

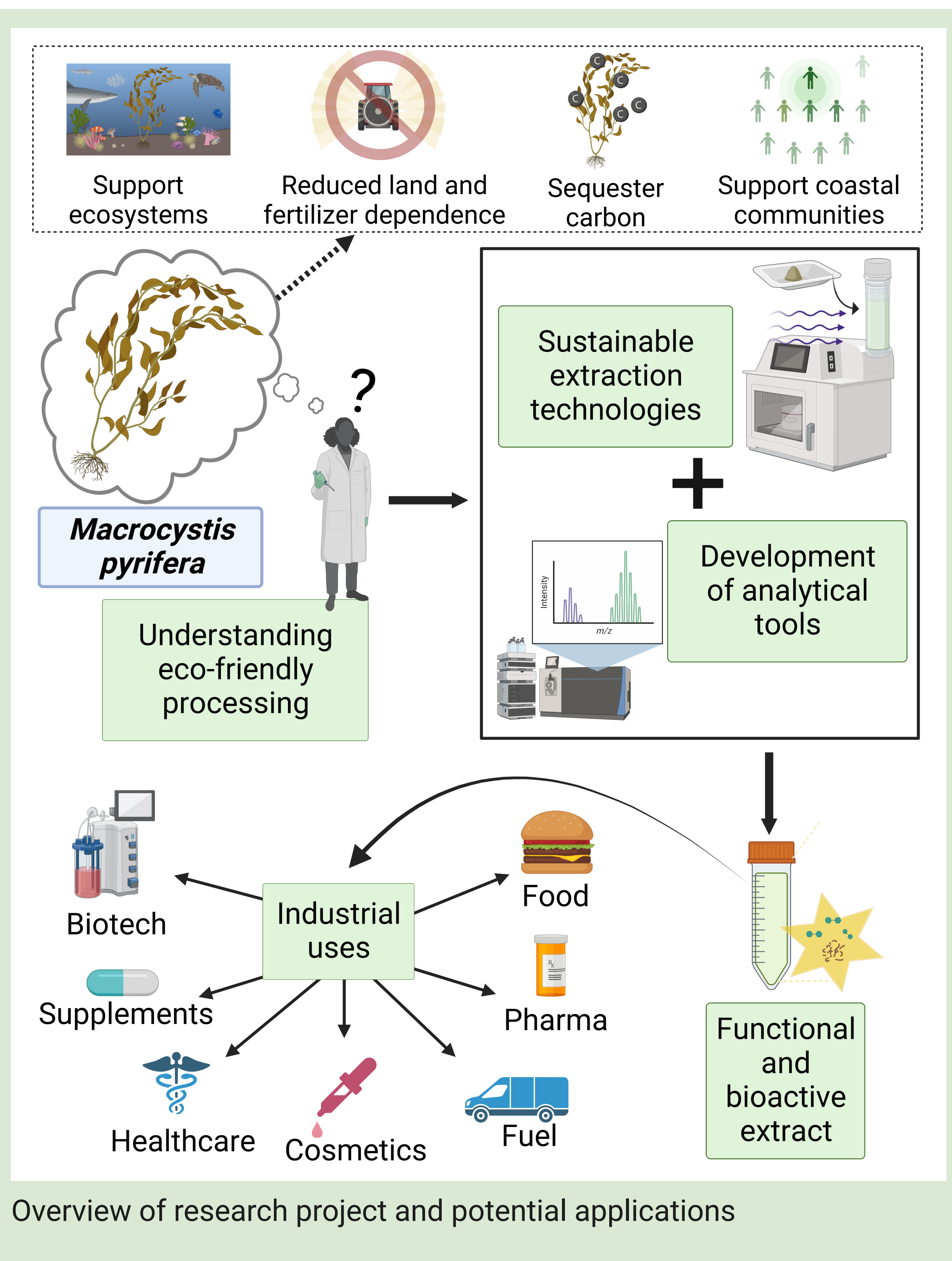


Helping it Green: Advanced Analytical Tools for Eco-Friendly Giant Kelp Extractions



