## OC.36_82 - PANGENOME DATA MINING AND PHENOTYPIC EVALUATION OF WEISSELLA CIBARIA STRAINS FOR PROBIOTIC APPLICATIONS

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Objective:
The aim of this study is a comprehensive analysis of the Weissella cibaria pangenome with a specific focus on the variome, which can include genetic traits responsible of probiotic or starter culture properties in certain strains belonging to this species. The selected genes can be exploited as biomarkers for a rapid screening of W. cibaria strains with probiotic potential.

Methods:
Comparative genomics analysis was performed on 111 strains of W. cibaria, including 12 newly sequenced strains, to evaluate the composition of the pangenome. Phenotypic tests were conducted on the new strains: adhesion to Caco2 cells, tolerance to bile salts and low pH, production of exopolysaccharides and antimicrobial compounds, which contribute to gastrointestinal tract colonization and resilience, to determine their potential for probiotic applications. Antibiotic susceptibility and decarboxylase activity were also performed to assess the safety for introduction in the food chain.

Results:
Comparative genomics and phylogenomics investigations allowed the identification of discriminant genetic traits, also considering the different isolation sources of W. cibaria. Among the newly isolated strains, a higher adhesion capability was observed compared to the reference probiotic strain Lacticaseibacillus rhamnosus GG. Additionally, some of these new W. cibaria strains demonstrated the production of antimicrobial compounds.

Conclusions:
This study provides evidence for different probiotic and starter traits among the investigated W. cibaria strains, both genotypically and phenotypically. The study also suggests the selection of specific genes to be used as biomarkers for rapid screening purposes.

## OC.37_117 - ACHIEVING EFFICIENT VIABIILITY OF AKKERMANSIA MUCINIPHILA DURING AEROBIC STORAGE AND GASTROINTESTINAL PASSAGE THROUGH CALCIUM-ALGINATE ENCAPSULATION

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Objective:
Akkermansia muciniphila is considered a next generation probiotic that can be incorporated in new foods and pharmaceutical formulations. Effective delivery systems should be developed to ensure high probiotic viability and stability during manufacturing, product shelf-life and after consumption, namely, throughout digestion. Our work aimed to evaluate the effect of an extrusion method on A. muciniphila viability during 28-days refrigerated aerobic storage and when exposed to simulated gastrointestinal conditions.

Methods:
Upon cultivation, A. muciniphila was mixed in 2 %(w/v) sodium alginate and dripped into 4%(w/v) calcium chloride using extrusion. The calcium-alginate entrapped cells and free counterpart (control) were stored under refrigerated aerobic conditions (4 ºC) and their viability was assessed at 0, 7, 14, 21 and 28-days, enumerating colony-forming units (CFU) in appropriate media. Also, the survival of free and encapsulated A. muciniphila during gastrointestinal passage, at 1 and 28-days of storage, was assayed using Infogest digestion protocol.

Results:
Akkermansia muciniphila was encapsulated successfully in a calcium-alginate matrix via extrusion (encapsulation yield of 60%). Furthermore, encapsulated A. muciniphila exhibited a high stability in viability (loss < 0.2-log cycle) after 28-days of refrigerated aerobic storage, maintaining its viability around 8-log CFU/g. In contrast, free cell numbers decreased approximately 1-log cycle under similar storage conditions. At 28-days of storage, when exposed to digestion simulation, encapsulated bacteria reduced viable cell numbers around 1-log cycle, whereas free counterpart reported >2-log cycles reduction.

Conclusions:
Extrusion seems to be a promising strategy to safeguard A. muciniphila during refrigerated aerobic storage and gastrointestinal passage.