

ANALYSIS OF THE PROFILE OF VOLATILE ORGANIC COMPOUNDS IN CHLORELLA VULGARIS

Agricultural, Marine and Food Biotechnology

PO - (734) - ANALYSIS OF THE PROFILE OF VOLATILE ORGANIC COMPOUNDS IN CHLORELLA VULGARIS

Moreira, Catarina (Portugal)¹; Ferreira Santos, Pedro (Portugal)¹; Nunes, Rafaela (Portugal)¹; António Teixeira, José (Portugal)¹; Rocha, Cristina (Portugal)¹

1 - Minho University

Body

It is known that the incorporation of microalgae into foodstuffs enables to modify the overall flavor leading to desirable or undesirable organoleptic properties. Nevertheless, few were the studies conducted focusing on the analysis of the profile of volatile organic compounds (VOCs) produced by microalgae, which are the main compounds responsible for the aroma perception.

The aim of this study was to analyze the VOCs profile of *Chlorella vulgaris* powder by gas chromatography coupled with mass spectrometry (GC-MS). Different techniques were used for the extraction of the VOC's, prior to the chromatographic analysis: 1) solid-phase microextraction (SPME), and 2) ultrasound-assisted liquid extraction (UALE) using five different solvents. For the SPME analysis, 0.5 g of *C. vulgaris* was exposed to a divinylbenzene/carboxen/polydimethylsiloxane (DVB/CAR/PDMS) fiber and was desorbed for 5 min into GC-MS. For the UALE, 2 g of sample was placed in five different solvents for extraction (chloroform, dichloromethane, hexane, ethyl acetate and acetone).

For both SPME and UALE the GC-MS analysis was performed on Stabilwax (SW) and RXI-5 columns. The results showed very different profiles of VOCs between columns and techniques of extractions. In the analysis with the SW column no compounds were detected in acetone, hexane and ethyl acetate and only a few were present with the chloroform (39 VOCs) and dichloromethane (15 VOCs) extraction when compared to SPME (75 VOCs). In the RXI-5 analysis, a reduced number of compounds was identified when comparing with SW in SPME (39 and 75 VOCs, respectively), and in UALE, ethyl acetate was the only solvent with any retention of VOCs that could be detected with this column, having chloroform, dichloromethane, acetone and hexane, 10, 10, 5, and 8 VOCs respectively. In SPME, the main chemical classes of identified VOCs were, alcohols and hydrocarbons. In UALE, the VOCs profile was more balanced with alcohols, aldehydes, carboxy group, ketones and hydrocarbons. Only with hexane it was possible to find aromatic groups. Compounds such as hexanal, tetradecane, and 3-methylbutanal were found in SPME as reported in literature, although 3-methylbutanal was only present for SW.

In conclusion, SPME run in a SW column showed more VOCs retention and seems to be more appropriate to enable aroma prediction in *C. vulgaris*-based foodstuff.

Acknowledgements

Portuguese Foundation for Science and Technology (FCT) - 2021.05734.BD

Palavras-chave : VOCs, SPME, Aroma characterization, microalgae