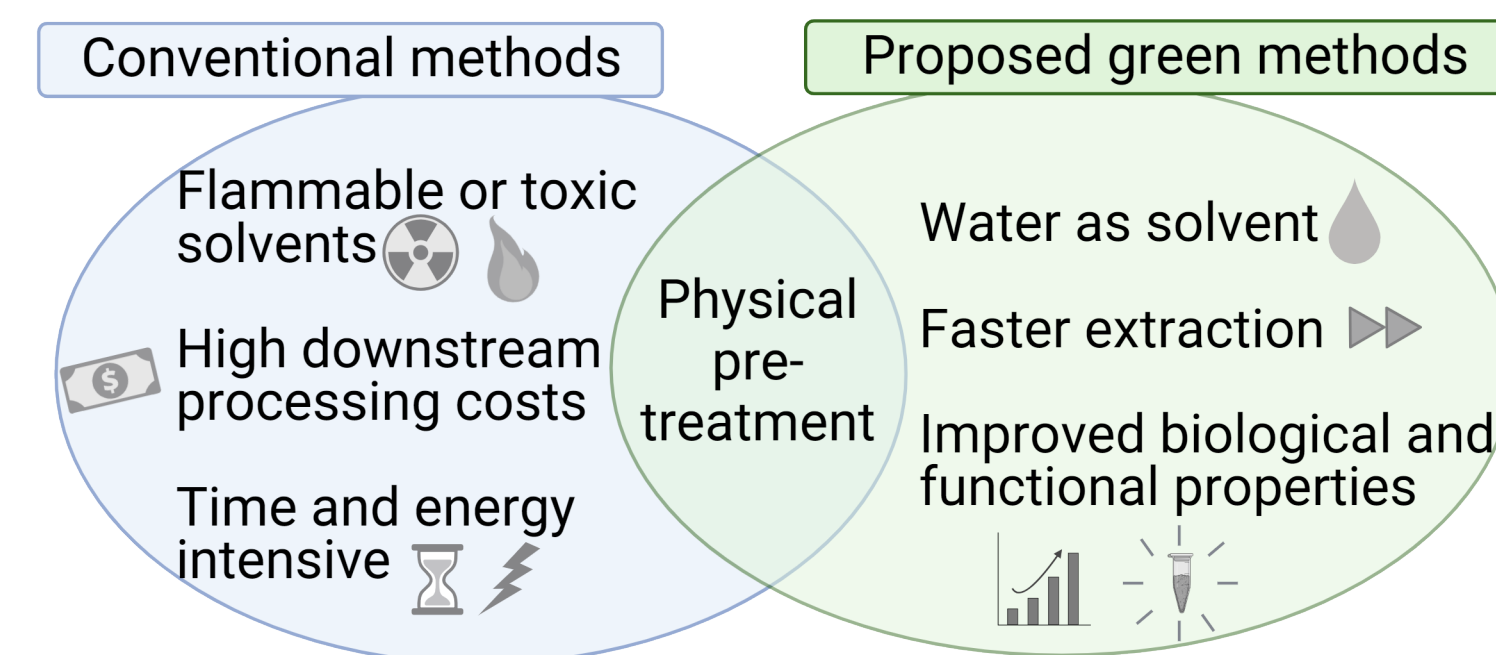
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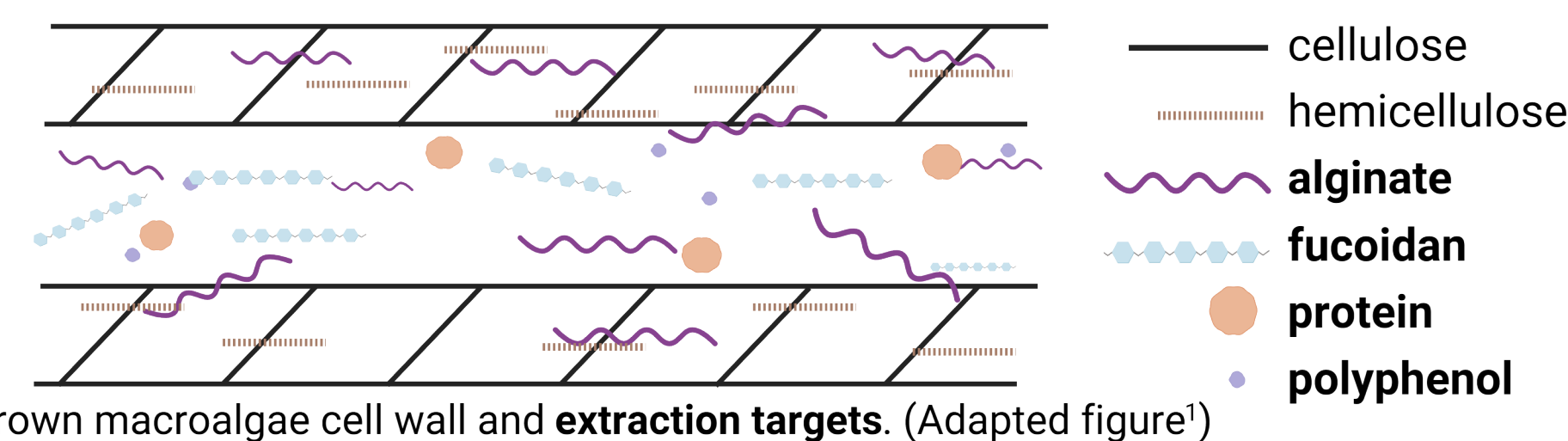
INTRODUCTION

