Observing the Optimal Salinity Level for Algae Survival

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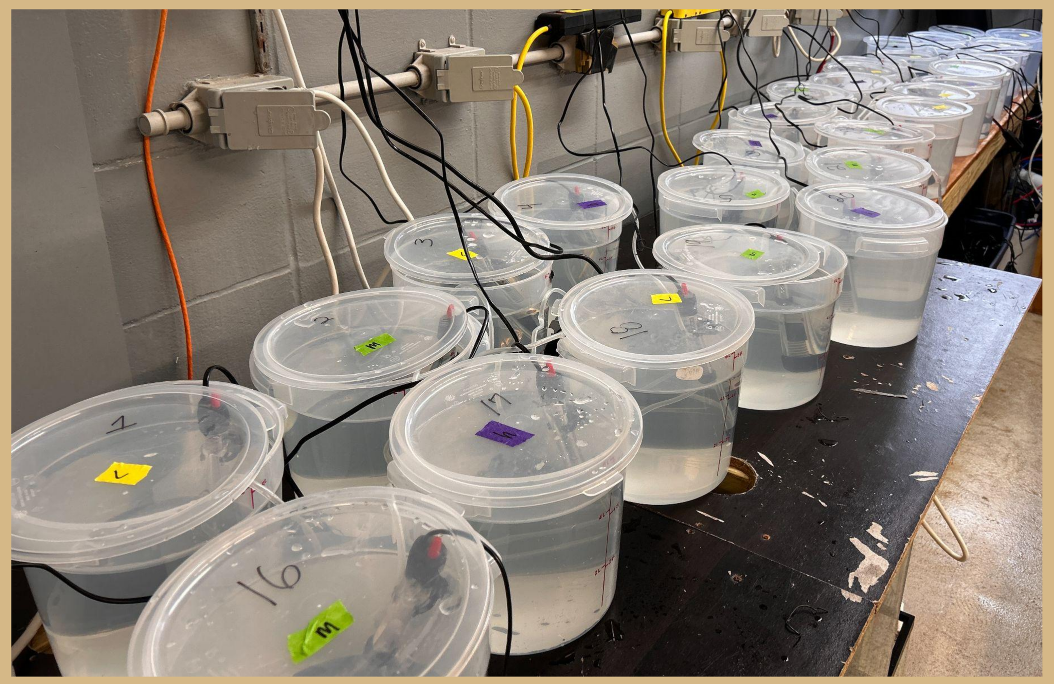
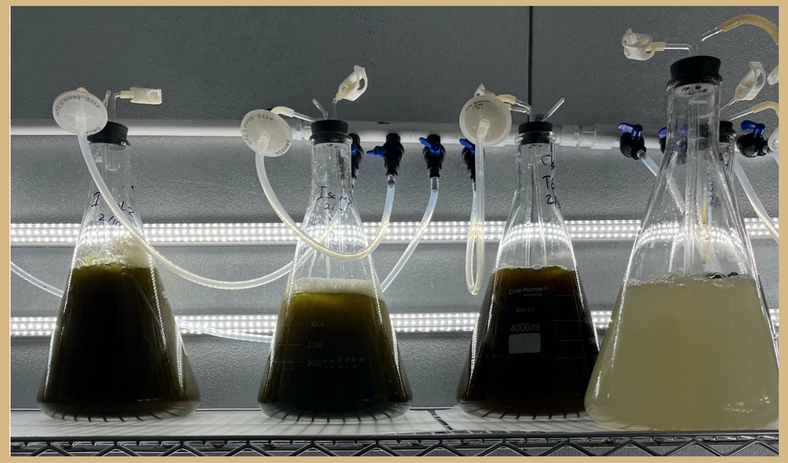
Background & Purpose

Oysters are filter feeders, which means they derive their nutrients from phytoplankton or algae by filtering through ocean water. Algae have varying survival rates dependent upon abiotic factors in the environment, such as water temperature and salinity. In this study, we will observe the optimal salinity level for algae: the salinity level at which the highest number of algae survive.

Methods

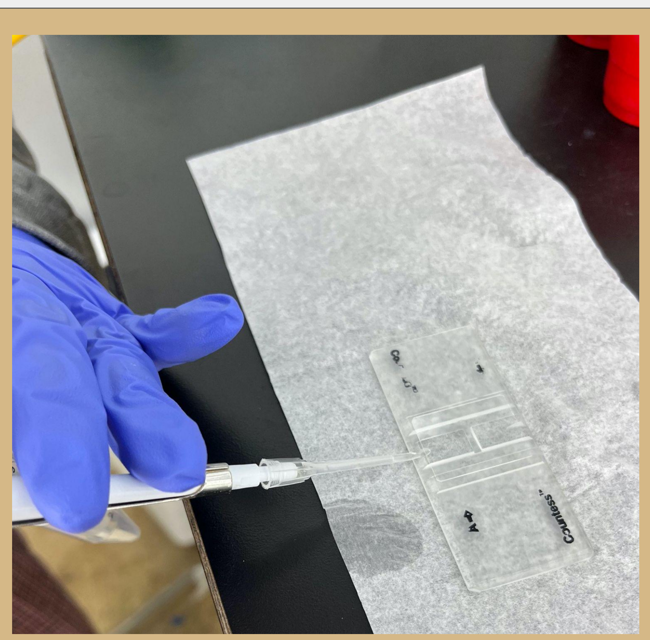
Thirty tanks were set up in a controlled environment within the FSU Marine Lab, each containing 2 liters of water at three different salinity levels: low (13-16 ppt), medium (23-26 ppt), and high (33-35 ppt). Ten tanks were randomly assigned to each salinity level. Water of various salinity levels was created by mixing freshwater with aquarium salt, then slowly diluting with additional water as tanks of lower salinity levels were filled. Each was set to a constant temperature of 26 degrees celsius, and a bubbler was added to aerate the water. Once the tanks had been running for a day, the algae was added from the sterile algae room in the FSU Marine Lab.





