



# Optimized Conditioning Process for Seaweed Macro Cascade -Project H2020-BBI-PPP-2015-1

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# Summary

The overall objective of WP2 is the preparation for microbial refining and extraction of value-added compounds. This is achieved by the conditioning, storage and mineral removal of freshly harvested seaweeds to be converted to high-value compounds in subsequent work-packages, i.e. develop methods for conditioning, pre-treatment and storage of harvested seaweed for microbial and chemical refining. The work will focus on the following areas:

- Conditioning of seaweed, i.e. dewatering, drying and ensiling to facilitate storage, and further recovery of all identified algae compounds
- Combined storage and in-situ (biological and chemical) pre-treatment
- Optimal recovery of residuals (including mineral and salt) from the conditioning processes

This Deliverable 2.1 describes the conditioning of seaweed by screw pressing in both laboratory and pilot scale.

## **Screw pressing of brown algae in laboratory:**

The approach was to dewater the biomass by screw-pressing using the brown seaweed species *Saccharina latissima* and *Alaria esculenta*, and green seaweed *Ulva lactuca*. The dry matter content after screw pressing in the solid fraction was increased significantly compared to fresh biomass, particularly for *S. latissima* with an increase from 13% to 25 %, and for *U. lactuca* from 15% to 28%. In terms of dry matter distribution between the two fractions, a very large proportion of the dry matter was obtained in the solid fraction for *S. latissima* with nearly 95 %. For *A. esculenta*, 72 % of the recovered dry matter was obtained in the solid fraction. The process was optimized from the study on the effect of acid pretreatment on the dewatering of *S. latissima*, which showed that soaking in 1 % HCl for one hour prior to screw-pressing could further increase the dry matter content of the solid fraction to 32%. Pretreating of *U. lactuca* by a shredder also showed improvement to the screw press process.

## **Screw pressing of brown algae in pilot scale in The Faroe Islands:**

Pilot scale test was then focused on pre-treating the brown seaweed biomass *S. latissima* which is intended for ensilage in order to aid the fermentation process and ensure that the Lactic Acid Bacteria (LAB) outcompete other microorganisms that are present. The first step was milling or shredding the algae to increase the surface area and accelerate decomposition by allowing the LAB to access the free sugar. Dewatering the biomass pulp by screw-pressing was intended to increase the dry matter content of the silage, thus improving stability and decrease transport weight. This was processed for 4 tons of *S. latissima*.

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