Title:

"Report on seasonal variation of value-added components in different types of macroalgae"

Macro Cascade -Project

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Deliverable 1.2

Work package 1

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Summary

The biochemical composition was determined from *S. latissima*, *A. esculenta* and *Laminaria digitata* samples collected monthly (2015-2017). Also, the purpose was to obtain indepth knowledge about the target biochemical composition of cultivated brown macroalgal species to plan harvest, decide on product applications, and plan for future biorefinery processes. Analyses of dry matter, minerals (ash), protein, carbohydrate, lipid, amino acid profile, fatty acid profile, antioxidant activity, α-carotene, β-carotene and D-vitamin, sodium, iodine, lead, mercury, cadmium and arsenic including inorganic arsenic were performed, and evaluated in relation to their interannual, seasonal, site and depth variations.

The results of the biochemical composition showed a significant variation of several compounds between species and seasons, but not between years, cultivation depths and sites. There was a seasonal trend that dry matter and carbohydrates concentrations went up in winter where ash and protein were lowest, and the opposite during summer. *Saccharina latissima* has a high carbohydrate (42-57% of dw) and ash concentration (36-42% of dw), lower content of protein (11-14% of dw; N*6.25), and small amounts of total lipids (2.4% of dw). Vitamin D and α-carotene were not detected in any of the species and a low antioxidant activity was revealed. β-Carotene was found with a content of 10-22 ppm of dw. Iodine concentration was high for *S. latissima* and *L. digitata* (3998-5361 ppm of dw) and lower for *A. esculenta* (234 ppm of dw) with lowest concentration during harvest season. The levels of heavy metals found within this work were in similar range as other food sources and below threshold values. The results can be used directly as product documentation by Ocean Rainforest and as input for other MacroCascade Work Packages. The results made a great contribution to the better understanding of the biochemical composition of cultivated macroalgae and that the most important variables affecting biochemical content are macroalgal species and seasonal variation.

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