



TASTE

Edible seaweed for taste enhancement and salt replacement by enzymatic methods

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Background

Health authorities worldwide have recommended reducing salt in processed foods in order to reduce the risk of high blood pressure. Seaweeds have a naturally salty taste being abundant in minerals like potassium and magnesium besides sodium. This salty taste improves the flavor profile of foodstuffs. In addition, some seaweed contain a range of potential flavor components that can naturally enhance the flavor of food. Mild enzymatic processing can release potential flavor components like proteins, peptides, amino acids and reducing sugars.



Fig 1. *Ascophyllum nodosum* (goodfruit.com)

Aim

The aim of this work was to develop a processing method to release flavor-enhancing components from the edible seaweed species *Fucus vesiculosus*, *Ascophyllum nodosum* and *Saccharina latissima* using mild enzymatic processing.

Conclusion

The project showed that enzymatic digestion of edible seaweed is a promising and innovative way to produce a new and all natural product for taste enhancement and salt replacements in food products.

Methods

A range of carbohydrate degrading enzymes and proteolytic enzymes were tested on the seaweed and various chemical characterizations were carried out on the resulting products. Analysis of neutral and reducing sugars, protein analysis, SDS page analysis, thin layer chromatography and amino acid analysis were used to identify the seaweed species, enzyme and process that gave the highest taste enhancement potential.



Fig 4. Seaweed extracts

Enzyme	Producer
Carbohydrate degrading enzymes	
Alginate lyase (Ala 1, Ala 2, Ala 3, Ala 4)	Prokazyne
Fucosidase	Prokazyne
Laminarinase	Prokazyne
β-glucosidase	Prokazyne
Alginate lyase	Sigma-Aldrich
Halitase ₅₅₁	Kura Biotech, Chile
Halitase ₃₆₂	Kura Biotech, Chile
Proteolytic enzymes	
Flavourzyme	Novozymes
Alcalase	Novozymes
ProteAX	Amano Enzymes Inc
Umamizyme	Amano Enzymes Inc
Protease A	Amano Enzymes Inc
Protease P	Amano Enzymes Inc

Fig 3. List of enzymes

This project has received funding from the European Seventh Framework Program managed by the REA – Research Executive Agency (<http://ec.europa.eu/research/rea.FP/2003-2013>) under grant agreement no.315170

Results

A process flow was developed with the potential to scale up for industrial production.

The most promising raw material, pre processing methods, enzymes and conditions during enzymatic digestion were identified.

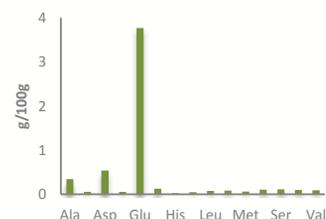


Fig 2. Amino acid analysis on *Ascophyllum nodosum*.



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