

DUAL-STUDY EXPLORATION: IMPACT OF EXTRACTION METHODS ON BIOAVAILABILITY, HEALTH-RELATED PROPERTIES, AND MATRIX VARIATIONS

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Introduction

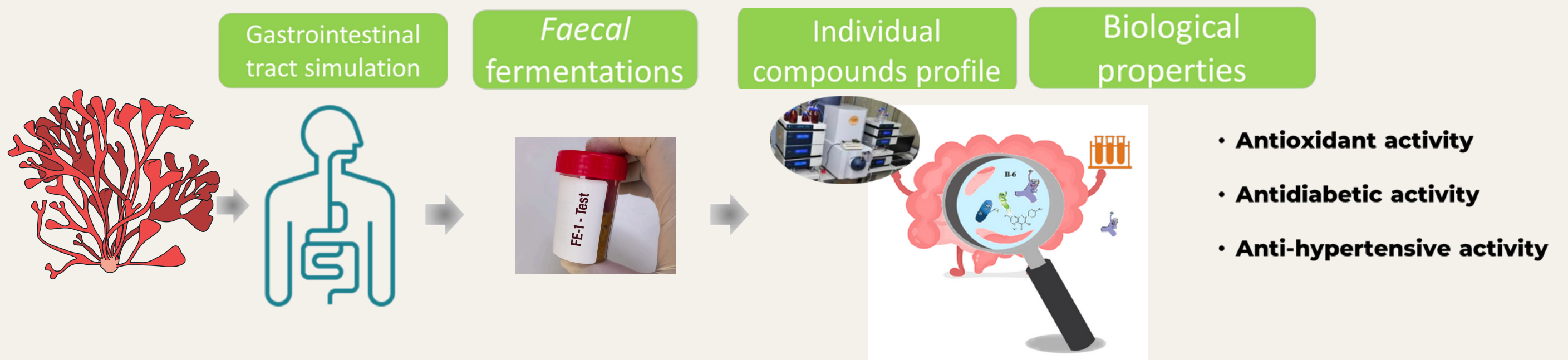
Osmundea pinnatifida and *Codium* spp. are rich in Bioactive Compounds (BC), which have been linked to numerous health benefits, including antioxidant, anti-hypertensive, and anti-inflammatory effects. However, the extent to which these compounds can be absorbed and utilized by the body is largely dependent on how they are affected by the process of digestion.

Objectives

By using the INFOGEST in vitro model, this study provides valuable insights into how hexane extraction influences the bioavailability of these BC. Furthermore, it examines the impact of non-absorbed fractions on gut microbiota growth (GMG).

In essence, this study contributes significantly to our understanding of the nutritional potential of algae and the role of digestion in unlocking their health benefits.

METHODOLOGY



RESULTS

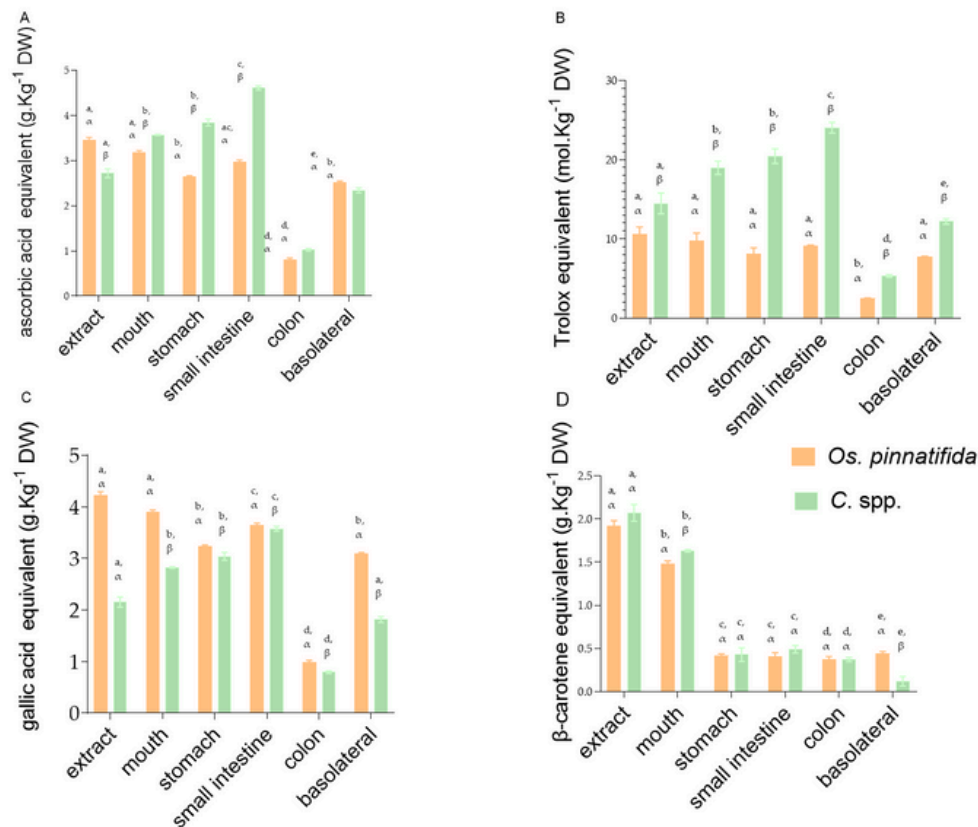


Fig.1 - Total phenolic compounds a) Antioxidant activity by ABTS, b) ORAC, c) total phenolic compounds, and d) beta-carotene throughout GIT.

