

Effect of *Lactococcus lactis* strains on the survival of *Listeria monocytogenes* and *Staphylococcus aureus* in yoghurt

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INTRODUCTION & AIM

Lactic acid bacteria (LAB) play a crucial role in dairy fermentation, contributing to product safety, texture, and flavor. Among LAB, *Lactococcus lactis* is widely used as a starter culture due to its acidifying ability and potential antibacterial activity.

Objective of the Study: To determine the effect of selected *Lactococcus lactis* strains on the survival of *Listeria monocytogenes* ATCC 7644 and *Staphylococcus aureus* ATCC 25923 in yoghurt.

Tasks of the Study:

- To evaluate technological properties of selected *L. lactis* strains.
- To evaluate antimicrobial activity of selected *L. lactis* strains.
- To evaluate the effect of selected *L. lactis* strains on the survival of *L. monocytogenes* ATCC 7644 and *S. aureus* ATCC 25923 in yoghurt.

METHOD

Antibacterial activity: Agar spot and overlay methods were used to assess inhibition zones against *L. monocytogenes* ATCC 7644 and *S. aureus* ATCC 25923.

Acidifying ability: The pH reduction in milk was measured after 6 and 24 hours of incubation to evaluate fermentation performance.

Challenge test: Yoghurt was prepared using UAT cow's milk with a commercial starter and 1% of selected *L. lactis* strain (LL29), then artificially inoculated with 5 µL of *L. monocytogenes* and *S. aureus*. Samples were stored at 4 °C and pathogen counts were monitored on days 1, 7, 14, and 21.

