

Extraction, Structural Determination, and Bioactivity Assessment of Fucoïdan Extract from Brown Algae

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This Ph.D. study is part of the joint European Interreg project "FucoSan".

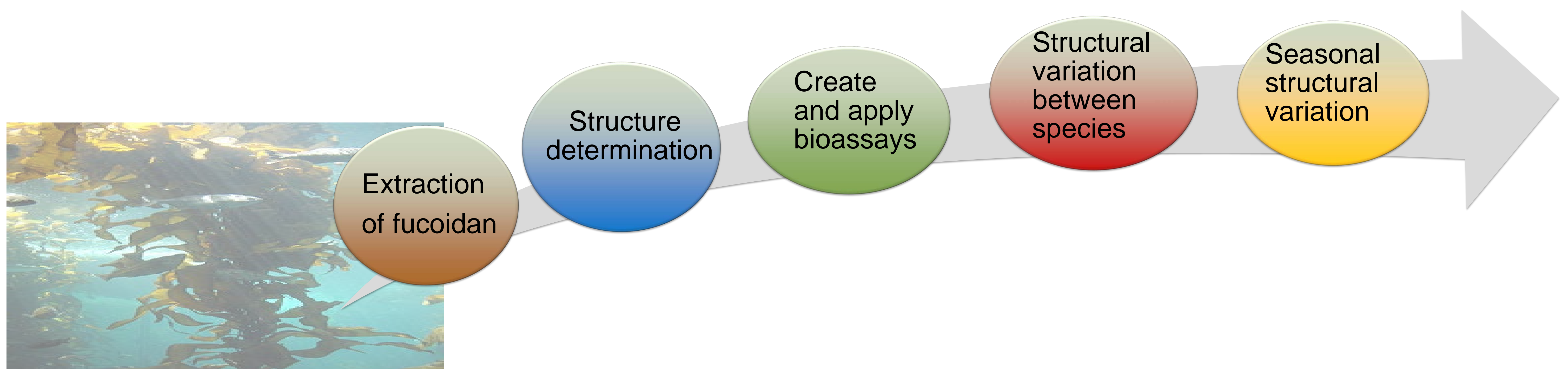
Background

Brown algae contain sulfated polysaccharides, known as Fucoïdians, which have been linked to a number of health benefits. Although they are sold as supplements, their structure and bioactivity is poorly understood. Shedding some light on these compounds and their mechanisms could assert their usage in not only supplements, but also in cosmetics, regenerative medicine, and ophthalmology.

Aim

Find the extraction method that gives the highest yield and purity of fucoïdan, as well as determining the structure of fucoïdan from various brown algae, and how their structure and bioactivity vary with the seasons.

Objectives



Methods

Extraction

- Classical multi-step method [1,2,3,4].
- Low chemical method [5]
- Micro-wave and ultrasound-assisted extraction [5]
- Membrane separation [6]

Structure

- Filtering of crude fucoïdan extract by Size Exclusion Chromatography (SEC).
- Fractionation by acid hydrolysis and analysis by HPLC-MS [7].
- HPLC-MS analysis of fucoïdan without fractionation [8].
- Analysis of native and desulfated fucoïdan fractions by ¹H-NMR and ¹³C-NMR [9]

bioactivity

- Assessed by bioassays, from suggestions by the Pukyong national university.
- Identification of bioactive sites from bioassay data and structure data, using chemometrics

Expected outcomes

An extraction method that can be used in the industry for production of fucoïdan products, as well a database showing the properties and differences of fucoïdan from different seaweed species and processing methods. 3-5 publications on structure, extraction, and bioactivity.



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FUCOSAN

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