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Evaluation of the ability of smear-ripened cheese microbial communities to colonize pea-protein matrix

Mahtab Shoukat¹, Eric Dugat-Bony¹, Dominique Swennen¹, Vincent Hervé¹, ²Marjon H. J. Wells-Bennik & Pascal Bonnarme^{1*}

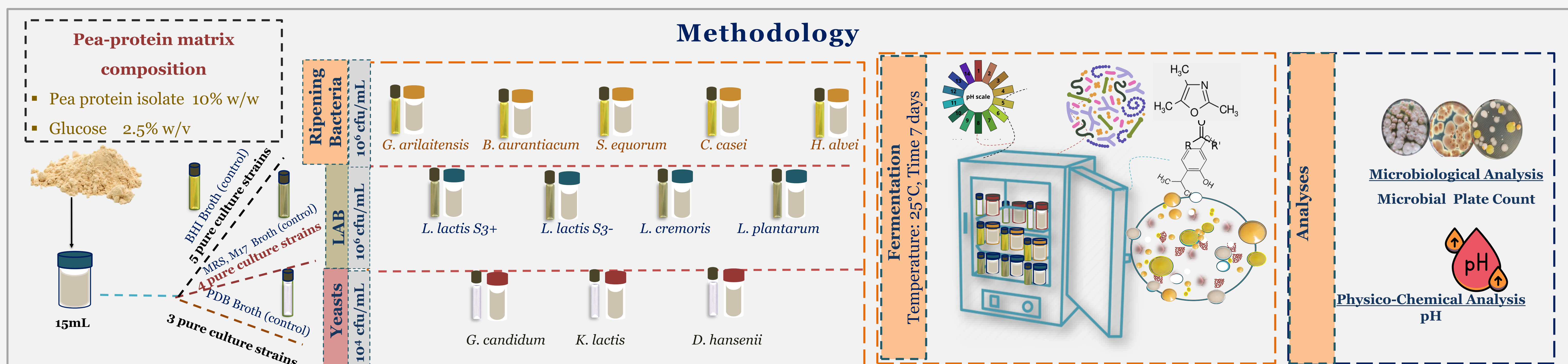
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Introduction

Plant-based substitutes for dairy and meat products have been one of the key innovative drivers since the last decade due to concerns about sustainability, lifestyle, and dietary limitations (El Youssef *et al.*, 2020). Pea protein is one of the most preferable plant-based protein to develop plant-based substitutes due to its high nutritional value (Masiá *et al.*, 2022). However, **microbial safety** and **sensory attributes** of these plant-based products are the main technological and scientific challenges for the food industry (Ben-Harb *et al.*, 2022). **Fermentation** and **ripening processes** may help to enhance the microbiological safety, nutritional, physicochemical, and sensory characteristics of plant-based products (Ben-Harb *et al.*, 2020). However, to understand the evolution and behaviour of microorganisms during these processes is crucial for the development of plant-based products with desired characteristics.