- Optimize giant kelp **eco-friendly processing methods** to improve on conventional methods
- Develop **analytical tools to guide** process optimization
- Maximize extraction of **bioactive and functional compounds** from giant kelp



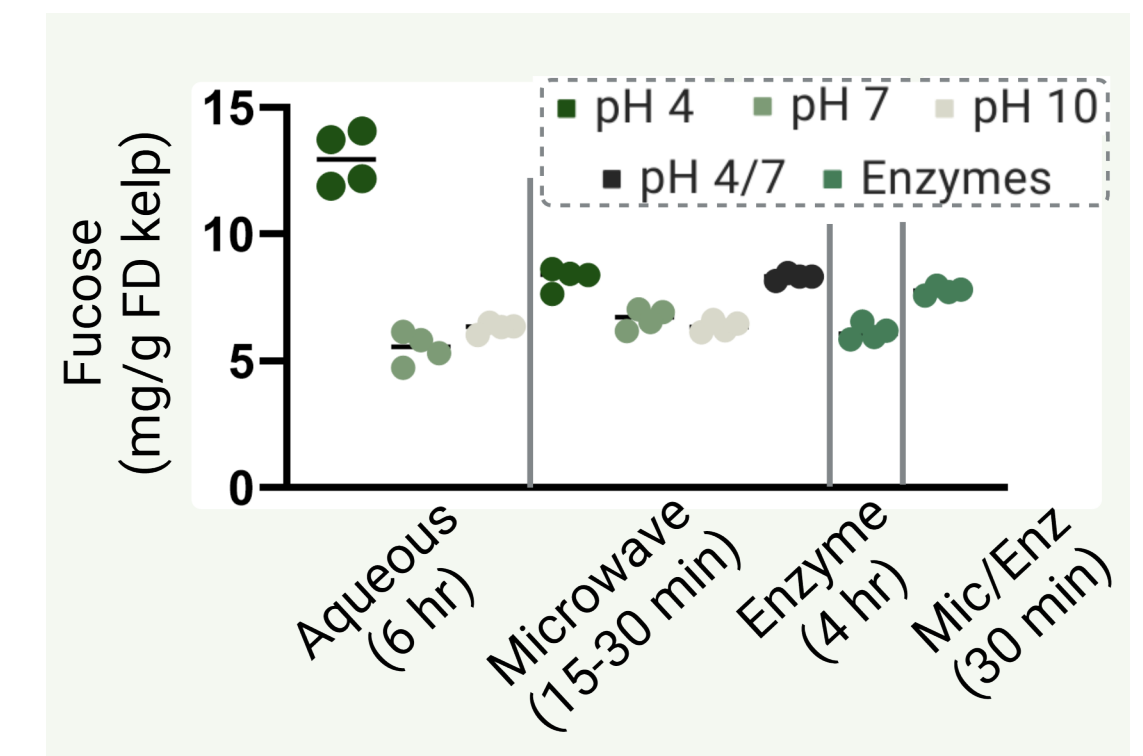
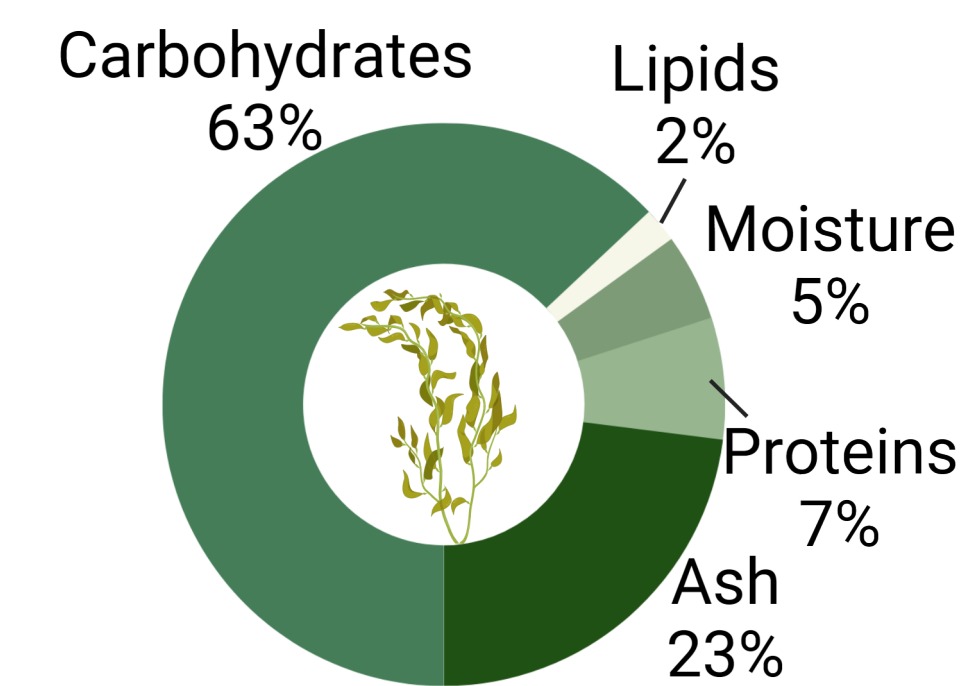
METHODS

