

Pilot scale land-based cultivation of *Saccharina latissima* Linnaeus at southern European climate conditions: Growth and nutrient uptake at high temperatures - DTU Orbit (08/11/2017)

Pilot scale land-based cultivation of *Saccharina latissima* Linnaeus at southern European climate conditions: Growth and nutrient uptake at high temperatures

Saccharina latissima is a cold water seaweed species with commercial potential. The northern Portuguese coast is the southern distribution limit of the species, where some dispersed populations can be found. *S. latissima* has been identified as being a potential candidate for monoculture or as part of integrated multi-trophic aquaculture (IMTA) systems, presenting good results considering both growth and biofiltration performance. In the present work, the cultivation of *S. latissima* in a pilot land-based system was performed in order to assess the efficiency of two different methods: tumbling in the water column vs attached to fixed ropes at the bottom of the tank. *S. latissima* cultivated in tumble culture presented the best results, reaching growth rates of $10.6 \pm 0.9\%$ day⁻¹ and 0.9 ± 0.1 cm day⁻¹, with a weekly yield around 120 g DW m⁻². Cultivation using this method was continued over the summer, for assessment of *S. latissima* growth at warmer temperatures. Average weekly yield ranged between 44.7 and 146.3 (average 110) g DW m⁻² from April to mid-May; from mid-May to mid-July a high variability was observed, when some negative values indicating biomass loss were obtained and from mid-July onwards, average weekly yield ranged between 36.7 and 78.3 g DW m⁻². These results showed that tank cultivation of *S. latissima* in tumble culture was possible throughout the summer, withstanding average temperatures around 20 °C from May onwards, well above published optimum temperatures for this species. This fact may be explained by their origin in populations located near the southern distribution boundary, which may have acquired adaptations that increased tolerance to high temperatures. Cultivation of *S. latissima* using tumble culture in outdoor tanks at southern latitudes appears to be feasible even during high temperature periods. Densities around 8 kg m⁻³ were effective in keeping epiphytes development low. This system may be used for seaweed monoculture or as a biofilter component of IMTA systems.

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