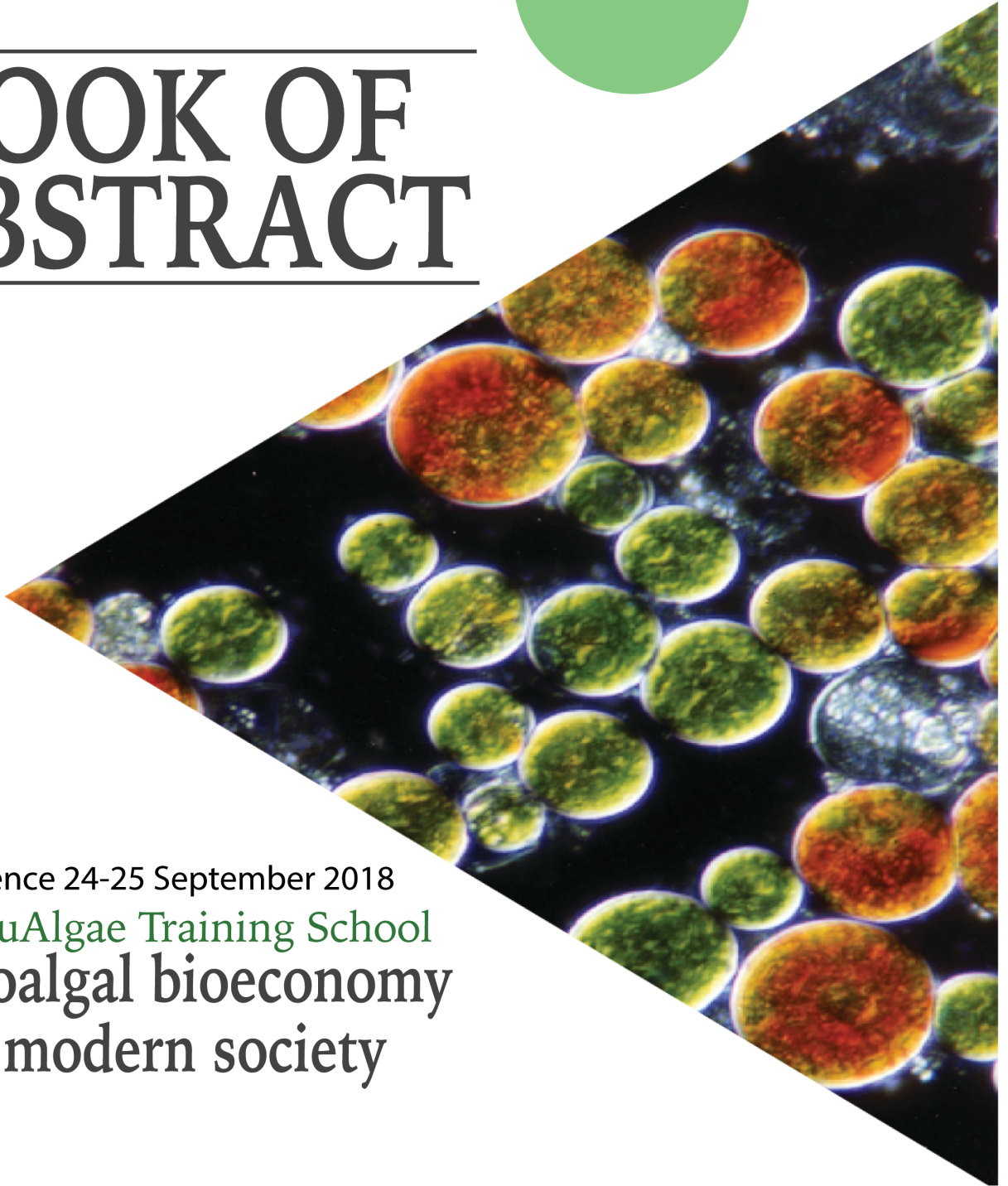


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# BOOK OF ABSTRACT

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in modern society



# Microalgae and cyanobacteria as promising ingredients for the development of functional beverages and foods

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The first aim of this work was to evaluate the use of lyophilised biomass of *Arthrospira platensis* F&M- C256 (spirulina) as a substrate for lactic acid fermentation by the probiotic bacterium *Lactobacillus plantarum* ATCC 8014. After 48 h of fermentation, a concentration of 10.6 log CFU mL<sup>-1</sup> was reached and lactic acid concentration increased to 3.7 g L<sup>-1</sup>. Lyophilised *A. platensis* F&M-C256 biomass is therefore a suitable substrate for *L. plantarum* ATCC 8014 growth. No increase of in vitro digestibility (IVD) was observed, while the antioxidant capacity (AC) and total phenolic content (TPC) did increase significantly at the end of fermentation (72 h) compared to the control (+80% and +140%, respectively).

The second aim of this work was to study the influence of the integration of microalgae and cyanobacteria on the nutritional and functional properties of bakery products (such as "crostini", crackers and biscuits). For "crostini" production, sourdough was used as leavening and fermentation agent. Three percentages of *A. platensis* F&M-C256 were tested (2%, 6% and 10% w/w). All the "spirulina crostini" showed higher protein content (PC) compared to the control (on average +40%). Six and ten percent integrated "crostini" also presented significantly higher TPC and AC compared to the control (+26% and +48%, respectively). A significantly lower value of IVD and crude protein digestibility between "spirulina crostini" and the control was found.

For crackers and biscuits, 2% and 6% (w/w) *A. platensis* F&M-C256, *Chlorella vulgaris* Allma, *Tetraselmis suecica* F&M-M33 and *Phaeodactylum tricornutum* F&M-M40 biomass were tested and microalgae-based products were evaluated in terms of physicochemical properties, IVD and AC. Microalgae crackers showed significantly higher PC than the control, with the highest values for 6% *A. platensis* and *C. vulgaris* (+9% and +27%, respectively). In microalgae crackers, the highest AC (around 25%) were found for *A. platensis* and *P. tricornutum* both at 6% incorporation level. Microalgae biscuits presented significantly higher AC compared to the control (from +45% to +307). All microalgae-based biscuits showed significantly higher TPC compared to the control. Six percent *P. tricornutum* biscuits exhibited the highest TPC (0.62 mg gallic acid equivalent g<sup>-1</sup>). Microalgae crackers showed high IVD (around 85%), with the highest value for *A. platensis*. These values are within the IVD range of commercial salted crackers. No significant difference in IVD between microalgae biscuits and the control (95%) was found.