Commercial cultivation and bioremediation potential of sugar kelp, Saccharina latissima, in Danish waters

Several seaweed species have been successfully tested for their biofilter potential for integrated multi-trophic aquaculture (IMTA). In this study, Saccharina latissima bioremediation potential was assessed over 12 months with respect to the yield, phosphorous (P), nitrogen (N) content and N removal. The experiment took place at two commercial cultivation areas; in close proximity to a blue mussel and fish farm (IMTA) and at a reference site, both situated outside Horsens fjord in Denmark. The maximum biomass yield over the first growing season was achieved in August (1.08±0.09 and 1.51±0.13 kg FW m-1) and September (0.92±0.18 and 1.49±0.16 kg FW m-1). Yield was significantly higher at the IMTA compared to the reference site in August (P<0.05). A second growing season did not improve biofiltration efficiency. The highest N and P removal was achieved in August and September. Again the IMTA location showed better N and P removal compared with the reference site in August; 5.02-7.02 g N and 0.86-1.23 g P m-1 of cultivation line (P<0.05). S. latissima shows potential for assimilation and removal of nutrients, particularly nitrogen. Seasonal variations of biofilter efficiency, conditions and potential applications should be taken into account when evaluating the best suited harvest time. For Horsens fjord, our results showed that the harvest time should take place in August-September in order to achieve maximum biofiltration efficiency (including N and P in epiphytes). However, for human consumption, it is better to harvest in May where the seaweed is free of epiphytes.

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