AKKERMANSIA MUCINIPHILA ROBUSTNESS TOWARDS DIFFERENT TEMPERATURES, ATMOSPHERES AND GASTROINTESTINAL CONDITIONS

Ana Cristina Freitas [1] - Daniela Machado [1] - Diana Almeida [1] - Catarina Seabra [1] - José Carlos Andrade [2] - Ana Maria Gomes [1]

Universidade Católica Portuguesa, CBQF - Centro de Biotecnologia e Química Fina - Laboratório Associado, Escola Superior de Biotecnologia, Porto, Portugal [1] - CESPU, Instituto de Investigação e Formação Avançada em Ciências e Tecnologias da Saúde, Gandra PRD, Portugal [2]

Objectives

Currently, *Akkermansia muciniphila* has been proposed as a next generation probiotic. However, detailed information addressing its viability under stressful conditions is scarce. Understanding a strain's resilience to potential stressful conditions is crucial for probiotic products manufacture. Herein, we evaluate the *A. muciniphila* susceptibility when exposed to environmental stresses including temperature, atmosphere and gastrointestinal passage (GIT).

Methods

For oxygen and temperature tolerance assays, *A. muciniphila* culture was incubated at different temperatures (4ºC/22ºC/37ºC and 44ºC), and under two atmospheres (aerobic and anaerobic) during 72 hours. Each 12 hours, pH values and *A. muciniphila* cultivable cell numbers were determined. To simulate GIT passage, an *in vitro* digestion method (1) was used.

Results

Overall, *A. muciniphila* exhibited a high oxygen tolerance with great stability in culturability (±8.0 Log CFU/mL) detected after 72h exposure at 4ºC and 22ºC, 24h at 37ºC and 12h at 44 ºC, as well when subjected to simulated GIT (7.8±0.3 Log CFU/mL).

Conclusions

This work is the first to evaluate the resistant *A. muciniphila* culturability when subject to environmental stresses, suggesting that no strict technological contingencies are required when manufacturing probiotic products containing this bacterium as well its possible storage at household conditions or handling at higher temperatures.

Acknowledgments

This work was supported by national funds through FCT/MEC (PIDDAC), project IF/00588/2015 and by Operational Program Competitiveness and Internationalization (FEDER), by the Foundation for Science and Technology budget, I.P. in its OE component, project POCI-01-0145-FEDER-031400 with CBQF scientific collaboration with FCT project UID/Multi/50016/2013.

(1)Minekus et al., Food Funct. 5(2014):1113–1124.

POSTBIOTIC CHARACTERIZATION IN THE AMENSALISTIC SYMBIOSIS AND CORRELATION TO THE RESILIENCE OF HUMAN MICROBIOTA

Virginia Fuochi [1] - Desirèe Sharon Vincenti [1] - Luca Laghi [2] - Antonio Rescifina [3] - Pio Maria Furneri [1]

Università degli Studi di Catania, BIOMETEC, Catania, Italy [1] - ALMA MATER STUDIORUM - Università di Bologna, Dipartimento di Scienze e Tecnologie Agro-Alimentari, Bologna, Italy [2] - Università degli Studi di Catania, Dipartimento di Scienze del Farmaco, Catania, Italy [3]

Objective

Lactic acid bacteria constitute a large group of Gram positive organisms belonging to the human microbiota. Among these the genus *Lactobacillus* is the most widely characterized.

Many studies in the literature showed that culture medium and abiotic factors influence the production of antimicrobial substances. Furthermore, recent studies highlight the potential of metabolomics to predict antimicrobial activity among different *Lactobacillus* species. The purpose of the study was focused on the production of postbiotics by two human origin strains of *L. fermentum*. Moreover, the evaluation of antimicrobial activity and the characterization of metabolites were performed.

Methods

In particular, the production of antimicrobial molecules by varying the culture medium for the greatest yield was achieved. Subsequently, the antimicrobial activity of the cell free supernatans (CFSs) was evaluated by agar well diffusion assay. Furthermore, metabolic characterization was assessed by ^{1}H-NMR analysis.

Results

The best yield of antimicrobial substances production was achieved with MRS medium with glycerol as supplement. CFSs showed antimicrobial activity against all pathogen strains tested. A panel of metabolites with variations in concentration were revealed by ^{1}H-NMR, but considerable differences among inter-species were not showed. Nevertheless, significant variances comparing the metabolites found in the supernatants of strains grown in MRS with glycerol and the same without supplements were recorded.

Conclusions

Despite the full characterization of the molecules present in CFSs has not yet occurred, the presence of sugars, amino acids and organic acids, suggesting the possible presence of bacteriocins or biosurfactants which could be linked to the antimicrobial activity.