- Downstream processing optimization - time, temperature, solids-to-liquid ratio, enzyme**
 - Aqueous (6 hour)
 - Enzyme-assisted (4 hour)
 - Microwave (15-30 min)
 - Microwave-enzyme (30 min)
- Analytical methods development and analyses**
 - Proteomics (proteins) by nanoLC-QToF*
 - Oligosaccharides (carbohydrates) by nanoLC-QToF*
 - Monosaccharides by HPAEC-PAD**



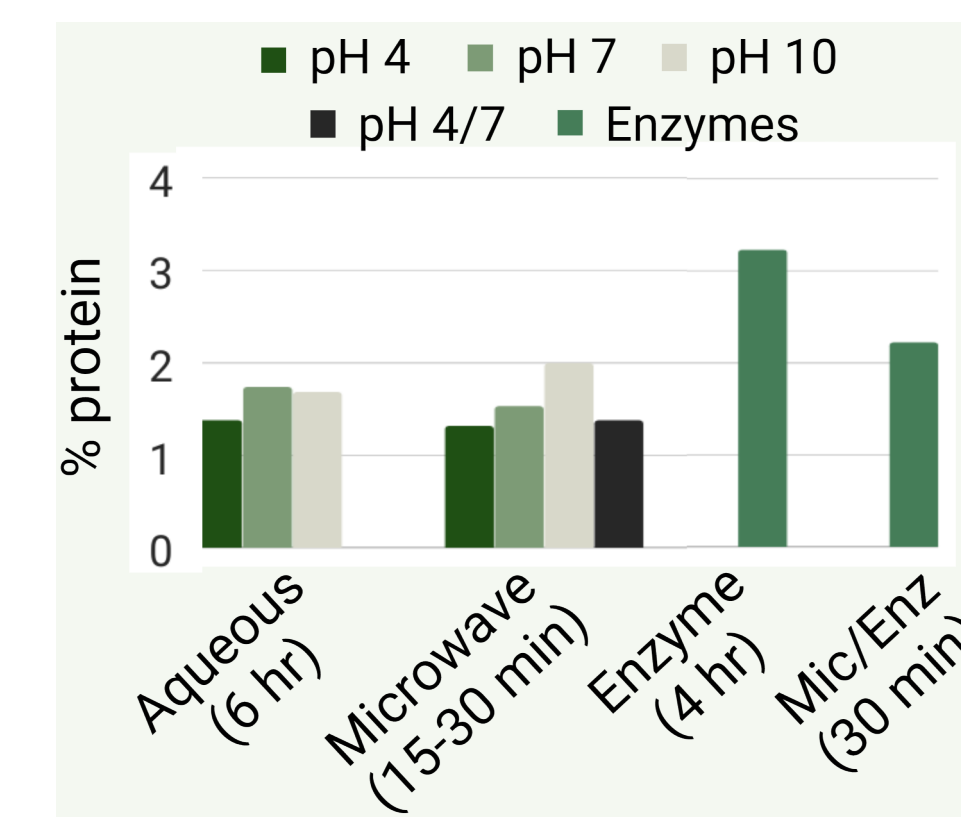
RESULTS

- 6 hour aqueous extraction comparable to 15 min microwaved-assisted extraction
- Bioactivity of extracts comparable to drugs on the market

