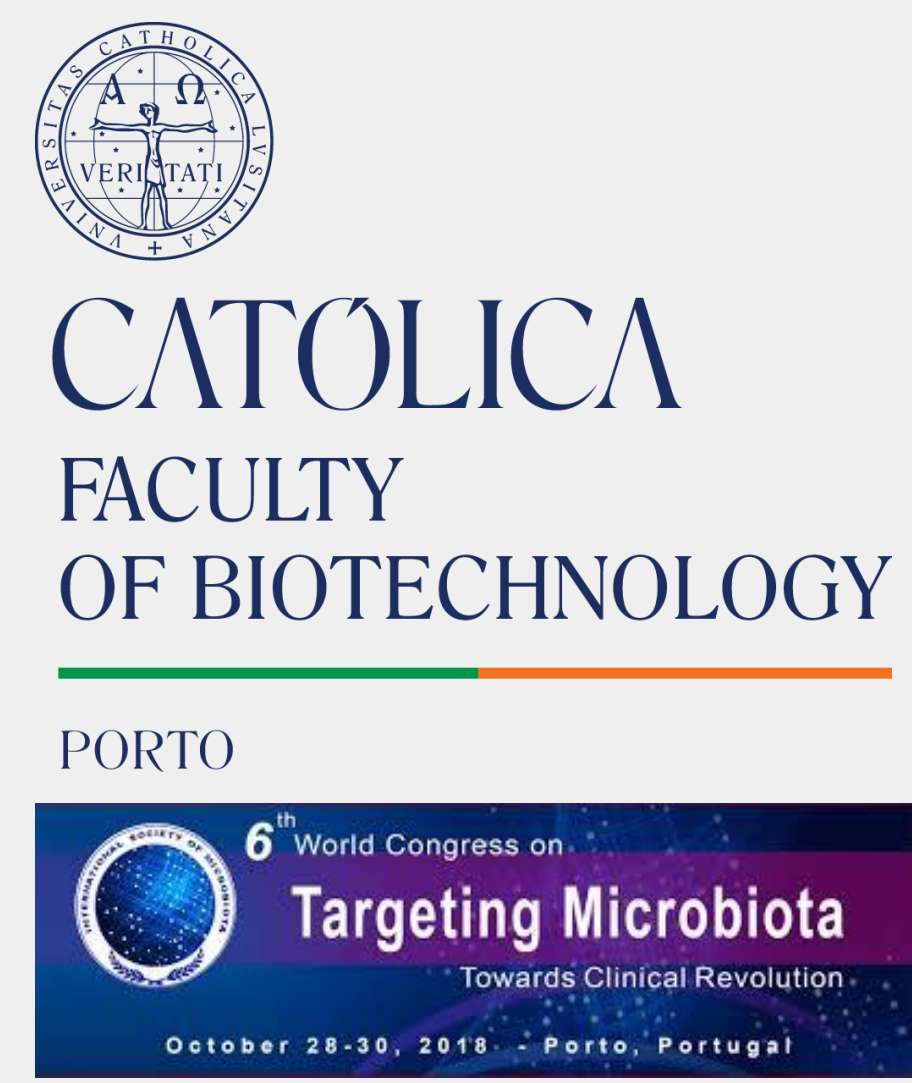


Evaluation of the prebiotic potential of *Coriolus versicolor*-Effect on the human gut microbiota

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Introduction

The human gut microbiota has become increasingly relevant when studying human health and disease due to its connection with the immune system and metabolism. Several factors are known to shape the microbiota composition, such as age, diet or genetic markers. Furthermore, the gut microbiota can be actively modulated by prebiotics, which pass through the gastrointestinal tract and are then fermented by colonic bacteria, leading to the production of metabolites and to changes in the microbial population dynamics[1]. In parallel, mushroom's consumption has become more relevant in western diets. *Coriolus versicolor* is a mushroom known for its immunomodulatory properties but has also displayed prebiotic-like activity in previous studies[2,3]. The main goal of the present work was to evaluate the prebiotic potential of a commercial supplement of *C. versicolor* biomass through *in vitro* faecal fermentations, using fresh faecal samples from five healthy donors, and to perform the subsequent analysis of changes in the bacterial population as well as concerning the production of short chain fatty acids (SCFA).

Methods

- Simulation of gastrointestinal tract digestion and dialysis**

Salivary Glands, Tongue, Esophagus, Stomach, Duodenum, Pancreas, Small Intestine, Colon, Rectum, Sigmoid, Appendix, Cecum.

pH 5.6-6.9
0.6mL/min α-amylase (100U/mL)

pH 2.0
0.05mL/mL pepsin (25mg/mL)

pH 6.0
0.25mL/mL pancreatin (2g/L) Bile Salts (12g/L)

- Faecal fermentations**

Negative control (C-): only medium and faecal inoculum;
Positive control (C+): medium, faecal inoculum and FOS;
Cv: medium, faecal inoculum and *C. versicolor* digested biomass powder.

