

# Green Natural Products From Seaweeds?

## Sustainable extraction of phenolic contents from brown seaweeds by natural deep eutectic solvents



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### Background and motivation

I am a postdoc researcher in marine natural product chemistry exploring sustainable micro/macro-algae biomass for potential industrial applications. My research interest in this project focuses on the complex challenges faced by extracting natural products from brown seaweeds through traditional methods, optimization of green extraction approaches as an alternative, and utilization of natural products in the pharmaceutical and food industries, which will contribute to the increasing blue economy.

### Project description

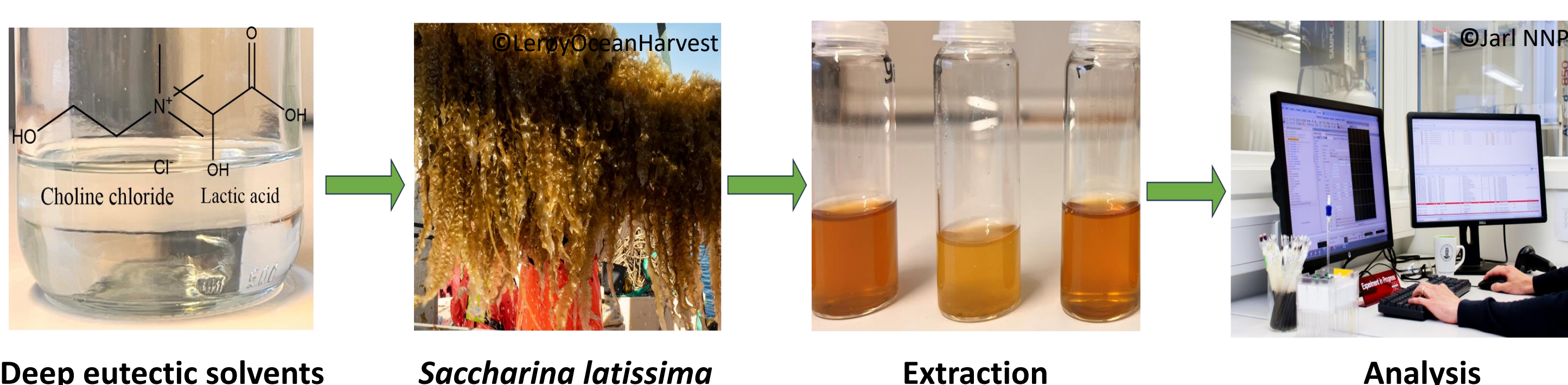
Brown seaweeds are a sustainable source of natural products, including polyphenols with potential industrial applications. The green phenolic contents from brown seaweeds will be tackled towards sustainable extraction with natural deep eutectic solvents to convert brown seaweed biomass into applicable products. The challenges faced by traditional extraction methods are safety, toxicity, long extraction time, laborious handling steps, volatile nature of solvents, and explosive characteristics that place a heavy burden on the marine natural products environment. The optimization of green extraction processes will overcome traditional extraction challenges, while integrating ultrasonic, microwave, and accelerated solvent-assisted processes will improve extraction efficiency.

### Main questions

- How can we extract marine natural products with environmentally friendly approaches?
- How can we assess the traditional extraction challenges towards green extraction?

