

The 13th European Nutrition Conference, FENS 2019, was held at the Dublin Convention Centre, 15–18 October 2019

Microalgae: A new source of healthy ingredients. Antioxidant and antimicrobial properties and incorporation as a functional ingredient for cheese making

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Abstract

Antimicrobial and antioxidant activities of nine species of microalgae have been determined to study its potential as healthy ingredients for functional foods. In order to determine the antioxidant capacity, two different techniques have been used. Firstly, a colorimetric test was carried out in order to detect the presence of lipophilic and hydrophilic antioxidant compounds, this method is based on the detection of the radical ABTS⁺, which is produced by the oxidation of ABTS in the presence of potassium persulfate, detection of the radical ABTS⁺ decreases in the presence of antioxidant compounds. Also the ORAC test was also applied for this purpose. Results with both methods showed very promising results for *Rhodomonas lens*. Thus this species was chosen to develop a functional cheese and study the healthy properties that the microalgae confer on it.

To determine the antimicrobial activity five food food-borne pathogenic strains were used: *Escherichia coli* CECT 516, *Enterococcus faecalis* CECT 481, *Listeria monocytogenes* CECT 935, *Salmonella enterica* CECT 4594 and *S. aureus* CECT 435. First, extracts of different polarity were obtained from microalgae. From each species, 4 extracts were obtained using different solvents of higher to less polarity (MilliQ Water, ethanol, ethyl acetate and hexane). The use of these solvents is common in the preparation of plant extracts, since they ensure the solubility of most of the compounds of interest and do not show toxicity after evaporation to determine the antimicrobial activity. The agar diffusion technique was used and the plates were kept refrigerated at 4 °C for 1 h to allow the extracts to diffuse through the agar and subsequently incubated at 37 °C for 24 h to allow microbial growth. After that time the presence of inhibition halos was observed around the perforations of the plates. Results showed that the ethanolic extract presented more antimicrobial activity than the extracts using MilliQ Water, ethyl acetate or hexane. *Salmonella* was not inhibited by any of the extracts studied.

Acknowledgements

Authors wish to thank EU for financial support through Interrreg Atlantic Area project EAPA_338/2016 EnhanceMicroAlgae High added-value industrial opportunities for microalgae in the Atlantic Area

Conflict of Interest

There is no conflict of interest