PRODUCTION OF LIPID RICH-EXTRACTS FROM CHLORELLA VULGARIS USING OHMIC HEATING

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Body

Microalgae biomass is a promising raw material for several bioproducts suitable for food, energy and pharmaceutical industries. The aim of the present work was to optimize the extraction of bioactive compounds from *Chlorella vulgaris* using Ohmic Heating (OH).

A rotatable central composite design for two factors was used to assess the effects of temperature and solvent (% ethanol in water) on lipid extraction yields and fatty acid profile. OH extraction experiments were powered by low-frequency (50 Hz) and high-frequency (25 kHz) to identify the presence of non-thermal effects and its influence on composition and bioactive properties of the generated extracts.

Lipid extraction using OH was successfully optimized with the best extraction conditions found at 70 ºC for 5 min using 88 % ethanol as a solvent. No effect on the application of the electrical frequencies was observed. These conditions allowed to recover up to 87 % of lipids from biomass, polyunsaturated fatty acids (PUFAs) accounting for 43 % of the extracted lipids against 26 % of saturated fatty acids (SFAs). The fatty acid profile reveals that C16:2, C16:3, C18:2 and C18:3 correspond to the PUFAs extracted from *Chlorella vulgaris*. Regarding lipid extraction yields OH was statistically equivalent to conventional heating (COV); however, in terms of heating kinetics, OH reaches the required extraction temperature 5 times faster than COV.

Results showed that OH has potential to be applied as a treatment for the production of *Chlorella vulgaris* PUFAs rich-extracts providing high recovery yields with reduced treatment times and less energy consumption.

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Palavras-chave : Ohmic Heating, Chlorella vulgaris, PUFAs rich-extracts, Microalgae