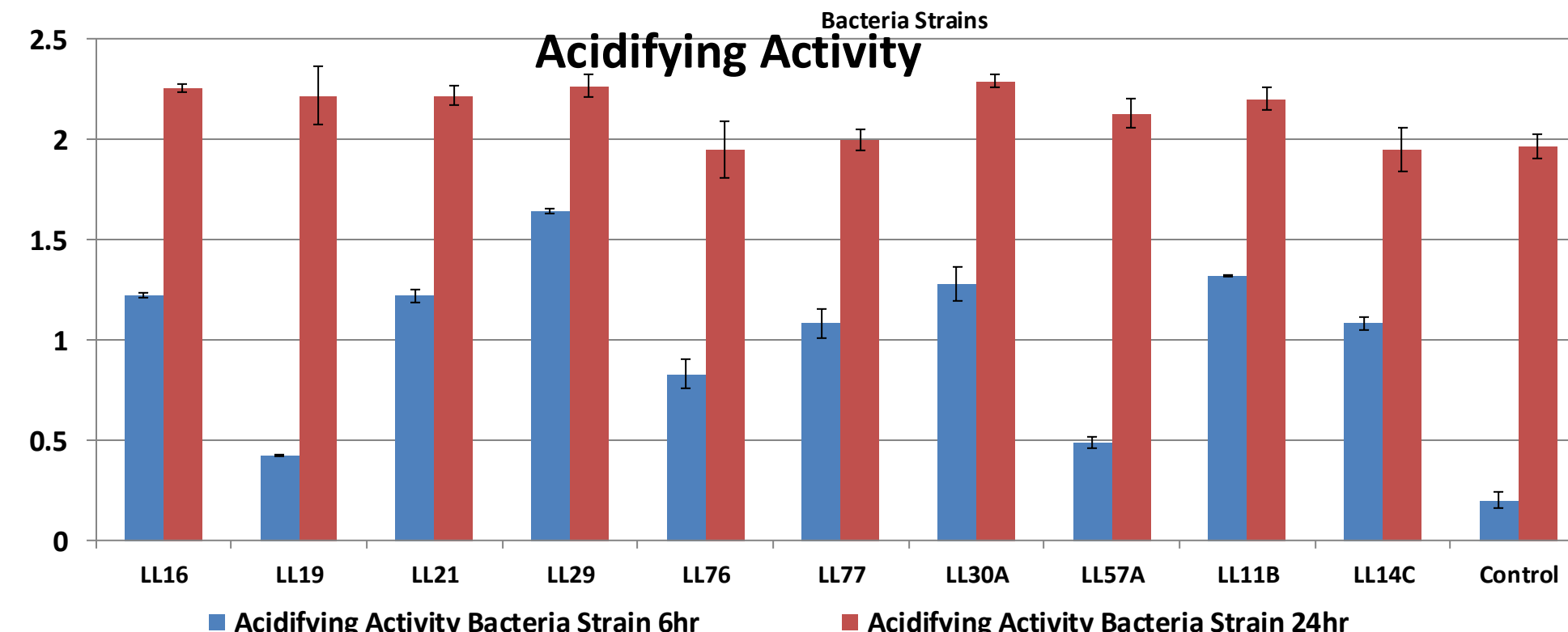
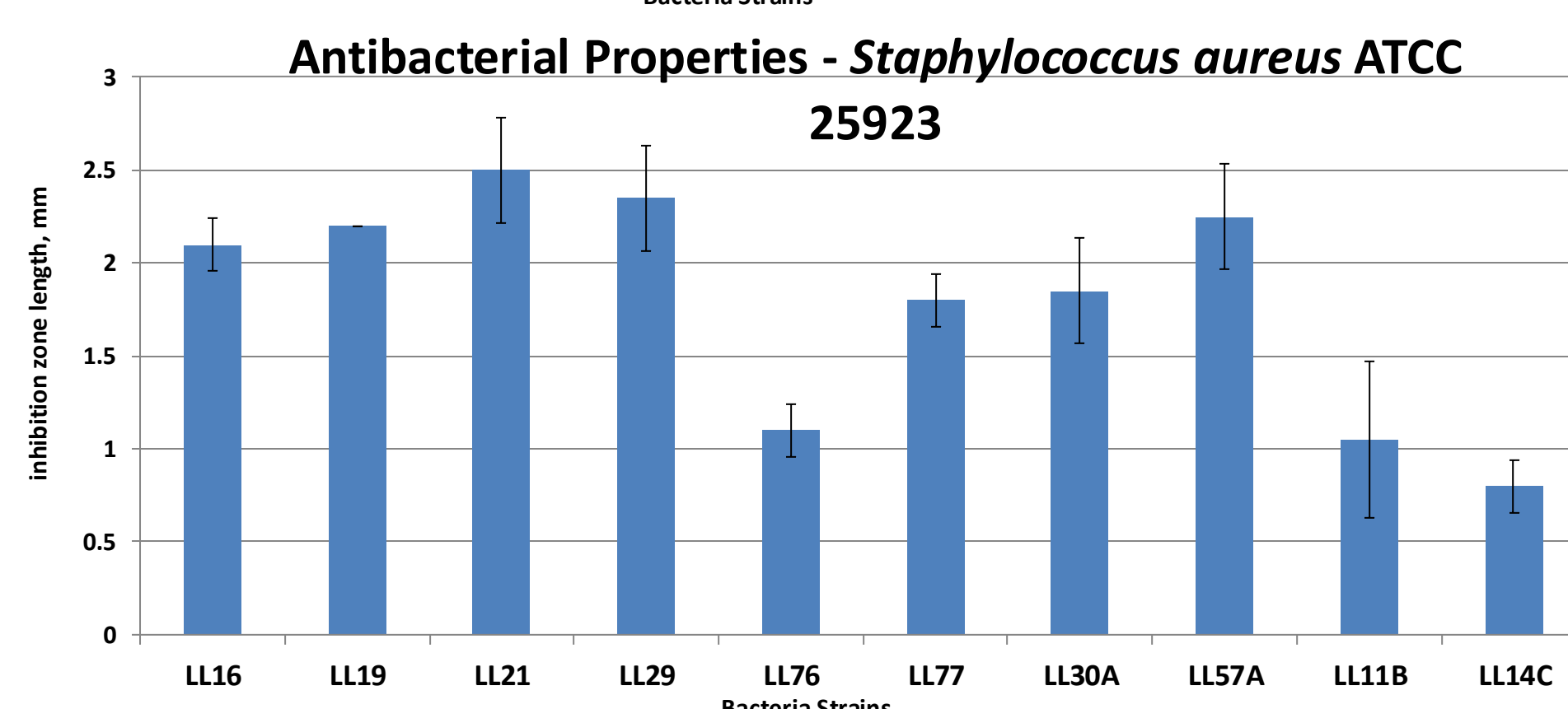