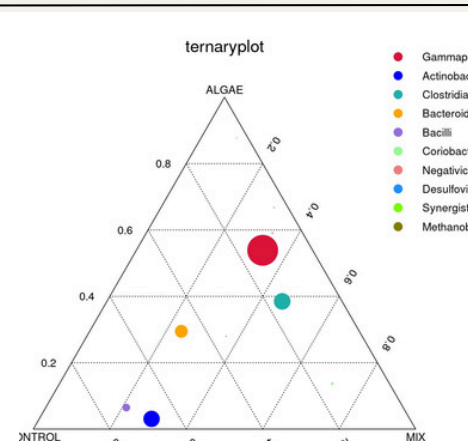


Fig. 2 - Effects of algae on microbiota, by ternaryplot.

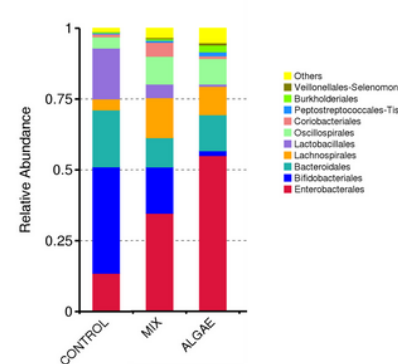


Fig. 3 - Relative abundance.

- The simulation revealed varied carotenoids along the gastrointestinal tract, with only 2.49% beta-carotene absorption.
- Carotenoids, especially lycopene, beta-carotene, beta-cryptoxanthin, and lutein, experienced significant decreases during passage through the gastrointestinal tract, particularly under stomach conditions.
- Carotenoid extracts exhibited noteworthy antioxidant and antidiabetic activities.
- *Os. pinnatifida* showed no detectable carotenoids, indicating compromised bioaccessibility in complex algae matrices without prior lysis treatment.

Conclusions

- The extraction method used in the algae study significantly influenced the bioaccessibility of nutrients and BC
- Both extracts exhibited high anti-inflammatory and moderate anti-hypertensive activities compared to algae matrices.
- The impact of digested algae highlighted the relative abundance of the Bacteroides genus

