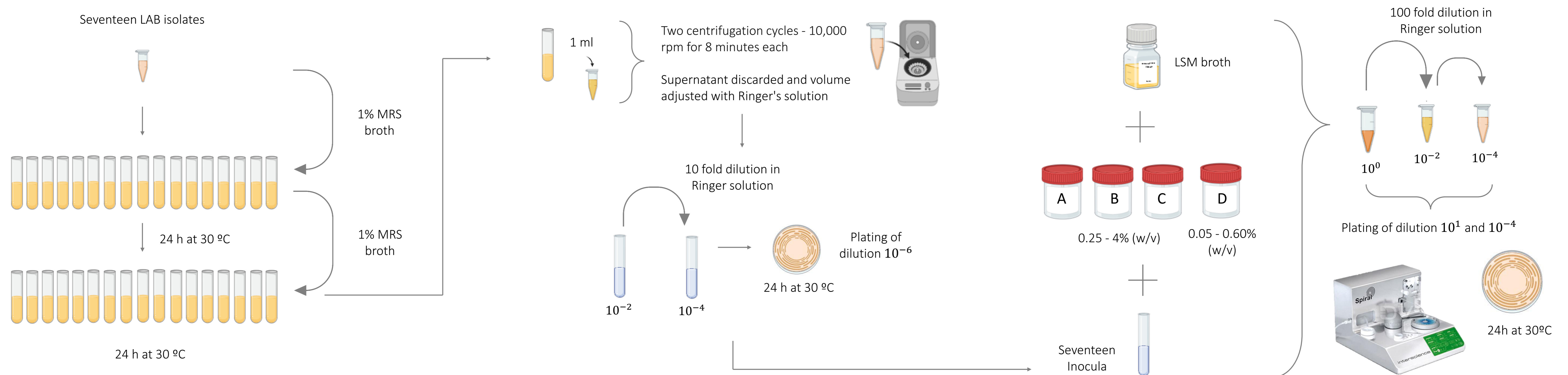
1 INTRODUCTION

Lactic acid bacteria (LAB) play a significant role in the spoilage of meat products, contributing to textural and sensory changes. Understanding the susceptibility of these bacteria to natural antimicrobial agents is crucial for developing new effective preservation strategies. Minimum inhibitory concentration (MIC) assays provide valuable insights into the efficacy of specific compounds in inhibiting bacterial growth and promoting food safety and quality [1,2]. As the clean-label movement influences consumer preferences, integrating natural preservatives into meat products not only extends their shelf life but also enhances trust in products committed to transparency and quality [3].

2 PURPOSE

This study aimed to assess the antimicrobial activity of clean-label alternatives to sodium nitrite in meat products. The objective was to identify substitutes that not only preserve organoleptic properties but also ensure microbiological safety in the development of reformulated products.

3 METHODOLOGY



4 RESULTS

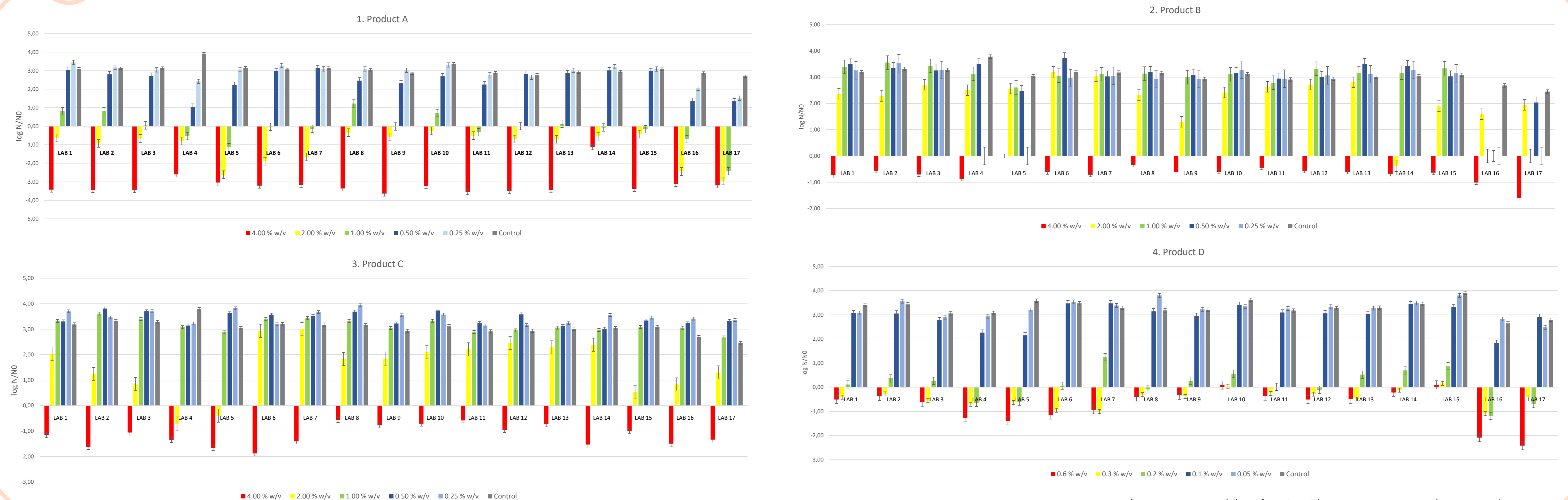


Figure 1-4: Susceptibility of Lactic Acid Bacteria to Compounds A, B, C and D.

5 CONCLUSIONS

- At a 1% (w/v) concentration, Compound A inhibited nine out of seventeen isolates, while all isolates were inhibited at 2% (w/v).
- Compounds B and C exhibited inhibitory effects only at concentrations exceeding 1% (w/v).
- Compound D inhibited the majority of isolates at the maximum recommended concentration of 0.3% (w/v).
- Compounds A and D showed promising results for future applications in clean-label meat prototypes.
- Spoilage LAB poses a serious threat to the meat industry, with food deterioration and recalls being an impending problem leading to food waste. Since clean-label alternatives to synthetic preservatives are eagerly sought after by consumers, the association of natural preservatives with this new dietary trend could prove valuable in the development of novel products.

6 REFERENCES & ACKNOWLEDGEMENTS

- [1] Zapašnik, A., Sokołowska, B., & Bryla, 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] Kowalska-Krochmal, B., & Dudek-Wicher, R. (2021). The Minimum Inhibitory Concentration of Antibiotics: Methods, Interpretation, Clinical Relevance. *Pathogens (Basel, Switzerland)*, 10(2), 165. <https://doi.org/10.3390/pathogens10020165>
- [3] 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>

This work was supported by agenda VIIAFOOD – Plataforma de Valorização, Industrialização e Inovação Comercial para o setor Agroalimentar (C644929456-00000040), funded by PRR – Plano de Recuperação e Resiliência e pelos Fundos Europeus NextGeneration EU Financial.