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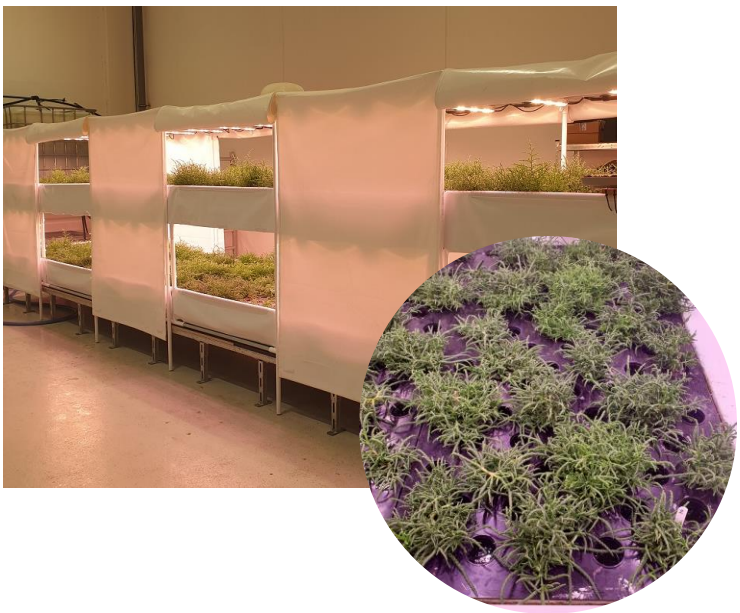

Use of a deep-water culture system (DWC) for year-round controlled production of *Salicornia*.

Hydroponics of *Salicornia* sp. in large scale

Authors

Ramon Perez, Alpha Aqua A/S, Denmark
Jiwan Kumar Chettri, Alpha Aqua A/S, Denmark

AQUACOMBINE

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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Hydroponics of *Salicornia* sp. in large scale

Use of a deep-water culture system (DWC) for year-round controlled production of *Salicornia*.

With controlled environmental conditions, the indoor hydroponic unit has the advantage of year-round plant production. Two batches of *Salicornia europaea* (7-8 months/cycle) were grown from seed to lignified biomass using an artificial nutrient solution of 5-1-4 (NPK) in an indoor hydroponic system at the Alpha Aqua demonstration unit in Denmark. The hydroponic unit consists of a two-storey vertical hydroponic deep-water system with a water holding capacity of 1.6 m^3 each, a mixer tank (for storage and on-demand supply of nutrient-enriched water), and the sump tank (for continuous water circulation to the hydroponic unit). For growing the individual plants' styrofoam rafts (60x120x4 cm) were made with two levels of plant density: 83 and 128 holes and special hard plastic covers (4 mm) were made with similar holes to support the styrofoam rafts.

The optimum water quality parameters: temperature (20-22°), salinity (10-15 ppt), pH (6.8-7.3), light (14 h), and oxygen (>6 mg/l) were maintained for maximum biomass gain.

In the first production cycle, a total of 152 kg of biomass (top of the plant without roots) was harvested (2.5 -3 kg of green biomass/m^2 and 6 kg of semi-lignified biomass/m^2).

The second cycle focused on harvesting strategy and planting density in the raft to obtain maximum biomass and provide optimum growing space for Salicornia. This would also allow the future farmer to optimize production and yields connected to sales prices targeting different markets and increase profitability. A harvesting approach includes- thinning, trimming, and total harvest.

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A total of 65 kg of Salicornia biomass was harvested from this production cycle. With this production strategy of thinning-trimming, the plants got wider space for growth and no mold infestation was observed in this cycle. The harvest at the lignified stage reduced the biomass weight due to the less water content. The harvested biomass ranged from 1.3 - 1.4 kg/m^2 of Salicornia in terms of greens, semi-lignified, and lignified. An average of 20-25 l of water consumption per day (i.e., 1-1.3 l/m2) was recorded in both cycles.

Overall, a good volume of Salicornia biomass was harvested (per m^2) using a hydroponic system and multiple harvesting (thinning, trimming) would allow a maximum harvest of green biomass which fetches a high price in the market.

Contact:

Ramon Perez
Alpha Aqua A/S, Denmark
rap@es.alpha-aqua.com

Jiwan Kumar Chettri
Alpha Aqua A/S, Denmark
jkc@dk.alpha-aqua.com

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