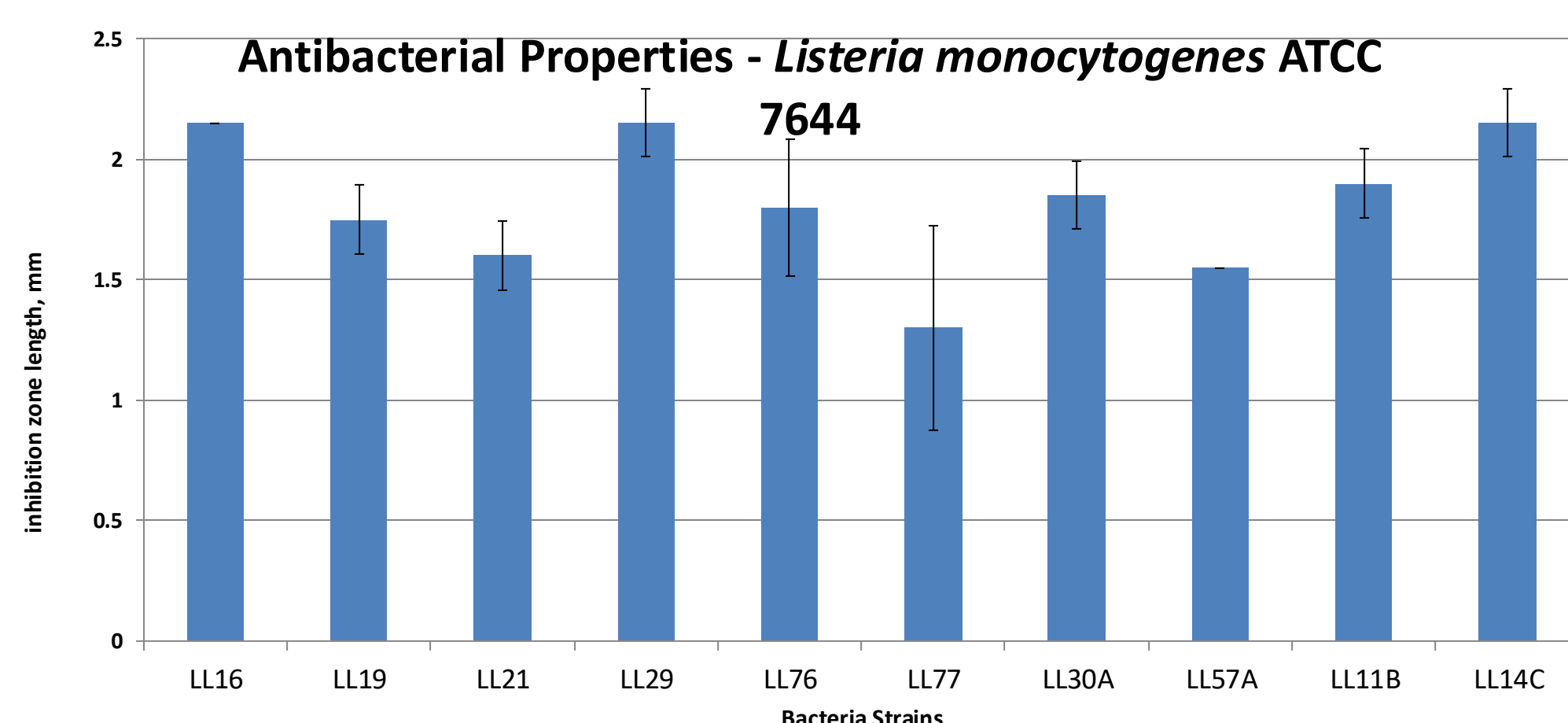
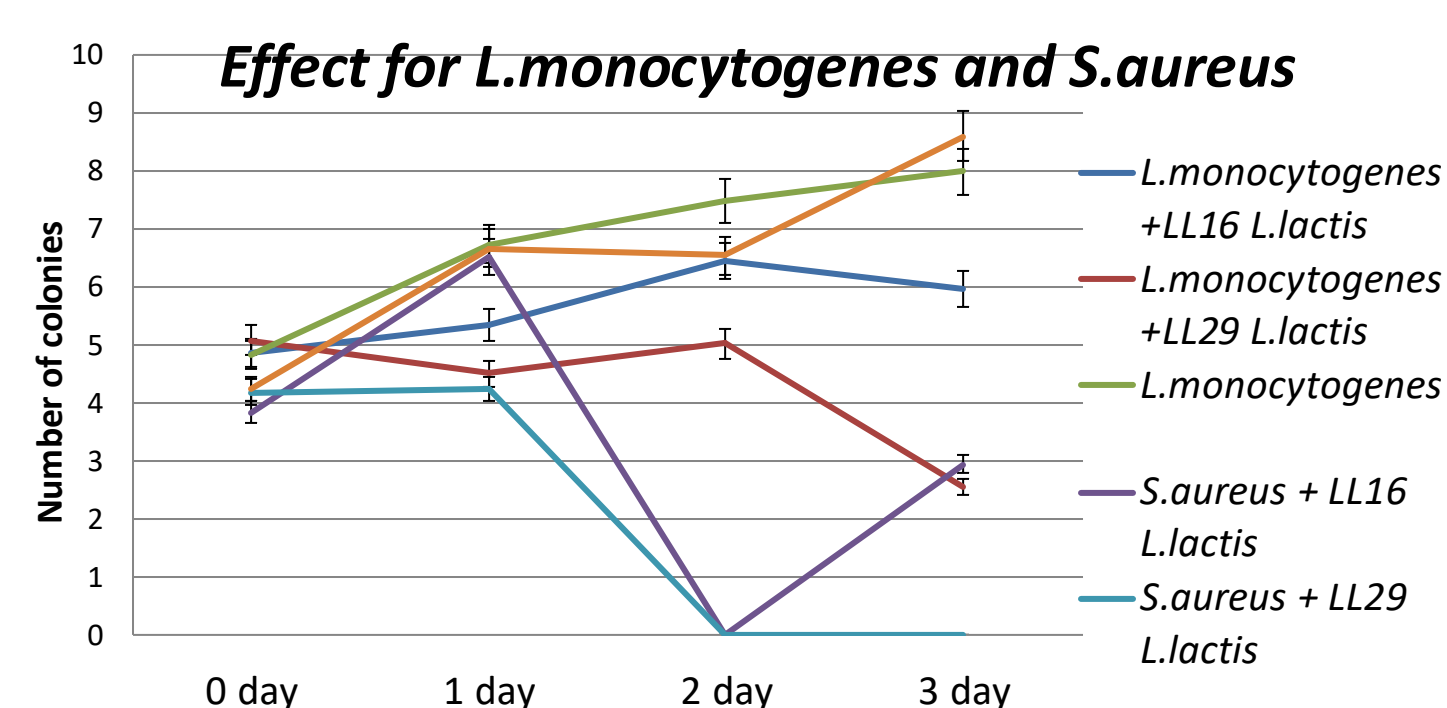
CONCLUSION

