Hydrophobicity and aggregation properties of gut commensals *Faecalibacterium duncaniae* DSM 17677 and *Akkermansia muciniphila* DSM 22959

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Introduction

Probiotics have been emerging as a **promising approach** to prevent and control **foodborne** diseases [1]. In the last years, the bacterial species isolated from gut microbiota, such as ***Faecalibacterium*** spp. and ***Akkermansia muciniphila***, have been proposed as novel probiotic candidates [2].

The cell surface **hydrophobicity**, **auto-aggregation** and **co-aggregation** with pathogens are considered desirable characteristics of probiotic strains and these properties may be used in preliminary screening to identify potential probiotic microorganisms appropriate for human or animal use [3].

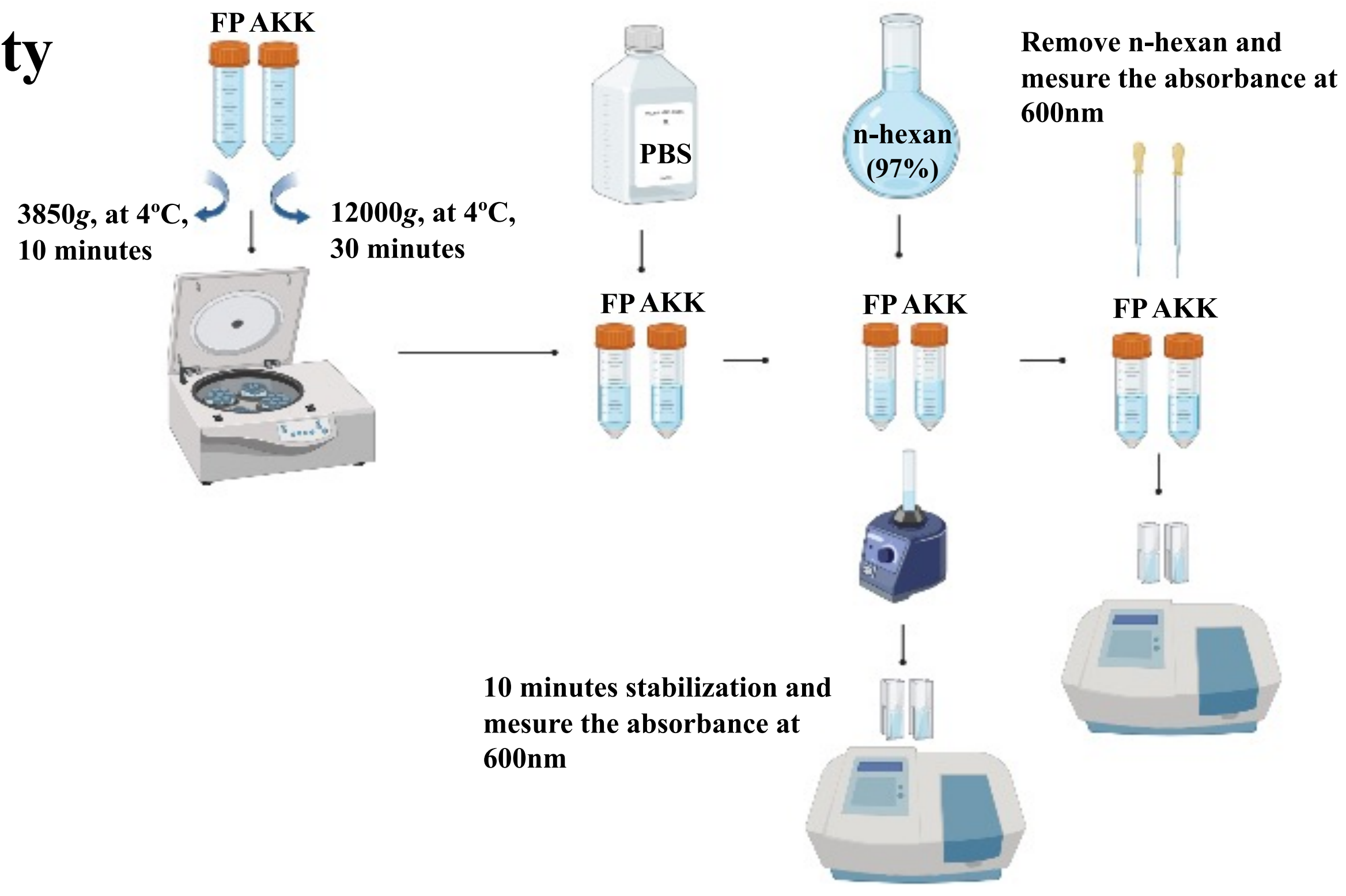
Objectives

Characterize the type strains ***Faecalibacterium duncaniae* DSM 17677** and ***Akkermansia muciniphila* DSM 22959** regarding the following probiotic properties: **hydrophobicity**, **auto-aggregation** and **co-aggregation** with the following foodborne pathogens: *Salmonella enterica* ATCC 14028 and *Listeria monocytogenes* NCTC 10357.