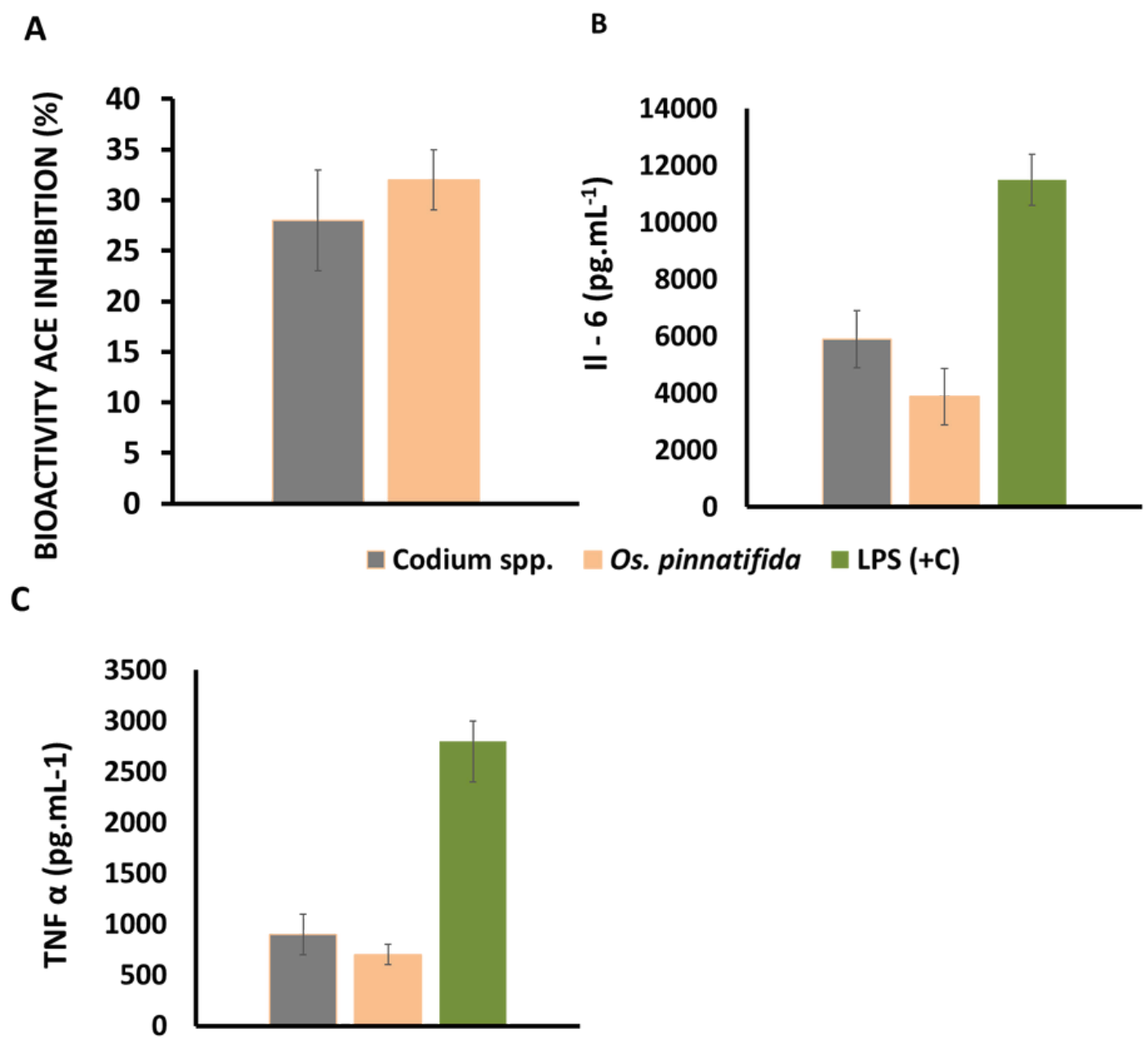
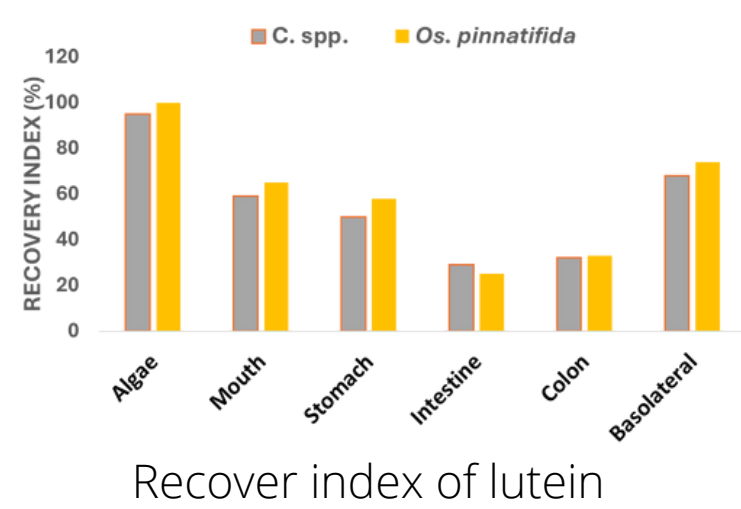
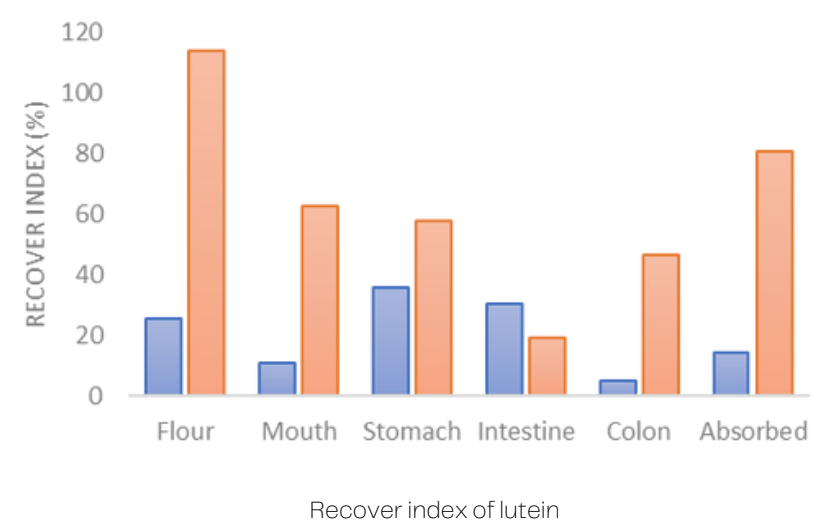
The findings underline the importance of extraction techniques and digestion conditions in determining the bioavailability and health benefits of bioactive compounds in algae. This provides important perspectives for future studies and uses in the field of functional foods and nutraceuticals.



Aknowledgements

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supplementary information



Bioactivity ACE inhibition (%), graph A; Interleukin-6 (IL-6), graph B, tumour necrosis factor-alpha (TNF- α), graph C, concentration in the supernatants from cells stimulated with a basolateral fraction of *Codium* spp., and *Os. Pinnatifida* algae in combination with 2.5 $\mu\text{g}/\text{mL}$ lipopolysaccharide (LPS) per well. The data are expressed as the mean \pm SD (* $p < 0.05$ vs. LPS control).