

Aggregation properties of probiotic strains under aerobic and anaerobic conditions

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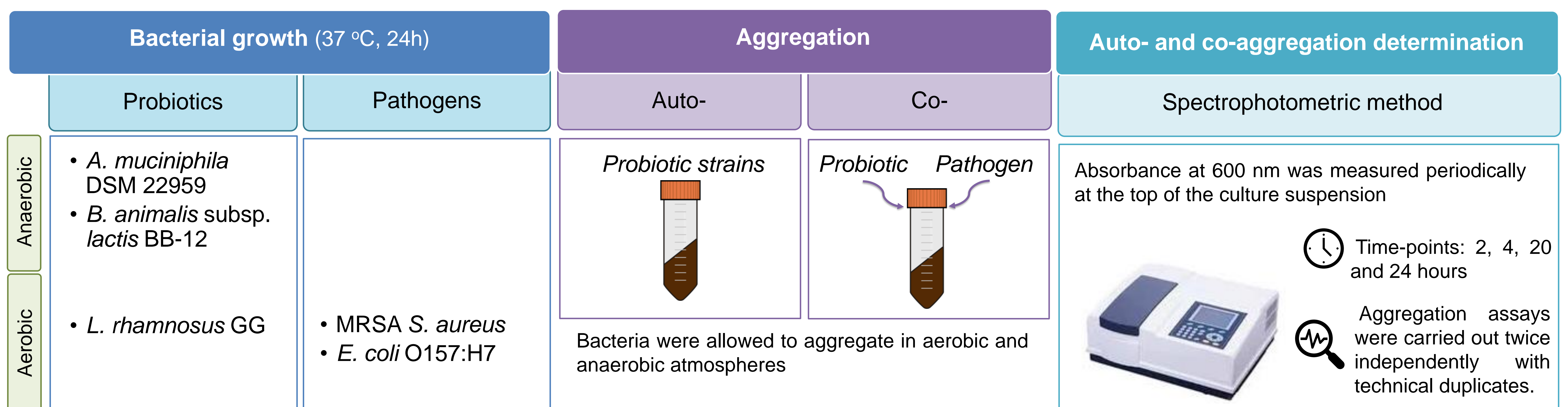
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Objectives

Aggregation between microorganisms from the **same species (auto-aggregation)** and from **different species (co-aggregation)** is considered a **desirable property of probiotics**, since it has been related with **successful gut colonisation** by probiotic strains and **clearance of intestinal pathogens**, respectively.

