Strain-Specific Interactions Between *Listeria monocytogenes* and *Salmonella* Typhimurium in Co-culture Conditions

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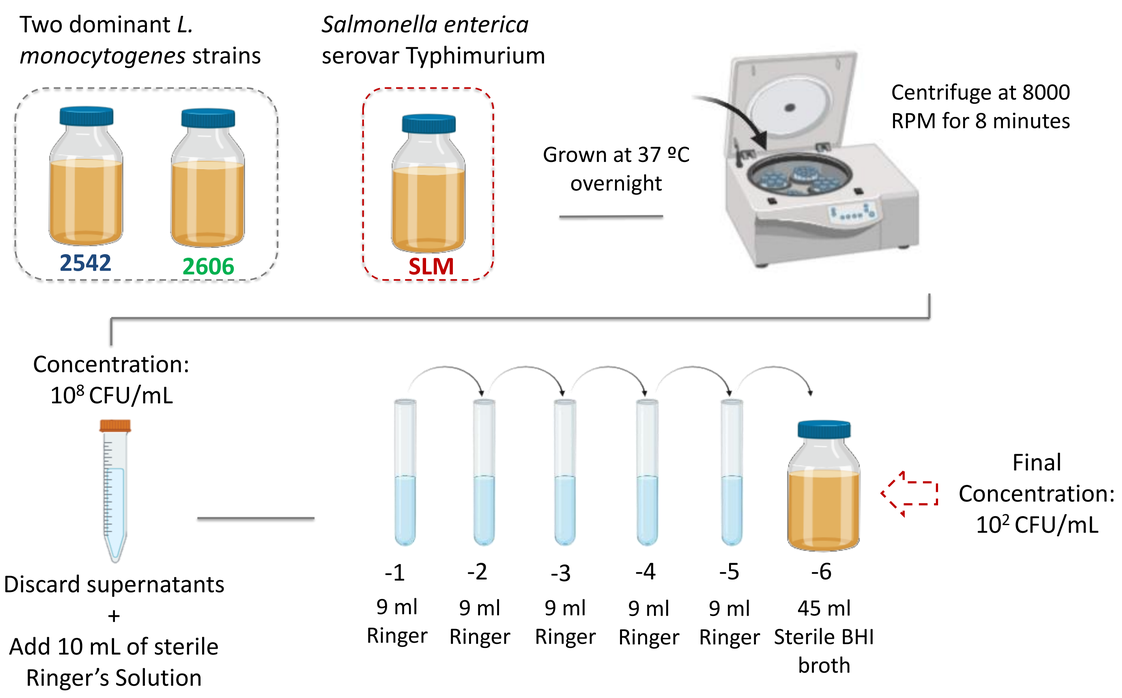
Introduction & Aim

Listeria monocytogenes is a foodborne pathogen associated with listeriosis, a severe infection with high mortality rates, especially among high-risk groups including the elderly, pregnant women, neonates, and immunocompromised individuals[1]. Within the human gastrointestinal tract, colonization by *L. monocytogenes* is challenged by several defense mechanisms, among which the gut microbiota plays a pivotal role in suppressing pathogen overgrowth and invasion[2]. This study aimed to assess the interactions between *L. monocytogenes* and *Salmonella enterica* serovar Typhimurium, a facultative pathogen that can transiently inhabit the human gut, to better understand how microbial competition may influence *Listeria* survival and behavior.

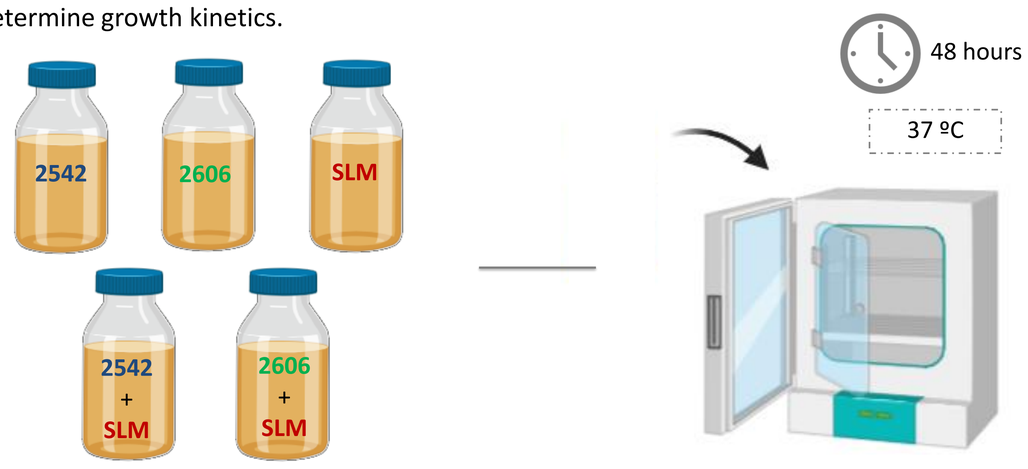
Methodology

A. Preparation of inoculums



B. Experimental Design

Listeria monocytogenes strains (2542 and 2606) were cultured either individually (**monoculture**) or in combination (**co-culture**) with *S.* Typhimurium over a 48-hour period. Samples were taken every two hours and plated on selective agar (Palcam or XLD) to monitor bacterial counts and determine growth kinetics.