Methods

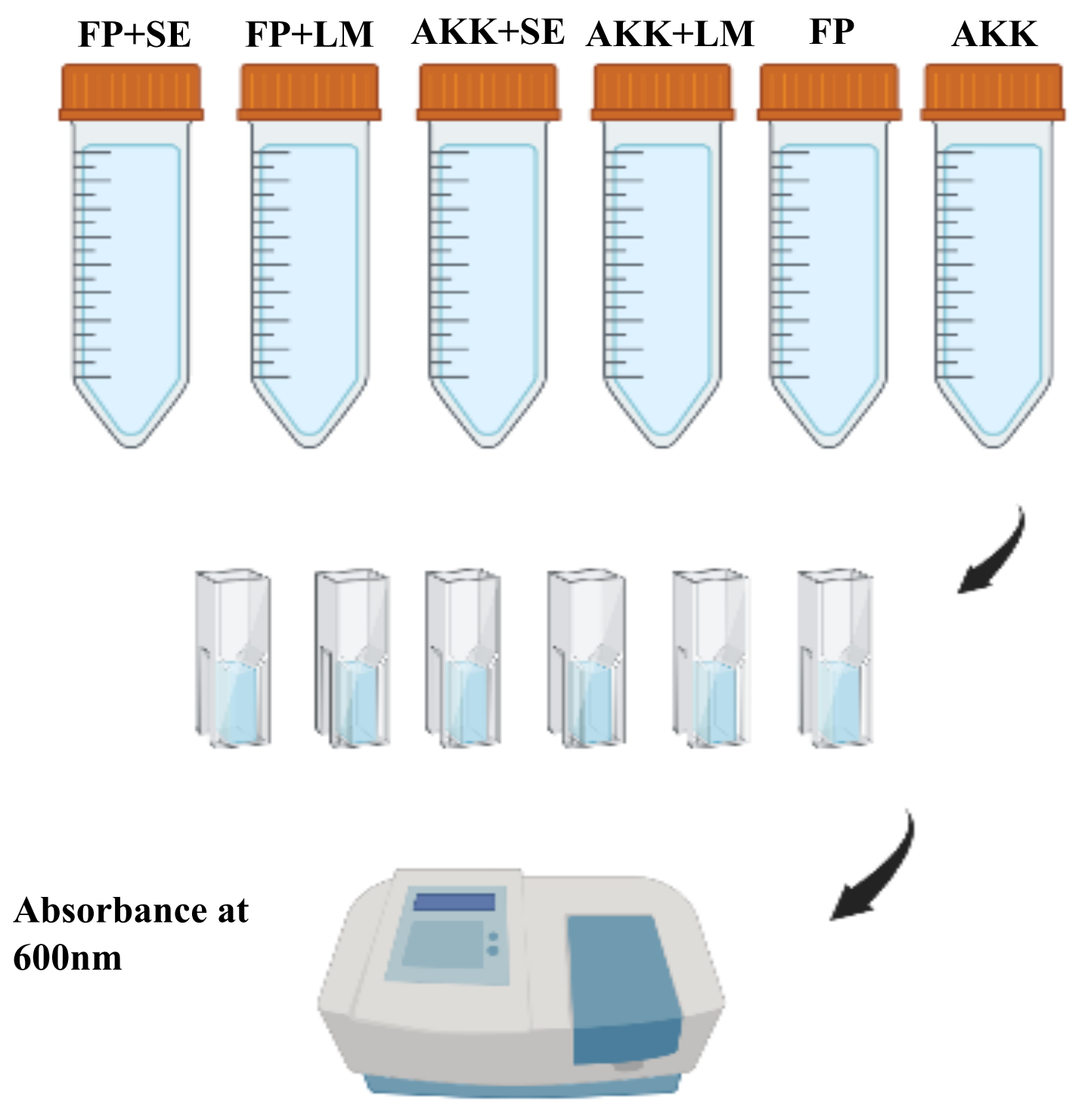
1) Cell surface hydrophobicity

Microbial adhesion to hydrocarbon method [4]