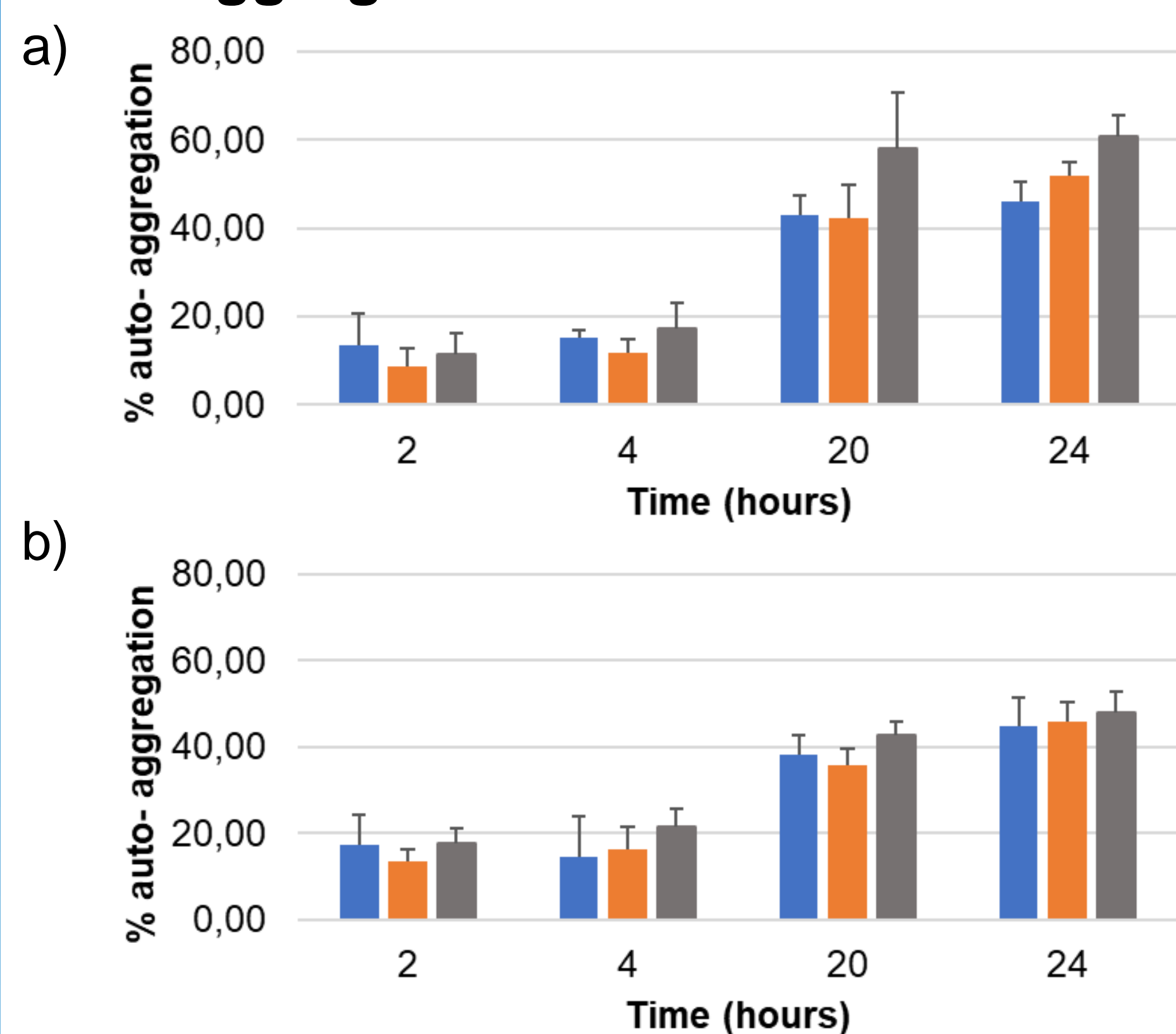
This study aimed to evaluate the **auto-** and **co-aggregation** properties of the **novel probiotic candidate** *Akkermansia muciniphila* DSM 22959 and the **commercial probiotics** *Bifidobacterium animalis* subsp. *lactis* BB-12 and *Lactobacillus rhamnosus* GG (formerly classified as *Lactobacillus rhamnosus*), with the **pathogens** methicillin-resistant *Staphylococcus aureus* [MRSA] and *Escherichia coli* O157:H7, under two atmospheric conditions (aerobiosis and anaerobiosis).

