retaste

rethink food waste

Athens, 6-8 May, 2021

Hellenic Mediterranean University

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Extraction of Chlorophylls from Bioresidues of Daucus Carota L. (Carrots) Aerial Parts for Food Colorants Development

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Abstract

The use of bio-residues from fruits and vegetables such as seeds, peels, aerial parts, etc., in the food industry has been of great interest due to the possibility of developing new secondary added-value materials such as natural colorants, which not only provide a colour to the food or product, but also provide health benefits to the consumer (Tiwari et al. 2019). In the present study, the extraction of chlorophylls from the aerial parts of carrots was carried out in order to develop natural food colourants. For that purpose, two types of extraction (maceration and ultrasound-assisted extraction) were performed to maximise the yield of chlorophyll recovery. Three types of solvents were used, prioritising green solvents (water, 90% ethanol, and hexane). At the same time, different parameters were varied in each of the techniques: i) in maceration: extraction time and solvent; ii) in ultrasound-assisted extraction: power and solvent. The extractions were carried out protecting the samples from light and the results were obtained using a newly developed chromatographic method through high performance liquid chromatography (HPLC) coupled to a diode array detector (DAD) and mass spectrometry (MS). In general, the aerial parts of carrot revealed as main compounds chlorophylls a and b, as well as derivatives in significant concentrations. The ultrasound technique proved to be more efficient than maceration extraction, with higher extraction yields when higher ultrasonic power was used. Compared to water and hexane, ethanol allowed the extraction of greater amounts of chlorophylls. These compounds can find application in food industry, but also in other industrial fields, given their high coloring properties, making these bioresidues valuable sources to exploit for colorants development.

Keywords: Chlorophylls, bioresidues, maceration, ultrasound-assisted extraction, green solvents.

References

Tiwari, Swati et al. 2019. “Organic Solvent-Free Extraction of Carotenoids from Carrot Bio- Waste and Its Physico-Chemical Properties.” Journal of Food Science and Technology. https://doi.org/10.1007/s13197-019-03920-5.

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