### Planned activities

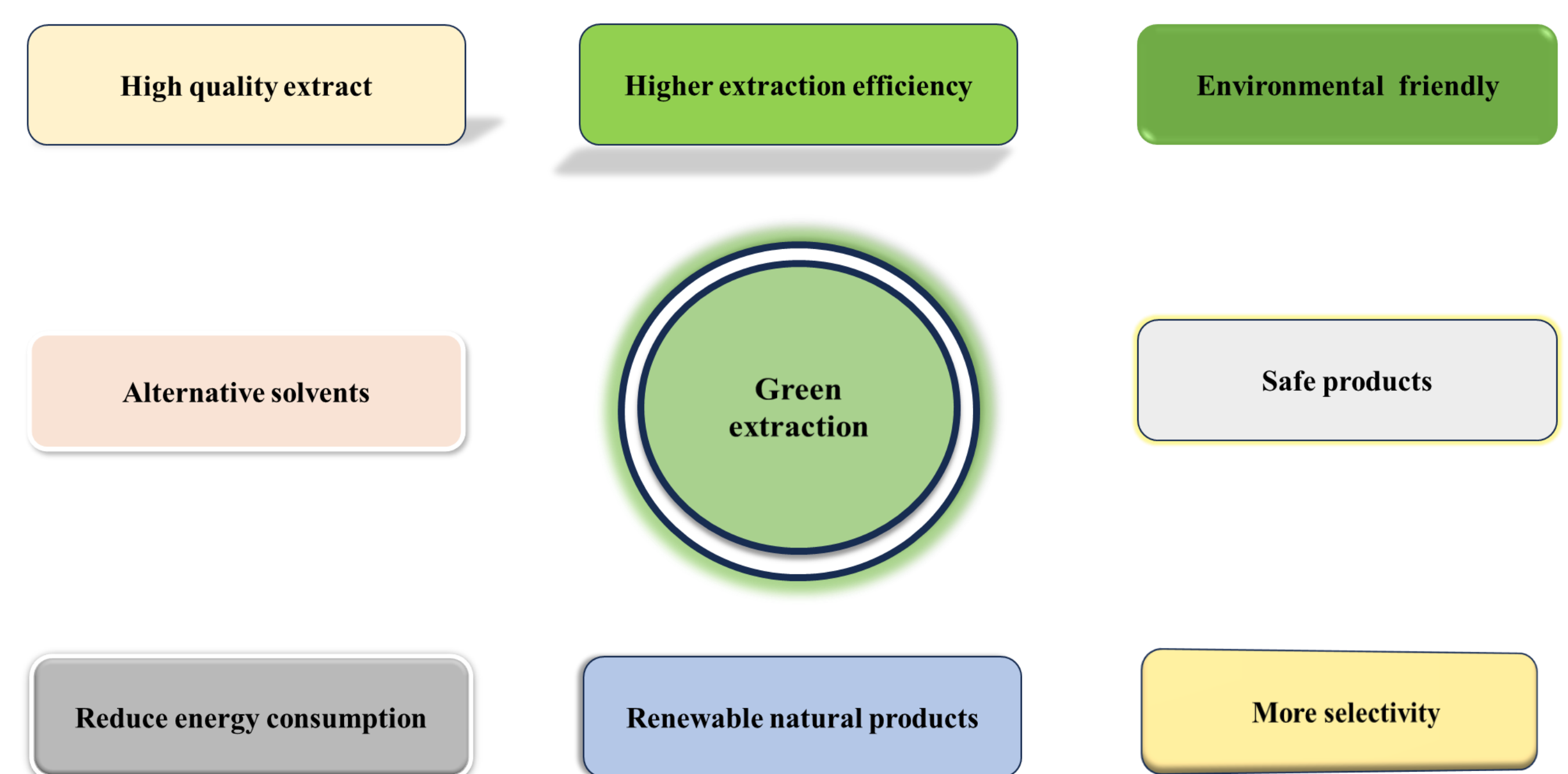
Selection of natural deep eutectic solvents with the desired properties, optimization of key parameters by response surface methodology (RSM), integration assisted processes, qualitative and quantitative analysis by UV, LC-MS, NMR, and counter current chromatography (CCC). Measure waste, energy use, and ecological impact compared to traditional methods. Ensure safety by conducting toxicity tests and assess scalability for industrial use of the green extraction. Improve the technique based on initial experiment results and examine economic viability for potential commercial applications. Academic and industrial collaboration.



Cultivation of *Saccharina latissima*

### Aims

- Develop green and sustainable extraction methods for polyphenols from brown seaweeds.
- Utilize natural deep eutectic solvents as an eco-friendly alternative to traditional, potentially toxic solvents.
- Increasing extraction yields of phenolic contents compared to traditional methods.



### Green extraction with deep eutectic solvents

### Marine sustainability

As the demand for marine resources continues to grow, it is crucial to implement sustainable approaches that will reduce the burden on the marine environment. The project will optimize extraction approaches to produce sustainable marine phenolic products.

### Supervisory team

Supervisor: Monica Jordheim, Associate Professor, Head of Bioresources and Pharmaceutical Chemistry research group, Department of Chemistry, UiB.  
Co-supervisor: Svein Are Mjøs, Professor, Department of Chemistry, UiB.



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