Methods

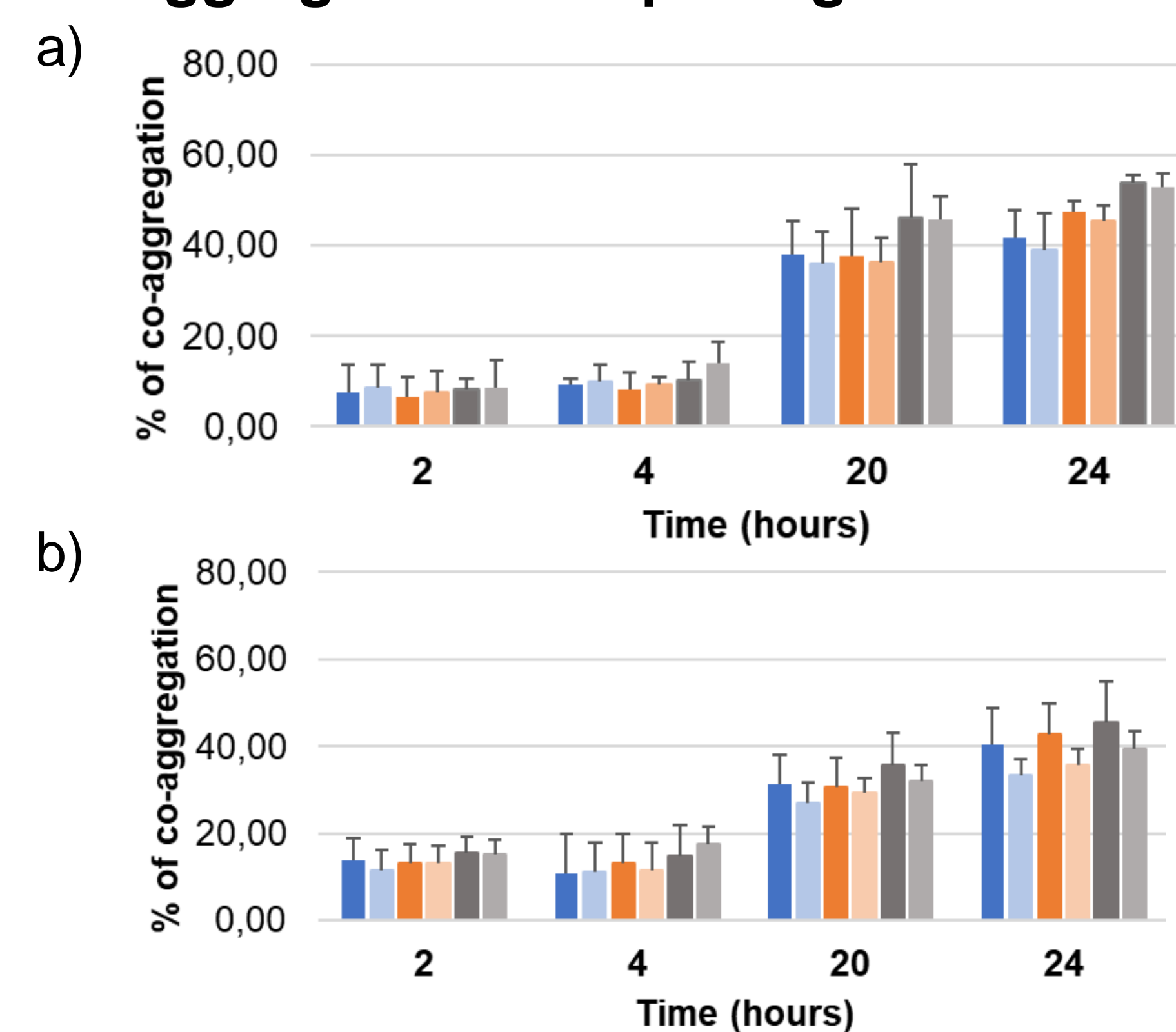


Results

Auto-aggregation



Co-aggregation with pathogens



Main Findings:

- All tested probiotic strains showed **auto-aggregation** abilities, and also capacity to **co-aggregate** with pathogens at **all time-points** and under **both atmospheres**.
- Overall, these **aggregation** properties **increased** with **increasing incubation period**.

Figure 1. Auto-aggregation ability of *A. muciniphila* DSM 22959 (blue), *B. animalis* subsp. *lactis* BB-12 (orange) and *L. rhamnosus* GG (grey) under aerobic (a) and anaerobic (b) conditions.

Figure 2. Co-aggregation ability of: *A. muciniphila* DSM 22959 with *S. aureus* (dark blue) and *E. coli* (light blue); *B. animalis* subsp. *lactis* BB-12 with *S. aureus* (dark orange) and *E. coli* (light orange); *L. rhamnosus* GG with *S. aureus* (dark grey) and *E. coli* (light grey) under aerobic (a) and anaerobic (b) conditions.

Conclusion

This work provides **novel insights** regarding **aggregation properties** of the **novel probiotic candidate** *A. muciniphila* DSM 22959 and commercial probiotics (*B. animalis* subsp. *lactis* BB-12 and *L. rhamnosus* GG) under two atmospheric conditions. Furthermore, the demonstrated aggregation properties of *A. muciniphila* DSM 22959 support its use as probiotic.

References

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Acknowledgements

This work was supported by national funds through FCT/MEC (PIDDAC), project references IF/00588/2015, under the Scientific Employment Stimulus - Individual Call (CEEC Individual) - CEECIND/00520/2017/CP1404/CT0001, and by Operational Program Competitiveness and Internationalization in its FEDER component and by the budget of the Foundation for Science and Technology, I.P. (FCT, IP) in its OE component, project reference POCI-01-0145-FEDER-031400-PTDC/BAA-AGR/31400/2017. We would also like to thank the scientific collaboration under the FCT project UIDB/50016/2020.