Results

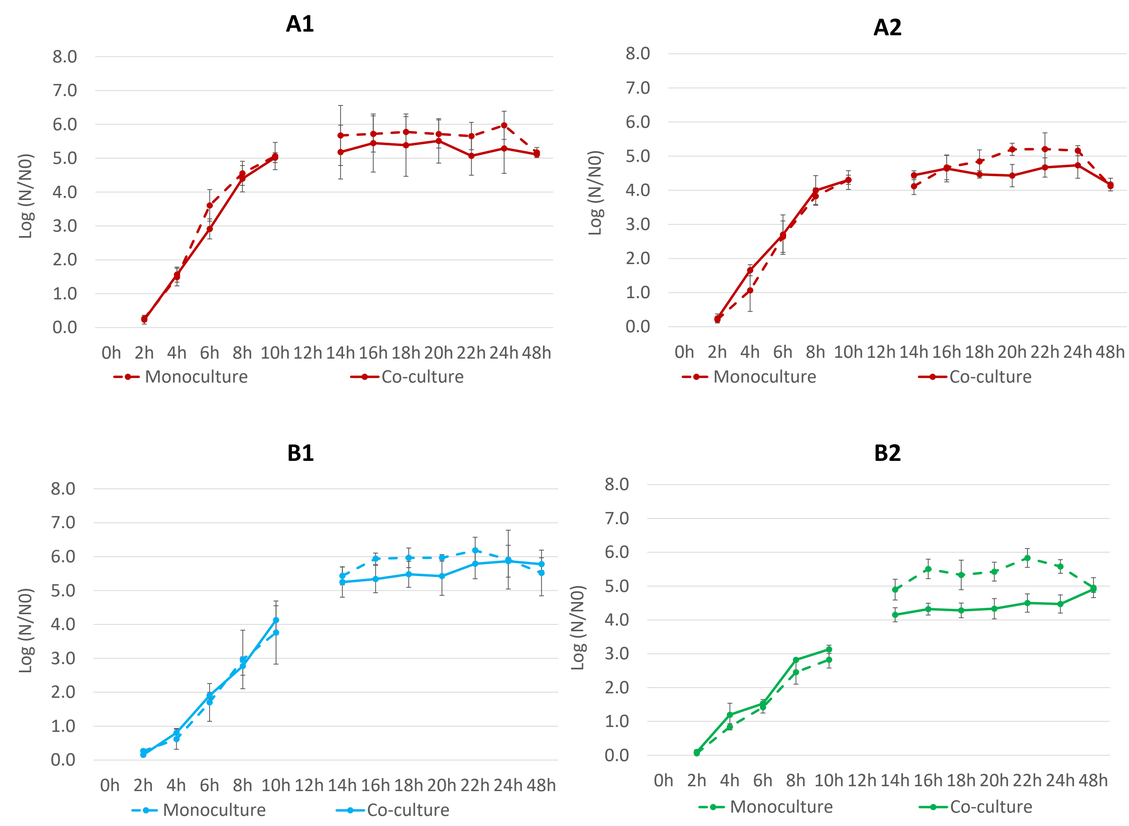


Figure 1. Survival of *L. monocytogenes* strains cocultured with *S.* Typhimurium: **A1** - *S.* Typhimurium in monoculture and in co-culture with strain 2542; **A2** - *S.* Typhimurium in monoculture and in co-culture with strain 2606; **B1** - 2542 *Listeria* strain grown alone and in co-culture with *S.* Typhimurium; **B2** - 2606 *Listeria* strain grown alone and in co-culture with *S.* Typhimurium. The results are means based on data from three replicates, and standard deviations are indicated by error bars.

The results demonstrated that:

- *S.* Typhimurium maintained a consistent growth profile in both mono- and co-culture settings (A1 and A2). In contrast, *L. monocytogenes* showed strain-dependent responses to co-culture, with *L. monocytogenes* 2606 showing greater sensitivity to the presence of *S.* Typhimurium (B2).
- During the initial 10 hours, both *L. monocytogenes* strains exhibited similar proliferation trends compared to their respective monocultures (B1 and B2).
- However, after this phase, strain 2606 exhibited a more pronounced inhibition, with a reduction of about 1.5 log cycles compared to its monoculture (B2).

Conclusion and Relevance

The results indicate that interactions between *L. monocytogenes* and *S.* Typhimurium are strain-dependent, with strain 2606 being more adversely affected by co-culture. These findings underscore the importance of microbial competition in shaping pathogen behavior in the gut environment. Future research will broaden this investigation by including a larger set of *L. monocytogenes* strains and co-culturing them with additional gut-associated bacteria to gain deeper insights into ecological interactions influencing pathogenicity and survival.

References

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[2] Bagatella, 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

Acknowledgements

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