Effects of *Sargassum horneri* extract on the germination and early growth of the saltmarsh plants, *Suaeda malacosperma* and *Salicornia europaea*

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Introduction

- Saltmarshes are one of the great carbon sinks as well as productive ecosystems on Earth (Ewers Lewis et al., 2018; Billah et al., 2022).
- *Suaeda malacosperma* and *Salicornia europaea* have been selected as major species used in saltmarsh afforestation. However, the germination and early development of saltmarsh plants are still scarce.
- *Sargassum horneri* is a bloom forming species in the East China Sea and is accumulated large biomass in Korea.
- The blooms are a threat to the coastal ecosystems. For utilizing the biomass, *S. horneri* extract has been studied as a potential biostimulant (Han et al, 2022).

Objective

- The aim of this study is to investigate the effects of the *S. horneri* extract (SHE) on the germination of *Su. malacosperma* and *Sa. europaea* at optimal and high temperatures.

Materials and Methods

1) Preparation of *Sargassum horneri* extract (SHE)

- *Sargassum horneri* was collected at Gimnyeong, Jeju, Korea in April 2023.
- The seaweed were dried at room temperature and ground into powder.
- The powder was added to 500ml deionized water and boiled in a water bath for about 1 hour.
- The extract was centrifuged and the supernatant was filtered with filter paper of 11µm pore size.

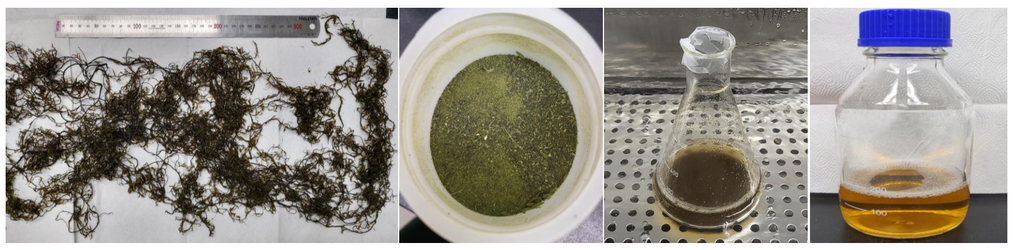

Fig 1. Preparing *Sargassum horneri* extract (SHE)

2) Experimental design

- The seeds were maintained at 4°C before the experiment began.
- In all trials, seeds were sown in petri dishes with paper filters moistened in water medium to avoid desiccation.
- The seeds were treated with either deionized water (control) or 0.5% SHE solution (diluted with deionized water).
- Temperature conditions 25°C (optimal temperature) and 30°C (heat stress temperature).
- Each trial was conducted using 3 replicates of 25 seeds (total of 75 seeds per trial).
- The germinated seeds were counted every 2 days for 18days.
- The seeds were moistened every 2 days.

Results

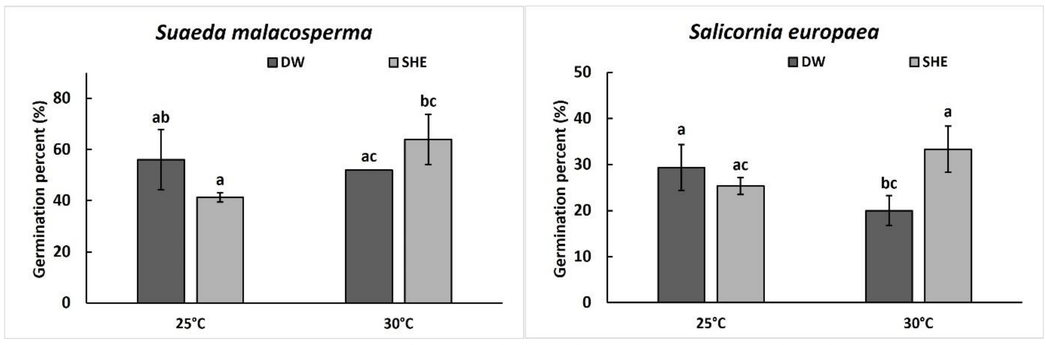

Fig 2. Germination percent of *Suaeda malacosperma and Salicornia europaea* seeds in and deionized or SHE water.

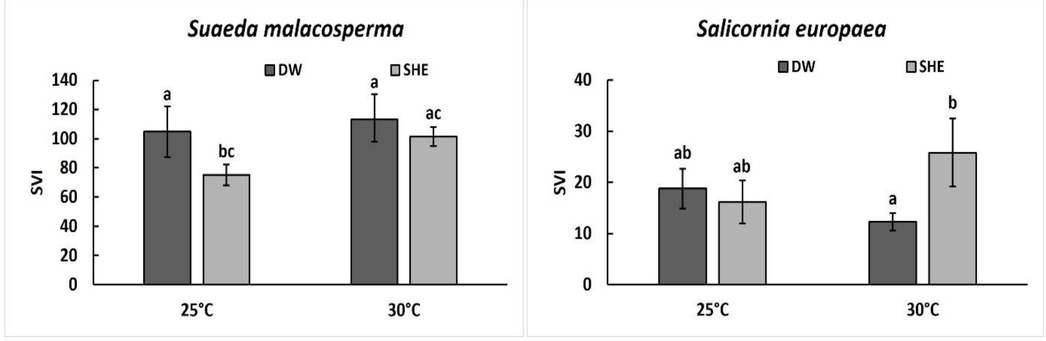

Fig 3. Seedling vigor index of of *Suaeda malacosperma and Salicornia europaea* seeds in and deionized or SHE water.

- ❖ DW: treatment with deionized water
- ❖ SHE: treatment with 0.5% SHE solution

- For germination percent (GP) of *Su. malacosperma*, under both temperature conditions, no significant differences were observed between control and SHE group (Fig 2).
- For GP of *Sa. europaea*, although SHE effect was not observed under optimal temperature, the GP of the SHE treated group was higher than that of non treated group at higher temperature (Fig 2).
- Seedling vigor index (SVI) in *Su. malacosperma* at 25℃ was decreased when treated with SHE (Fig 3).
- For *Sa. europaea*, at 30℃, a significant increase was observed when treated with SHE (Fig 3).

Conclusion

- A significant beneficial effect of SHE was observed on GP and SVI in *Sa. europaea*.
- SHE may enhance thermal tolerance of *Sa. europea*.
- The impact of SHE could vary depending on the species.

References

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