Alginates from Alaria esculenta and Saccharina latissima

✓ First characterisation of alginate from Norwegian cultivated seaweed Establishment of alginate extraction protocol



<u>Katharina Nøkling-Eide^{1,2}, Anne-Mari Langeng¹, Andreas Åslund¹, Finn Aachmann², Håvard Sletta¹, Øystein Arlov¹</u>

¹Department of Biotechnology and Nanomedicine, SINTEF Industry, Richard Birkelands vei 3 B, 7034 Trondheim, Norway

²Norwegian Biopolymer Laboratory (NOBIPOL), Department of Biotechnology and Food Science and Technology, Sem Sælands vei 6/8, 7491 Trondheim, Norway

INTRODUCTION

Alginates are linear anionic polysaccharides with a broad range of application areas in food-, technical- and pharmaceutical industries. They are composed of $1 \rightarrow 4$ linked β -D-mannuronic acid (M) and its C5 epimer α -Lguluronic acid (G), arranged in G-, M- and MG-blocks. Most alginates originate from brown seaweeds, and Norway has a prominent 80 years old alginate industry based on the wild growing *Laminaria hyperborea*. Cultivated Alaria esculenta and Saccharina latissima offers a future supplementary biomass for alginate production, with a minimal impact on natural coastal ecosystems. The aim of this study was to establish an, until now lacking, protocol for efficiently extracting high-quality alginate from cultivated seaweed.







Alaria esculenta Saccharina latissima

Chemical composition of alginates extracted at pH 9. Fractions (F) of monads and diads, and averenge length of G-blocks (N_{G>1}): F_{GG} $F_{GM,MG}$ F_{MM} $N_{G>1}$ FM FG Alaria esculenta 0.58 0.42 0.41 0.25 0.17 11 Saccharina latissima 0.49 0.51 0.29 0.20 0.31 8 Alginate Est. protein 95 % 93 % Est. fucoidan **Σ** (P, K, Mg, Ca)





METHODS



pН

Characterisation of alginates Molecular Yield weight Purity Structure

Biomass characterisation: Ash and dry matter ICP-MS CNS

Parameters tested: Extraction time Temperature

NMR: Structural characterisation **ICP-MS:** Element consentration **CNS:** Co-extracted protein and fucoidan GPC: Molecular weight

CONCLUSION

- Possible to efficiently extract alginate with high yield and \checkmark quality from cultivated Alaria esculenta and Saccharina latissima
- ✓ pH 9 and short extraction time (1–5 hours) are favorable
- ✓ Alginate purity comparable to commercial alginate (LF 10/60) from *Laminaria hyperborea* stipe, but with a lower G-content

Contact: Katharina.Nokling-Eide@sintef.no





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