



ALGAEUROPE

03-05 DECEMBER 2019 | PARIS



ABSTRACT BOOK ALGAEUROPE CONFERENCE



ALGAEUROPE 2019 ORGANIZERS



ALGAEUROPE 2019 SPONSORS

Networking Dinner



Silver sponsors



Lanyards sponsor



Coffe break sponzor



Session sponsor



Speakers gift sponsor



Lactic acid fermentation of *Arthrospira platensis* for the production of a new lactose-free beverage rich in probiotics

Alberto Niccolai^{1*}, Kaja Bažec², Liliana Rodolfi^{1,3}, Natascia Biondi¹, Mario R. Tredici¹, Polona Jamnik²

¹ Department of Agriculture, Food, Environment and Forestry (DAGRI), University of Florence, Piazzale delle Cascine 24, 50144 Florence, Italy

² Department of Food Science and Technology, Biotechnical Faculty, University of Ljubljana, Jamnikarjeva 101, 1000 Ljubljana, Slovenia

³Fotosintetica & Microbiologica S.r.l., Via dei Della Robbia 54, 50132 Florence, Italy



Alberto Niccolai, Ph.D.

Postdoctoral researcher

University of Florence

Italy

About the author:

Msc degree in 2013 in Agricultural Sciences and Technologies. Ph.D. in 2017 in Agriculture and Environmental Sciences, with a thesis on “Microalgae as source of innovative foods and nutraceuticals”. Post-Doc Researcher at the Department of Agriculture, Food, Environment and Forestry (DAGRI) of the University of Florence, in the group led by Prof. Mario Tredici. He is working on the use of microalgae for the production of new food products, on bioactive molecules from microalgae and cyanobacteria for agro-industry and for cosmetic and pharmaceutical applications.

Company info:

Department of Agriculture, Food, Environment and Forestry (DAGRI), University of Florence, Piazzale delle Cascine, 18, 50144, Florence, Italy

Phone: +39 0554574005

Website: <https://www.dagri.unifi.it/>

Abstract:

The first objective of this study was to evaluate the use of lyophilised biomass of the cyanobacterium *Arthrospira platensis* F&M-C256 in a “vegetal soybean drink” (Alce Nero), as substrate for lactic acid fermentation by *Lactobacillus plantarum* ATCC8014 (LAB8014) and to evaluate the fermented products in terms of probiotic bacteria content, biochemical composition, *in vitro* digestibility (IVD), *in vitro* antioxidant activity (IVAA), and total phenolics (TP), which are considered parameters of great importance for the development of probiotic and functional beverages.

The suitability of *A. platensis* biomass as substrate for LAB8014 growth was tested according to Niccolai et al. (2019).

After 72 h of fermentation, the LAB8014 concentration was 10.5 log CFU mL⁻¹ and lactic acid and acetic acid concentration reached 1.2 and 7.7 g L⁻¹, respectively. As expected, after 72 h of fermentation a decrease of pH (-8%) and carbohydrates (-25%) was observed. Lyophilised *A. platensis* biomass was shown to be a suitable substrate for LAB8014 growth.

After fermentation, the lyophilized broth contained 51% of proteins and 23% of lipids. IVD, IVAA and TP increased (+2%, +31%, and +30%, respectively), while phycocyanin content decreased (-23%).

The *in vivo* antioxidant activity of the lyophilized broth (after 72 h fermentation) was also measured using a *Saccharomyces cerevisiae* ZIM2155 model. An aqueous extract prepared from the lyophilized broth was able to strongly reduce intracellular oxidation processes in the yeast cells.

This study highlights the potential of *A. platensis* F&M-C256 biomass as a substrate for the production of lactose-free vegan beverages rich in probiotics.

Acknowledgements:

This work was supported by COST Action ES1408 EUALGAE (European Network for Algal Bioproducts) STSM grant.

Keywords:

Arthrospira platensis, spirulina, lactose-free beverage, bioactivity, probiotics

References:

Niccolai, A., Shannon, E., Abu-Ghannam, N., Biondi, N., Rodolfi, L., & Tredici, M. R. (2019). Lactic acid fermentation of *Arthrospira platensis* (spirulina) biomass for probiotic-based products. *Journal of Applied Phycology*, 31(2), 1077-1083.