

BIOACCESSIBILITY AND BIOACTIVITY OF ALOE VERA JUICE FERMENTED WITH PROBIOTICS: EFFECT OF IN VITRO GASTROINTESTINAL DIGESTION

Agricultural, Marine and Food Biotechnology

PO - (732) - BIOACCESSIBILITY AND BIOACTIVITY OF ALOE VERA JUICE FERMENTED WITH PROBIOTICS: EFFECT OF IN VITRO GASTROINTESTINAL DIGESTION

Cuvas-Limon, Ruth (Mexico)¹; Ferreira-Santos, Pedro (Portugal)²; Cruz, Mario (Mexico)³; Teixeira, José (Portugal)²; Belmares, Ruth (Mexico)¹; **Nobre, Clarisse** (Portugal)²

1 - Autonomous University of Coahuila; 2 - Universidade do Minho; 3 - Antonio Narro Autonomous Agricultural University

Body

Introduction

Fruit and vegetable-based beverages, fermented with Lactic Acid Bacteria, are considered excellent functional foods with great bioactive properties like antioxidant and probiotic action [1]. This study aims to explore the antioxidant activity, and bioaccessibility of bioactive compounds from an *Aloe vera* juice fermented with probiotic LAB *Enterococcus faecium* and *Lactococcus lactis*.

Methodology

A. vera and the produced fermented juices were digested using the INFOGEST standardized *in vitro* gastrointestinal digestion protocol [2]. Total phenolic content and individual phenolic compounds (by UPLC) were determined during digestion. The radical scavenging activity (DPPH and ABTS) and Reducing Antioxidant Power (FRAP) was accessed in the *A. vera* and in both juices [3].

Results and conclusions

A great release of phenolic compounds was observed during the intestinal phase, especially for the fermented *A. vera* juices. Since phenolics are mostly absorbed in the intestine, where they appear to be more bioaccessible, this shows an increased functionality of the produced fermented food. Fourteen phenolic compounds were identified in the juices, including hydroxybenzoic acids (vanillic, ellagic and 3,4-hydroxybenzoic acids), hydroxycinnamic acids (p-coumaric and ferulic acids), flavonols (kaempferol), flavan-3-ols (epicatechin and catechin), stilbene (resveratrol), flavanones (naringenin and hesperidin), flavone (quercetin and taxifolin) and anthracenes (aloin). Epicatechin, hesperidin and aloin were the compounds with highest concentration in juices. The fermentation of the *A. vera* increased the bioaccessibility of the *A. vera* biocompounds, particularly for kaempferol, ellagic acid, resveratrol, hesperidin, ferulic acid and aloin. Also, the *A. vera* phenolics released during digestion were able to reduce free radicals either by hydrogen donation, as assessed by ABTS test, or by electron donation, as assessed by the FRAP test. The efficacy of functional foods in providing therapeutic or physiological benefits depends largely on maintaining their bioavailability, and the antioxidants play a major role in the gastrointestinal tract by maintaining redox equilibrium against harmful oxidants, and preventing diseases linked to reactive oxygen species generated during digestion. Therefore, the developed probiotic *A. vera* juice will allow the use of natural resources for human health improvement, due to its potential as novel added-value functional beverage with great bioactive potential.

Acknowledgements

This work was supported by the National Council of Science and Technology (CONACYT, Mexico) under the CVU 559365. This study was also supported by the Portuguese Foundation for Science and Technology (FCT) under the scope of the strategic funding of UIDB/04469/2020 unit and the Project ColOsH PTDC/BTM-SAL/30071/2017, also by the European Regional Development Fund (ERDF) through the Competitiveness Factors Operational program – Norte 2020, COMPETE and by National Funds through the FCT - under the project AgriFood XXI (NORTE- 01-0145-FEDER-000041).

References

BIOACCESSIBILITY AND BIOACTIVITY OF ALOE VERA JUICE FERMENTED WITH PROBIOTICS: EFFECT OF IN VITRO GASTROINTESTINAL DIGESTION

[1] Spontaneously fermented traditional beverages as a source of bioactive compounds: an overview, Cuvas-Limon, R. B., Nobre, C., Rodriguez-Jasso, R. M., Ruíz, H. A., Loredó-Trevino, A., Teixeira, J. A., Belmares, R. "Critical reviews in food science and nutrition", 61(18): 2984-3006 (2021).

[2] INFOGEST static in vitro simulation of gastrointestinal food digestion. Brodkorb, A., Egger, L., Alming, M., Alvito, P., Assunção, R., Ballance, S., . . . Recio, I. Nature Protocols (2019).

[3] Unravelling the biological potential of pinus pinaster bark extracts. Ferreira-Santos, P., Genisheva, Z., Botelho, C., ...Teixeira, J.A., Rocha, C.M.R., Antioxidants, 9(4): 334 (2019).

Palavras-chave : Aloe vera, probiotics, bioaccessibility, antioxidant activity, in vitro digestion