- LL16 is an excellent acidifier with desirable sensory characteristics.
- LL29 demonstrates superior antibacterial activity and ensures microbial safety in dairy products.
- Both strains can be applied as starter cultures to enhance quality and safety in fermented dairy processes.

FUTURE WORK / REFERENCES

Kondrotiene, K., Kasnauskite, N., Serniene, L., Gözl, G., Alter, T., Kaskoniene, V., Maruska, A. S., & Malakauskas, M. (2017). Characterization and application of newly isolated nisin producing *Lactococcus lactis* strains for control of *Listeria monocytogenes* growth in fresh cheese. *LWT*, 87, 507–514. <https://doi.org/10.1016/j.lwt.2017.09.021>

RESULTS & DISCUSSION



Acidification: Strain LL16 demonstrated the highest fermentation activity, achieving a pH drop of 2.26 ± 0.01 after 24 hours with desirable aroma and gel-like texture.

Antibacterial activity: LL29 exhibited the strongest inhibition against *S. aureus* (2.35 ± 0.19 cm zone). LL16, LL29, and LL14C effectively inhibited *L. monocytogenes* (2.15 ± 0.09 cm zones).

Pathogen inhibition in yoghurt: The challenge test showed that yoghurt containing LL29 completely inhibited both *L. monocytogenes* and *S. aureus* during 21-day storage at 4 °C.

These findings confirm that *L. lactis* strains, particularly LL16 and LL29, possess promising functional properties for safe and effective dairy fermentation, combining strong acidification capacity with antibacterial potential.