Impact of *Escherichia coli* on the Growth of *Listeria monocytogenes*: A Preliminary Assessment

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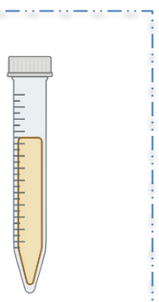
Introduction and Objectives

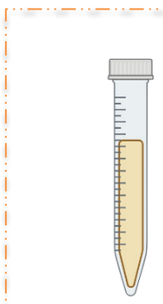
Listeria monocytogenes is a foodborne pathogen responsible for listeriosis, a life-threatening illness that poses a significant risk to susceptible populations, including the elderly, pregnant women, neonates, and immunocompromised individuals[1]. The human digestive system presents multiple barriers to *L. monocytogenes*, including the gut microbiota, which plays an important role in limiting bacterial survival and infection potential[2].

Methodology

A. Preparation of inocula



Listeria monocytogenes

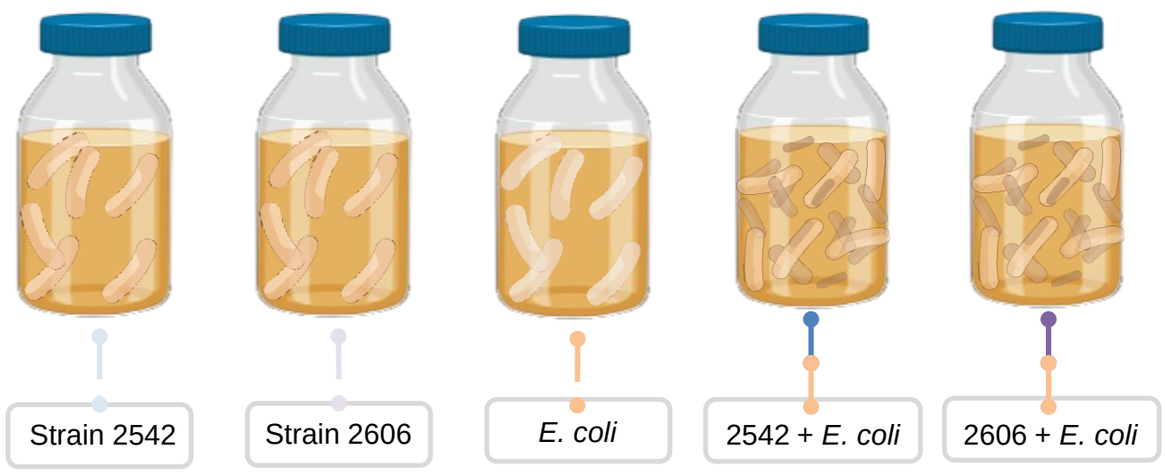


Escherichia coli

Strains tested individually:
- Strain 2542
- Strain 2606

Centrifuge at 8000 RPM for 8 minutes
+
Wash cells with sterile Ringer Solution
&
Repeat

B. Experimental Design



T0 – T26h

Samples taken every 2 hours and enumeration on selective media (TBX and Palcam)