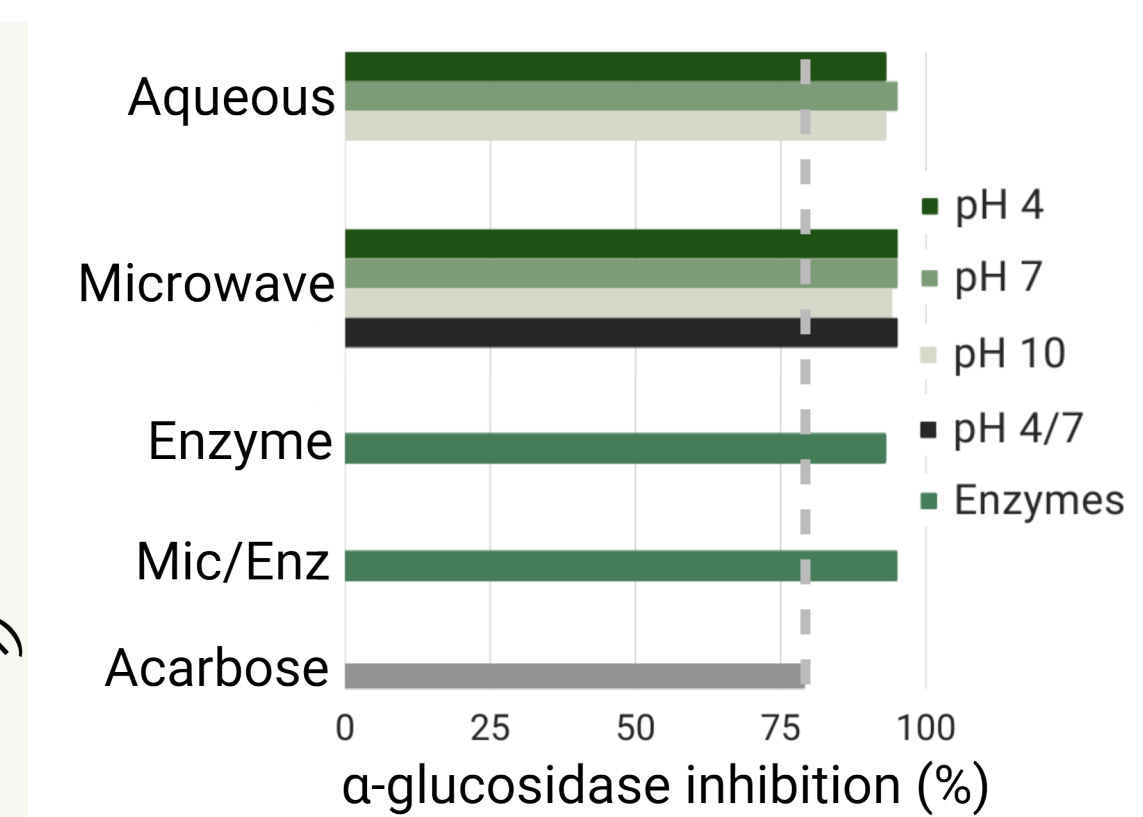


Composition of *Macrocystis pyrifera* (giant kelp)

Fucose amounts for all extractions (mg fucose/g freeze dried kelp)



Total protein content (%) of all extracts



α -glucosidase % inhibition, with acarbose as control

CONCLUSION

- Commercial potential - **significantly reduced processing time** without sacrificing extract quality
- Biological properties \rightarrow **func. foods, supplements**
- Potential drug effects - **antioxidant, antihypertensive, antidiabetic**

ACKNOWLEDGEMENTS
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REFERENCES
1. Kostas et al., 2021, "Macroalgal biorefinery concepts for the circular bioeconomy: A review on biotechnological developments and future perspectives", Renew. Sustain. Energy Rev., 151.

*Nano-liquid chromatography coupled to quadrupole time-of-flight mass spectrometer
**High-performance anion-exchange chromatography with pulsed amperometric detection