

Cunha, S., Coscueta, E., Silva, J. L., & Pintado, M. (2019). *Optimization of bioactive peptides extraction from chlorella vulgaris*. Abstract from 2nd International Symposium on Bioactive Peptides, Valência, Spain.

*Chlorella vulgaris* may be a source of several interesting compounds, as bioactive peptides with anticancer, antioxidant, anti-hypertensive activities. Furthermore, microalgae peptides may also be of great interest due to their functional properties as solubility, emulsifying and foaming properties, which could be beneficial for industrial application. The microalgae cell wall is rich in polysaccharides making it rigid and difficult to digest and, consequently, limiting the extraction of proteins and generation of peptides. Whereby it is important to break cell wall to achieve a more efficient peptide extraction. Therefore, this work aimed to obtain an optimized microalgae extract rich in bioactive peptides, through the combination of acid and enzymatic hydrolysis. *Chlorella vulgaris* was submitted to several extraction conditions, with variable factors including temperature, pH values, enzymes type, enzymes concentration, incubation time, use of salts and acids. The best factors were chosen after the determination of protein concentration (Bicinchoninic acid assay) and hydrolysis degree (2,4,6-Trinitrobenzene-l -Sulfonic Acid Method). A combination of an acid and an enzymatic hydrolysis, with a cellulase and a protease, appeared to be the best method to achieve protein and peptide extraction. The antioxidant and anti-hypertensive activities of peptides were tested by Oxygen-radical absorbance-capacity assay and ACE-inhibitory activity assay, respectively. To confirm the optimal extraction conditions, an experimental design was performed using statistical centurion software. Factorial design allowed an evaluation of the effect of three factors (protease concentration, temperature and hydrolysis time) on protein release and extracts bioactivities. The best extracts showed high antioxidant (34  $\mu\text{mol}$  Trolox Equivalent/mg sample) and anti-hypertensive (IC<sub>50</sub> of 12,75  $\mu\text{g}$  protein/mL) activities. Thus, the factorial design allowed to confirm the combination of experimental factors that leads to the most efficient extraction of antioxidant and anti-hypertensive peptides, validating the studied extraction method. The obtained peptide extract may be further tested toward the development of functional foods.