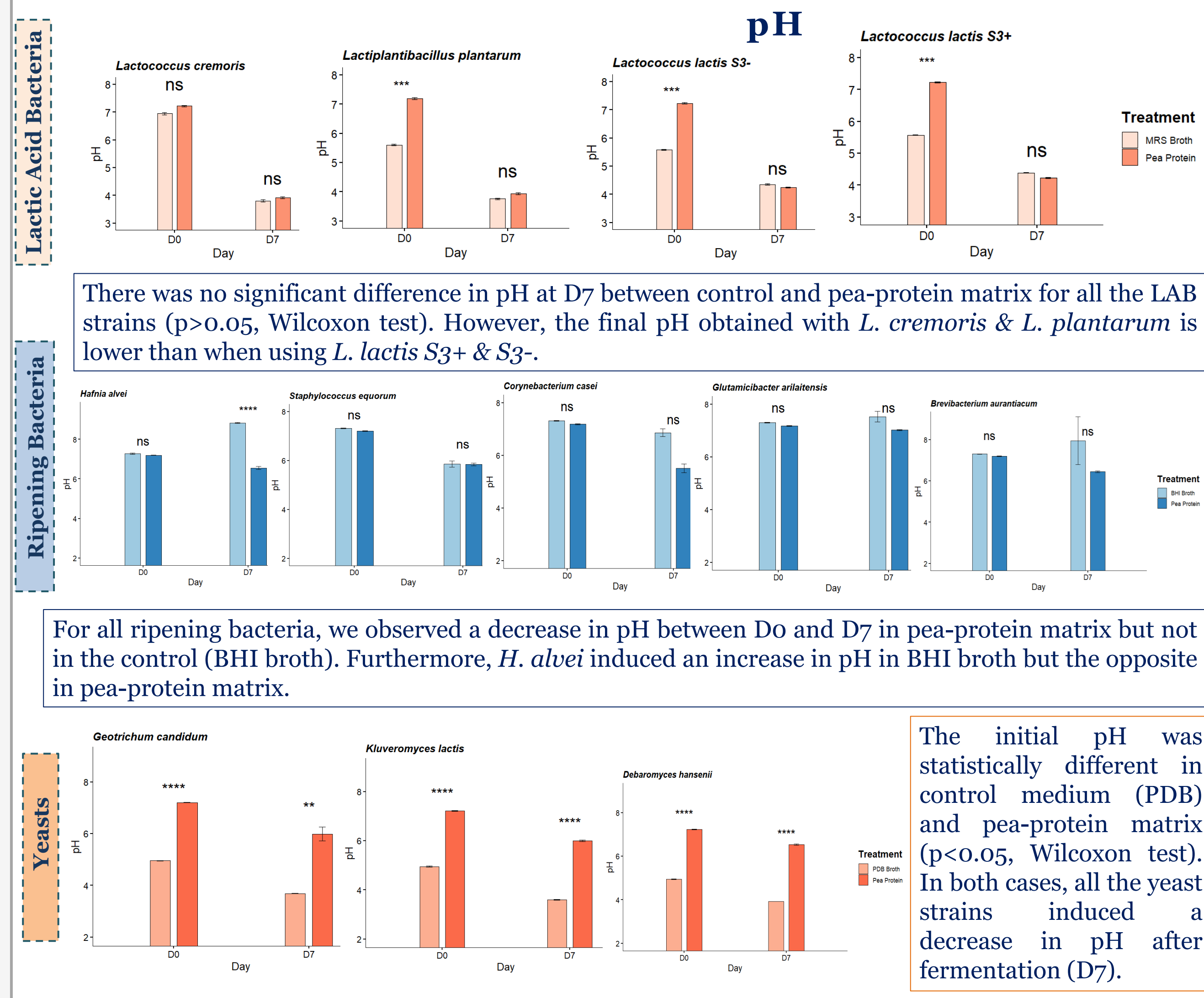
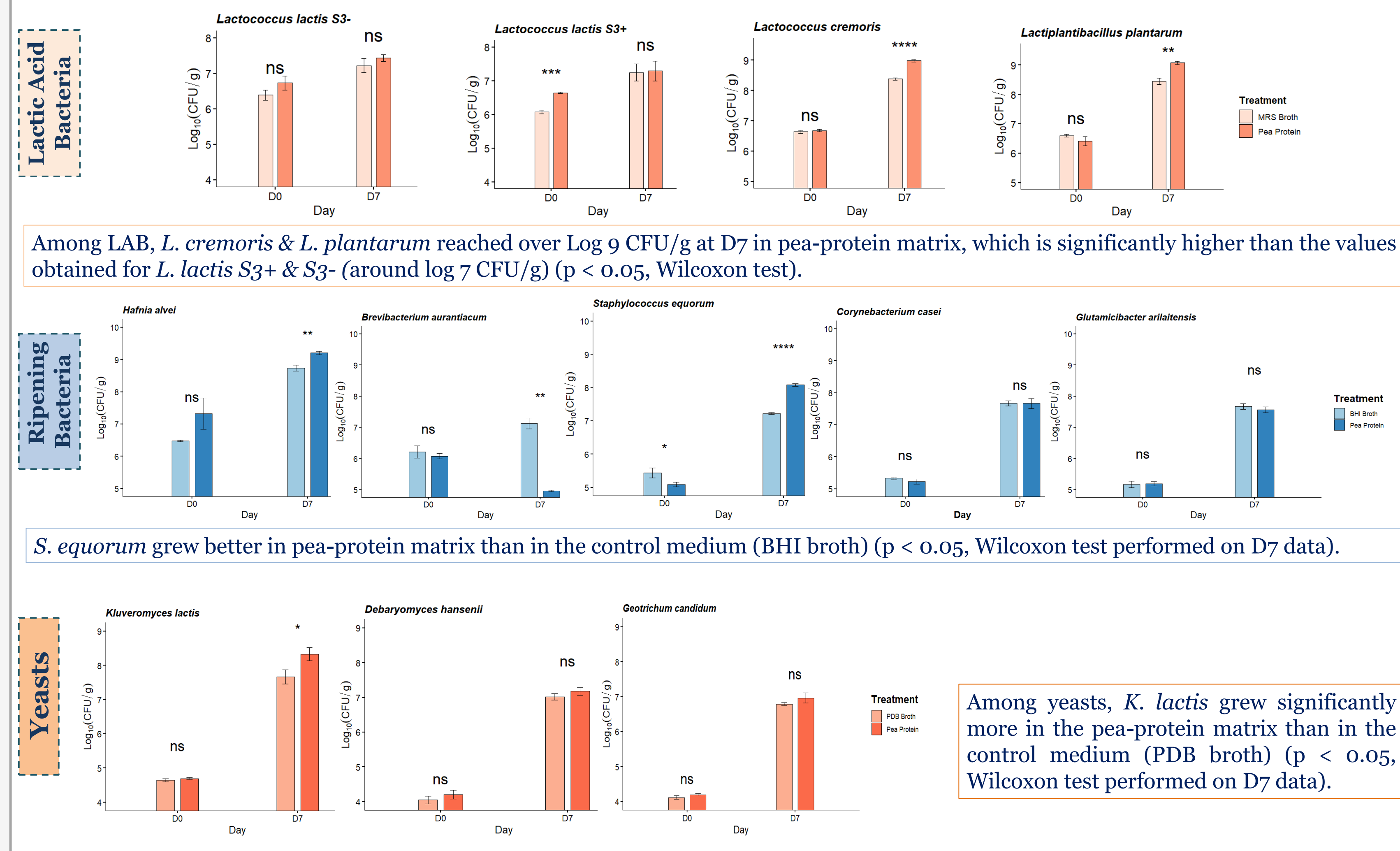
Aims & Objectives

