Extents of Marine Salinization Increasing Thermal Tolerance in Seagrass

Kulamavalavan, Karun (School: New Rochelle High School)

To address the depletion of seagrass, this study aimed to understand seagrass conservation approaches by investigating the impact of varying salinity levels and temperature fluctuations on thermal tolerance, and the effects of activated carbon (AC) on growth rates. Syringodium Filiforme samples were cultivated in different salinities and substrates, and parameters were measured, including cell wall density, carbohydrate content, and stem growth. Simulated bleaching events provided comparable data for analysis through various statistical tests in R version 4.3.1. The statistically significant results revealed that higher saline-induced seagrass samples exhibited greater thermal resilience following simulated bleaching. '50 ppt' and '50 ppt AC' groups exhibited significant positive effects ($p<0.05$) on cell wall density and carbohydrate content. Statistical correlations between activated carbon and overall growth underscored the importance of these factors in seagrass health. In the '20 ppt' groups, the comparison between AC and non-AC showed significant difference ($t = 5.3972$, p-value = 0.0003127), with 95% confidence interval (1.681676 to 4.051657) and '50 ppt', the t-test indicated a significant difference between groups with and without AC ($t = 3.1195$, p-value = 0.01094), with 95% confidence interval (0.4241072 to 2.5492261). This study's findings advocate for strategically assisted evolutionary interventions to mitigate seagrass loss, emphasizing the significance of establishing seagrass rejuvenation efforts through the use of increased salinity. As seagrasses continue to disappear, this research provides a foundation for future studies and conservation efforts to ensure the vitality and longevity of these essential marine ecosystems.