Results

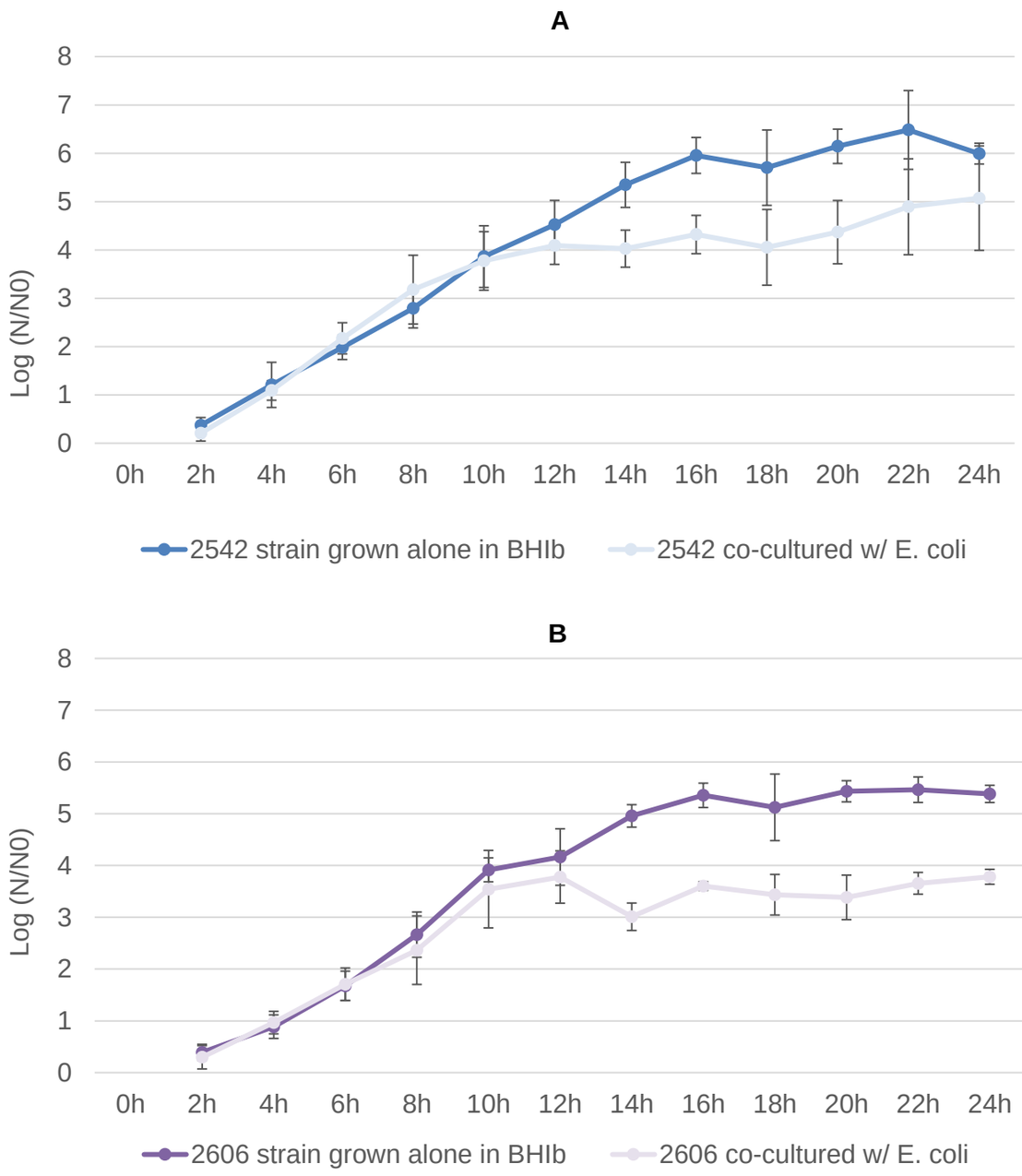


Figure 1. Behaviour of *L. monocytogenes* strains in co-culture with *E. coli*: A - strain 2542 grown alone and in coculture with *E. coli*; B - strain 2606 grown alone and in coculture with *E. coli*. Results are mean values based on data from three replicates and standard deviations are indicated by error bars.

- Growth analysis revealed that *E. coli* maintained comparable proliferation patterns regardless of whether it was cultured alone or with *L. monocytogenes* (data not shown).

- However, *L. monocytogenes* exhibited distinct responses depending on the strain. During the first 12 hours, both strains followed similar growth patterns in co-culture and single culture. After 24 hours, strain 2542 displayed a 1.8 log cycles reduction when co-cultured with *E. coli*, whereas strain 2606 showed a more pronounced decrease of 2.1 log cycles.

Conclusions

These findings suggest that strain 2606 is more susceptible to the presence of *E. coli* than strain 2542, highlighting potential strain-specific interactions within the gut environment. Future studies will expand on these observations by incorporating additional strains and examining their behavior in the presence of other predominant gut bacteria to better understand the impact of microbial interactions on *L. monocytogenes* survival.

Acknowledgements

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References

[1] Swaminathan, B., & Gerner-Smidt, P. (2007). The epidemiology of human listeriosis. Microbes and Infection, 9(10), 1236–1243. https://doi.org/10.1016/j.micinf.2007.05.011
[2Bagatella, S., Tavares-Gomes, L., & Oevermann, A. (2022). *Listeria monocytogenes* at the interface between ruminants and humans: A comparative pathology and pathogenesis review. Veterinary Pathology, 59(2), 186–210. https://doi.org/10.1177/03009858211052659

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