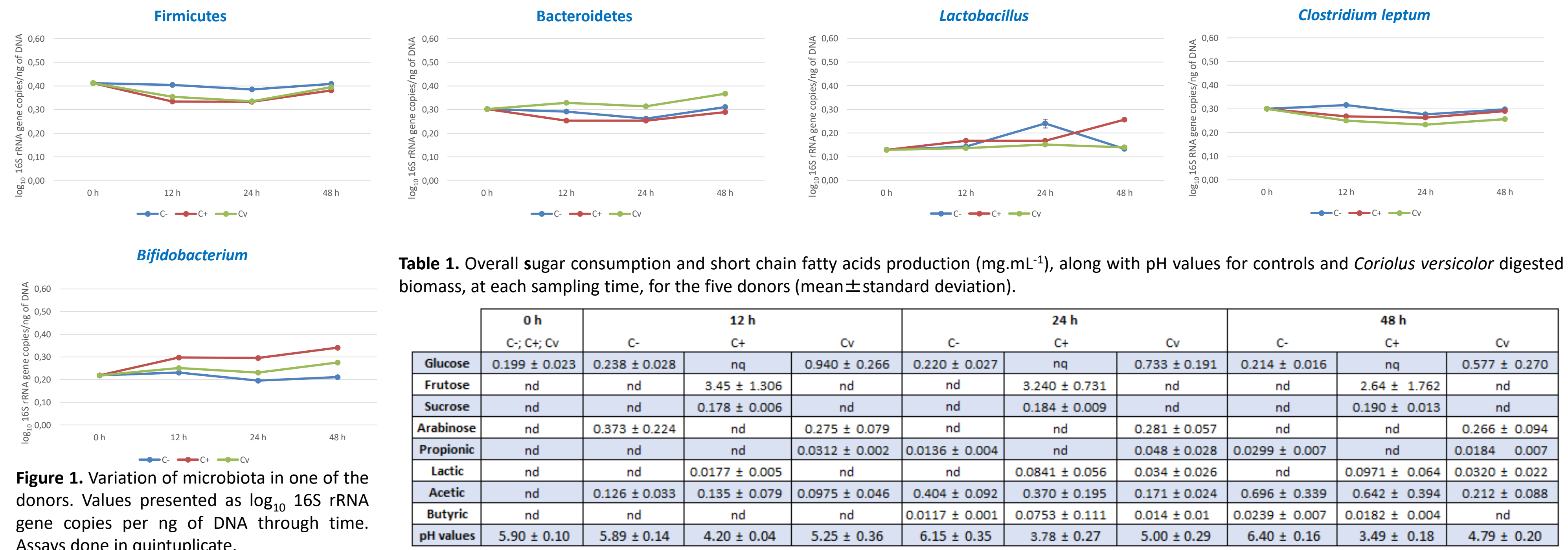
- After DNA extraction of the samples collected, **the bacterial population** was analyzed through **qPCR**

- Sugar consumption** and **SCFA production** evaluated through **HPLC**

Sampling at 0, 12, 24 and 48 h; pH values measurement and centrifugation

Pellets
Supernatants

Results



Conclusions

- C. versicolor* biomass had a bifidogenic effect and induced positive changes in the gut microbiota with Firmicutes and *C. leptum* population as observed for positive control FOS;
- The pH values decreased throughout the 48 h of fermentation thus showing that *C. versicolor* was fermented;
- The fermentation led to the production of SFCA and sugar consumption. Glucose was consumed, and arabinose (a sugar present in mushrooms) was detected but not consumed. Propionic and acetic acid were detected after 12 h, but lactic acid was only detected after 24 h of fermentation;
- These results may open the possibility for its establishment as a prebiotic ingredient.

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1. Wang, B., Yao, M., LV, L., Ling, Z. & Li, L. 2017. The Human Microbiota in Health and Disease. Engineering, 3, 71-82.
2. Cruz, A., Pimentel, L. L., Rodríguez-Alcalá, L. M., Fernandes, T. & Pintado, M. 2016. Health Benefits of Edible Mushrooms Focused on *Coriolus versicolor*: A Review. Journal of Food and Nutrition Research, 4, 773-781.
3. Yu, Z.-T., Liu, B., Mukherjee, P. & Newburg, D. S. 2013. *Trametes versicolor* Extract Modifies Human Fecal Microbiota Composition In vitro. Plant Foods for Human Nutrition, 68, 107-112.