2) Aggregation properties

Spectrophotometric method [3;5]



AKK- *Akkermansia muciniphila* DSM 22959
FP – *Faecalibacterium duncaniae* DSM 17677
SE- *Salmonella enterica* ATCC 14028
LM- *Listeria monocytogenes* NCTC 10357
PBS- Phosphate-buffered saline

Main findings

Cell surface hydrophobicity

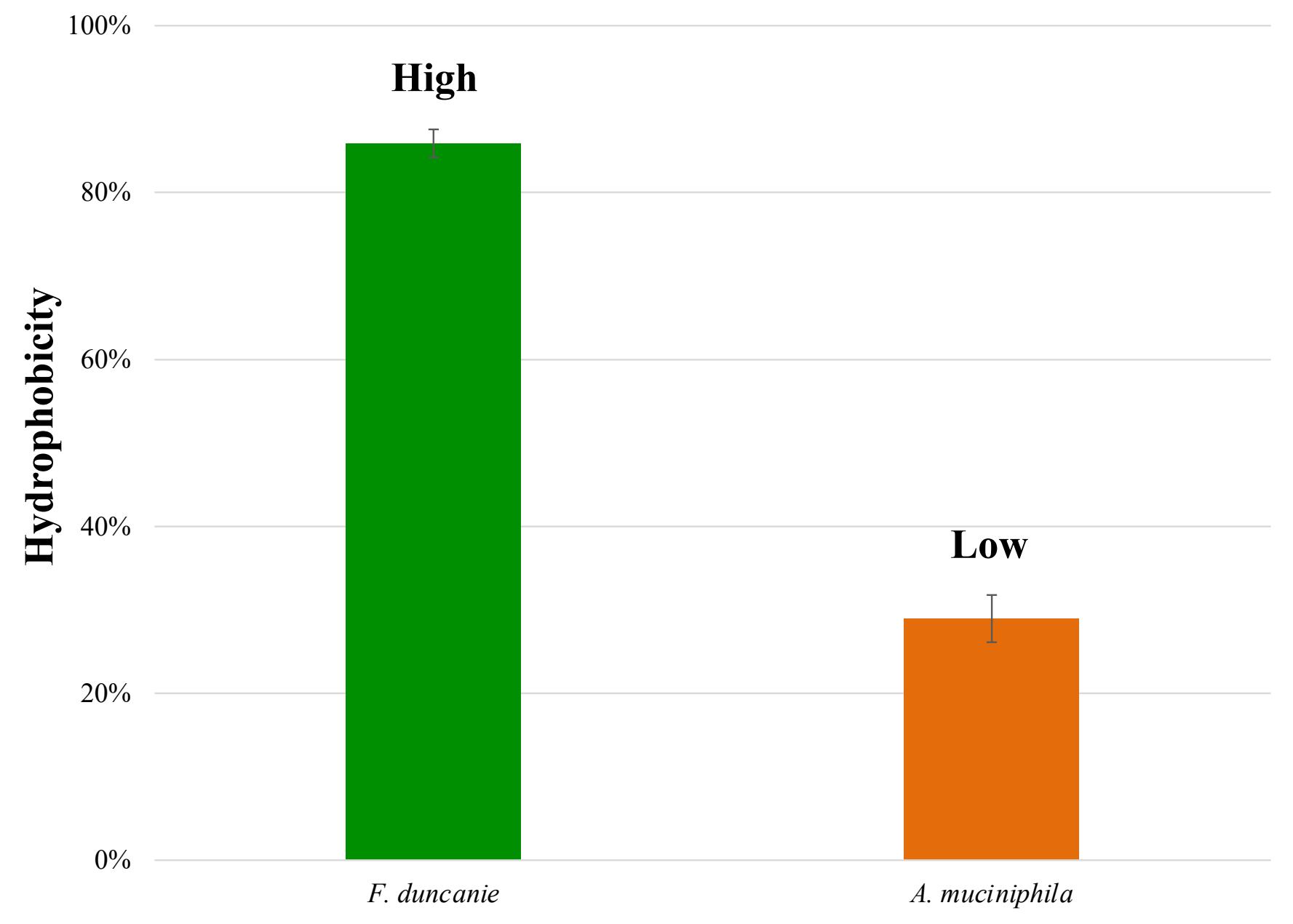


Fig. 1 Hydrophobicity percentages of *Faecalibacterium duncaniae* DSM 17677 and *Akkermansia muciniphila* DSM 22959.

