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Crithmum maritimum


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Chemical variation in halophyte biomass cultivated at different salinities.

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The circular approach of AQUACOMBINE combines aquaculture, farming and bioprocessing to utilize all fractions of the produced biomass and produce value added food, feed, bio-compounds and bioenergy.

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Knowing the effects of salinity on biomass composition allows optimisation of cultivation to increase production of the desired compounds.

An increase in cultivation salinity causes oxidative stress in plants and can affect the chemical composition of biomass. Therefore, the effect of cultivation salinity on the yield and composition of *Salicornia europaea*, *Tripolium pannonicum* and *Crithmum maritimum* was analysed in a characterisation study. *S. europaea* and *T. pannonicum* were cultivated in a hydroponic system under 0, 10, 20, 30, and 40 g/l NaCl salinities. *C. maritimum* could not survive under the highest salinity conditions; therefore, it was cultivated under 0, 5, 10, 15 and 20 g/l salinities. Biomass was harvested green, but not-food grade, and fractionated to green juice and fibre residue using a single-auger screw press. The composition of these fractions were analysed separately for the contents of carbohydrates, Klason lignin, protein, lipids, organic acids and minerals. By knowing the effect of salinity on the biomass composition, the cultivation could be optimised to enhance the production of desired compounds. The highest *S. europaea* yield was obtained in 20 g/l NaCl salinity, and these plants also had the highest lignocellulose content, 26.1 wt%, and the lowest crude protein content, 14.4 wt%. *C. maritimum* yielded the highest amount of biomass in 0 g/l NaCl, and for *T. pannonicum*, no significant change was observed in yield from batches grown in 0 g/l NaCl and 10 g/l NaCl. Salinity affected mainly the biomass yield instead of the composition of facultative halophyte species, and only a few significant changes were observed. *T. pannonicum* had the highest content of crude protein (29.9 wt%). Lipid content was low (< 4 wt%) in all species. *C. maritimum* exhibited the lowest salt accumulation. Overall, halophyte species can be seen as a potential feedstock for green biorefinery.

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