

Are commercial seaweed products able to affect carbohydrate digestion?

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1. Introduction

- Novel treatment aimed at decreasing carbohydrate digestion and subsequently blood sugar levels, is in demand for diabetic patients [1].
- Seaweeds are large marine algae; commonly consumed in most Asian countries.
- Certain species of seaweed have the potential to hinder the enzyme (α -amylase); responsible for the digestion of carbohydrate [1].
- It is hypothesized that seaweed products that undergo food processing, loses the ability to decrease carbohydrate digestion.

2. Aims

- Conduct carbohydrate digestion assays on α -amylase activity; upon α -amylase reaction with seaweed extracts.
- Evaluate the association between seaweed product processing techniques and carbohydrate digestibility

3. Materials and Methods

Extraction of 14 seaweed products (10 mg/ml)

- Extraction was conducted to release bioactive molecules into the buffer solution (i.e; seaweed extract)

Conduct reaction between α -amylase + seaweed extract

- Reaction between α -amylase and seaweed extract was conducted to allow possible bioactive molecules in seaweed to bind and affect α -amylase activity

Conduct reaction between potato starch and α -amylase + seaweed extract

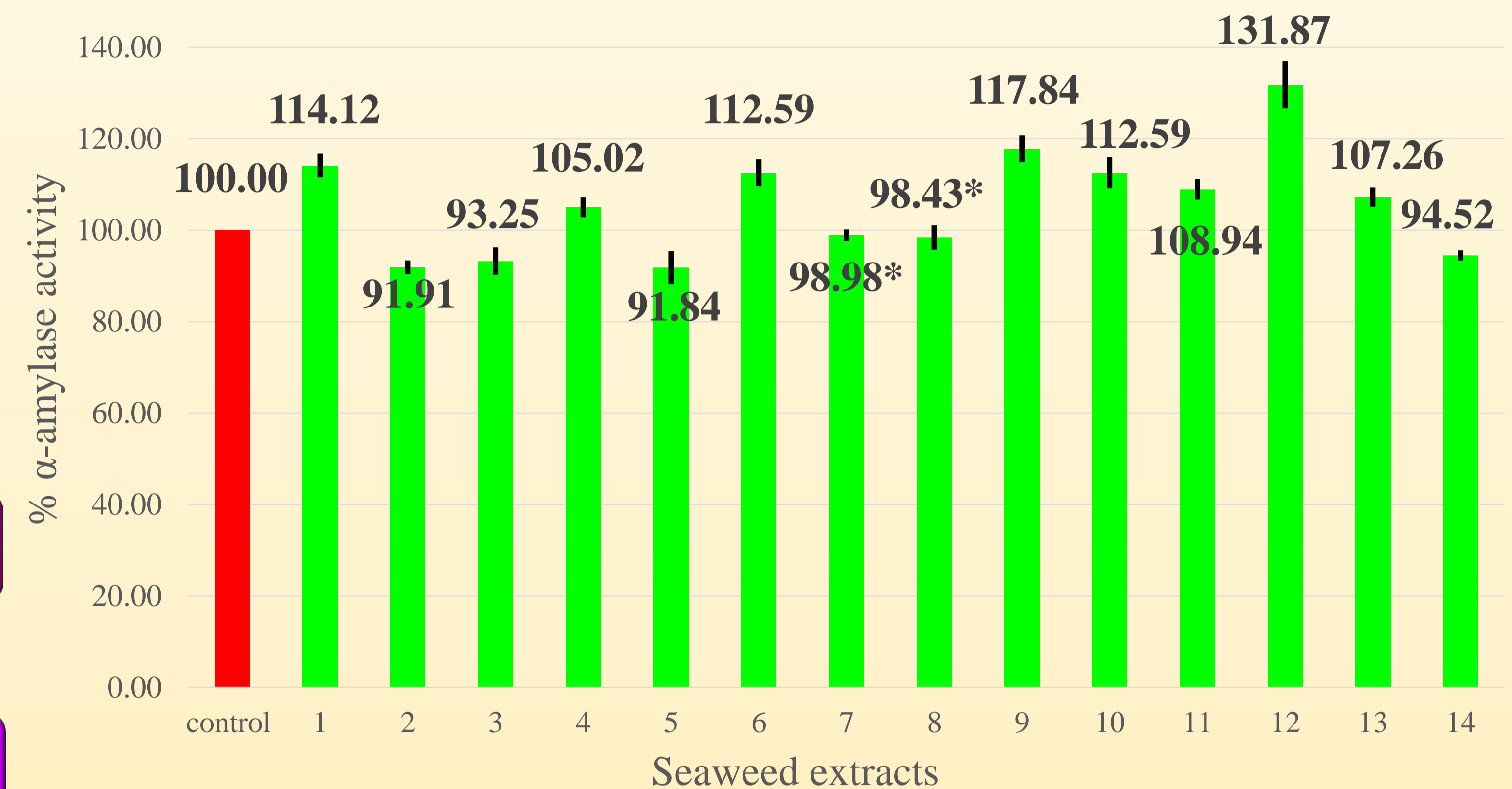
- Potato starch was added to α -amylase and seaweed extract to allow the digestion between unbound α -amylase and potato starch.

★ Analysis of α -amylase activity

- A visualizing reagent was added to the reaction mix to quantify the extend of starch digestion. The analysis of starch digestion was optimized to produce more constant results for each seaweed sample.

4. Results

- Analysis for each seaweed extract (labelled : 1 - 14) and control was replicated 8 times.
- Results are presented as mean \pm standard deviation of α -amylase activity.
- Mean α -amylase activity was statistically significant ($p < 0.05$) unless indicated by (*).



Based on the bioactivity of 10 mg/ml seaweed product :

- 8 out of 14 seaweed products showed more than 100 % α -amylase activity
- 6 out of 14 products showed less than 100 % α -amylase activity
- More commercial seaweed products boost carbohydrate digestion rather than reduce carbohydrate digestion.

5. Discussion

- Seaweed products used in this experiment were subjected to heat treatment during processing (i.e. roasted, grilled or dried).
- Heat treatment could effect structural changes in seaweed products[2].
- This may alter the bioactivity of processed seaweed products which could have resulted in an increased digestion of carbohydrates.

6. Conclusion

The results suggest that most commercial seaweed products boost carbohydrate digestion. Commercial seaweed products may undergo structural changes during food processing which could in turn result in an altered biological activity compared to raw seaweed products.

Reference