Auto- aggregation

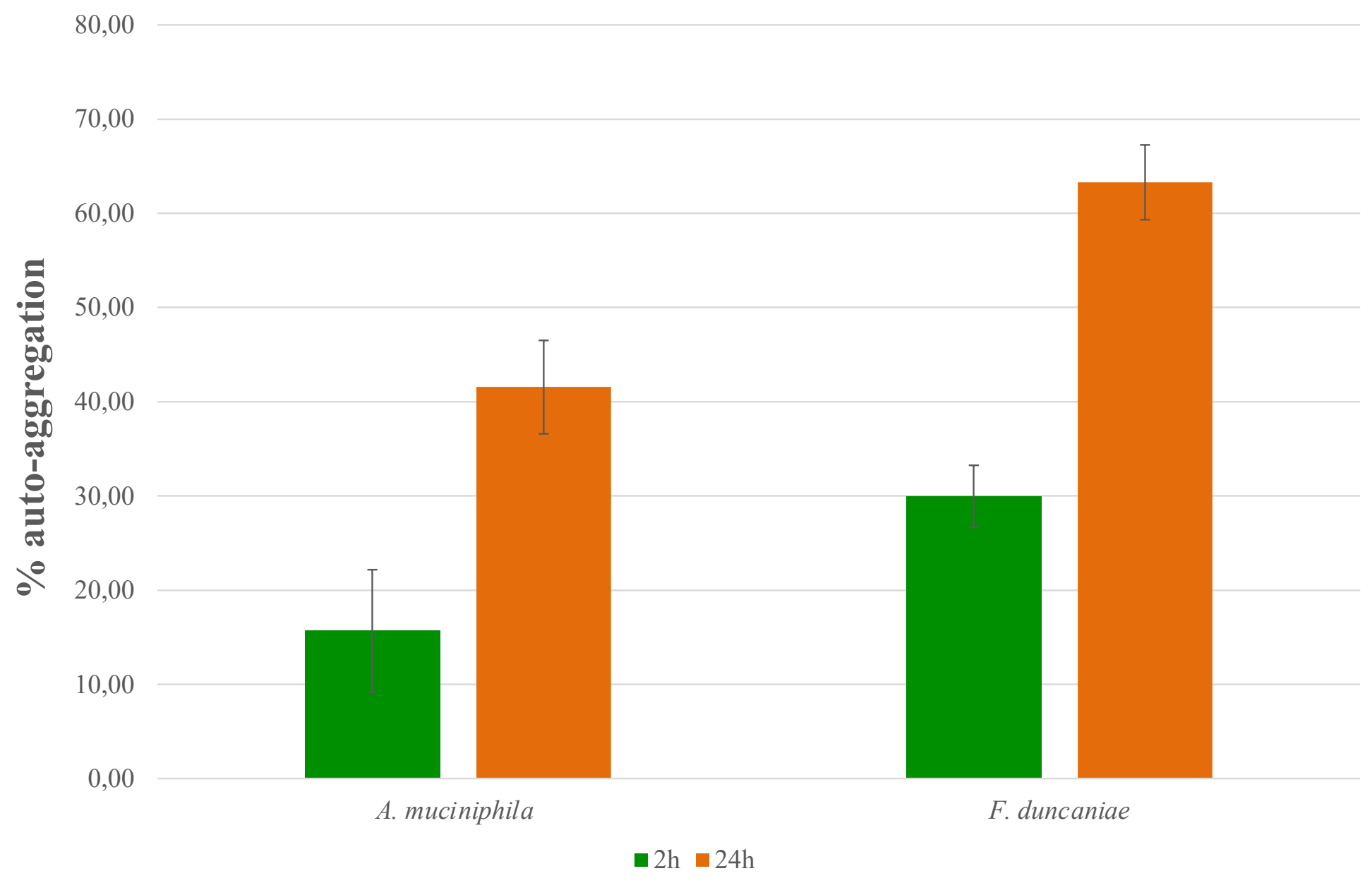


Fig. 2 Auto-aggregation percentages of *Faecalibacterium duncaniae* DSM 17677 and *Akkermansia muciniphila* DSM 22959, after 2 hours (green bars) and 24 hours (orange bars) of incubation at 37ºC under anaerobic conditions.

