

# Extraction and encapsulation of algae derived products using supercritical fluid technology

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Sea weeds or marine algae are known as sources of bioactive compounds, such as polyphenols, carotenoids or chlorophylls. Besides being abundant, they are a source of high purity compounds, with a great variety of products and structures<sup>1</sup> which also offer extracts with antioxidant, antimicrobial and antiviral properties.

Several methodologies have been employed in the extraction of bioactive compounds from algae such as solvent extraction, pressurized liquid extraction, microwave assisted extraction, and supercritical fluid extraction (SFE)<sup>2</sup>. This work is focused on the use of SFE using supercritical CO<sub>2</sub>. Three different algae from different families were studied, *Fucus Vesiculosus* (brown algae), *Gracilaria Verrucosa* (red algae) and *Codium tomentosum* (green algae), and a wide variety of extracts of different compositions were obtained.

A systematic study on the SFE is attempted, where the use of scCO<sub>2</sub> and the use of co-solvents such as ethanol were tested, in order to tune solvent polarity and selectivity. Besides the effect of variation of pressure, temperature will also be varied.

SFE will yield extracts of high purity, which can have a high value for several applications, in pharmaceutical, cosmetic or food industries. These extracts will further be encapsulated in polymeric particles, also using scCO<sub>2</sub> processing techniques (supercritical anti-solvent, SAS), in order to be able to use them in different applications. Biopolymers such as carrageenan and alginate (also derived from seaweed) will be used for this purpose.

## References

1. Grosso, C., Valentão, P., Ferreres, F. & Andrade, P. B. Alternative and efficient extraction methods for marine-derived compounds. *Mar. Drugs* **13**, 3182–3230 (2015).
2. Joana Gil-Chávez, G. *et al.* Technologies for Extraction and Production of Bioactive Compounds to be Used as Nutraceuticals and Food Ingredients: An Overview. *Compr. Rev. Food Sci. Food Saf.* **12**, 5–23 (2013).