- To evaluate the ability of smear-ripened cheese microbial communities to colonize a pea-protein matrix.
- To understand the growth behaviour of different cheese microorganisms in pure culture fermentation conditions.
- To identify microbial strains with optimum potential for pea-protein based cheese ripening.



Microbial Growth

Results



Conclusion

- All smear-ripened cheese microorganisms well colonized the pea protein matrix except *Brevibacterium aurantiacum*.
- Among lactic acid bacteria (LAB), *L. plantarum*, and *L. cremoris* showed higher growth tendency compared to *L. lactis* S3+ & S3- strains in pea-protein matrix.
- Most cheese ripening bacteria and yeasts demonstrated the ability to slightly decrease the pH of pea protein matrix especially *H. alvei* and *K. lactis*.

Future Work

- To understand the evolution and behaviour of smear-ripened cheese microorganisms and their interaction in a pea-protein matrix.
- To investigate the effect of iron-deficient and iron-rich conditions on the growth evolution of smear-ripened cheese microbial communities during pea-protein matrix fermentation.
- To identify an optimal synthetic microbial consortia for plant based cheese fermentation.

References

- Masiá, C., Jensen, P. E., Petersen, I. L., & Buldo, P. (2022). Design of a functional pea protein matrix for fermented plant-based cheese. *Foods*, 11(2), 178
- El Youssef, C., Bonnarme, P., Fraud, S., Péron, A. C., Helinck, S., & Landaud, S. (2020). Sensory improvement of a pea protein-based product using microbial co-cultures of lactic acid bacteria and yeasts. *Foods*, 9(3), 349.
- Ben-Harb, S., Irlinger, F., Saint-Eve, A., Panouillé, M., Souchon, I., & Bonnarme, P. (2020). Versatility of microbial consortia and sensory properties induced by the composition of different milk and pea protein-based gels. *LWT*, 118, 108720.
- Ben-Harb, S., Saint-Eve, A., Irlinger, F., Souchon, I., & Bonnarme, P. (2022). Modulation of Metabolome and Overall Perception of Pea Protein-Based Gels Fermented with Various Synthetic Microbial Consortia. *Foods*, 11(8), 1146.

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