Co-aggregation with foodborne pathogens

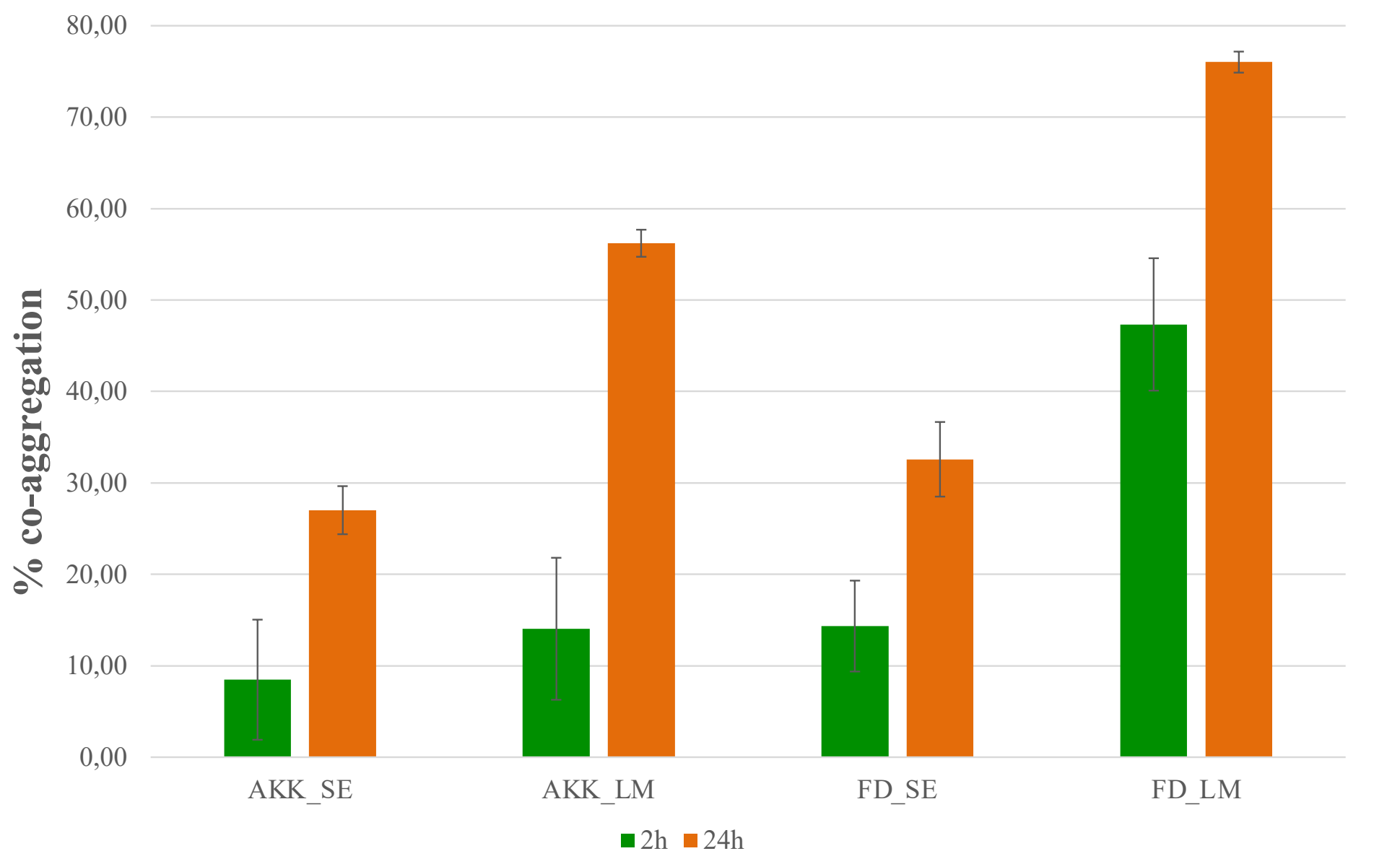


Fig. 3 Co-aggregation percentages of *Akkermansia muciniphila* DSM 22959 (AKK) and *Faecalibacterium duncaniae* DSM 17677 (FD) with *Salmonella enterica* ATCC 14028 (SE) and *Listeria monocytogenes* NCTC 10357 (LM) after 2 h (green bars) and 24 h (orange bars) of incubation under anaerobic conditions.

Conclusions

Both gut comensal strains displayed hydrophobicity and aggregation properties, corroborating their potential as probiotics. However, it is important to note that higher percentagens of hydrophobicity, auto-aggregation, and co-aggregation with foodborne pathogens were found for *F. duncaniae* DSM 17677 than for *A. muciniphila* DSM 22959.

References

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