Measuring Algae Concentration

The initial dilution factor of the algae was 1:1, which let us know to add 1.2 mL of algae to each tank. The algae were given a few minutes to acclimate to their tanks before the initial reading was taken. 1 ml of the algae-water mixture was taken directly from each tank and placed into vials. To count the concentration of algae in each sample, 10 microliters of liquid were placed into each side of a microscope slide from that sample. The slides were then counted once on each side using an automatic cell counter to determine the total algae concentration.



Between each sample, the microscope slide was appropriately cleaned with ethanol and distilled water to ensure there were no residual cells from previous samples remaining on the slide. This was repeated with each of the 30 samples for every measurement. All samples were measured at 4 hours, 8 hours, and 24 hours. Water quality (salinity level and temperature) was recorded each time a new sample was taken.

Results

There is sufficient evidence from this experiment to prove that algae survivability is not related to salinity level. Algae decayed at a steady rate across the experiment time regardless of the conditions they were subjected to. The death of algae over time may be due to another factor, such as temperature.

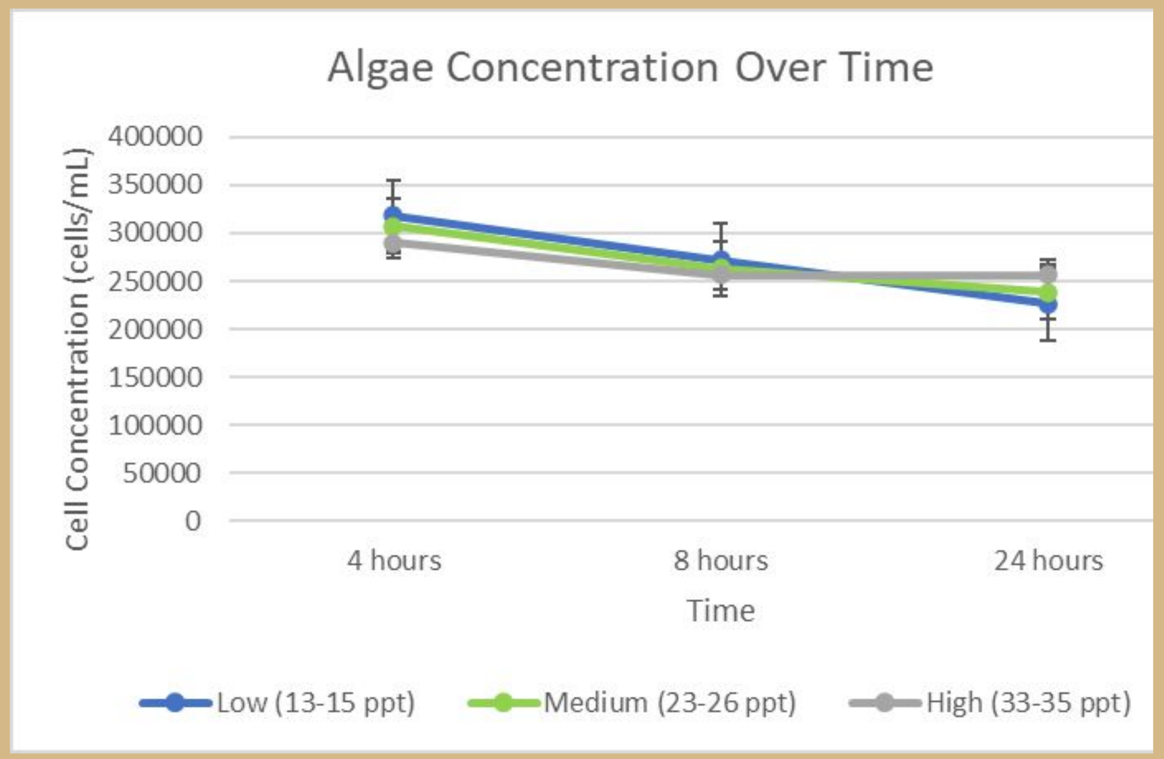


Figure 1. Concentration of algae over the course of the experiment at each salinity treatment.

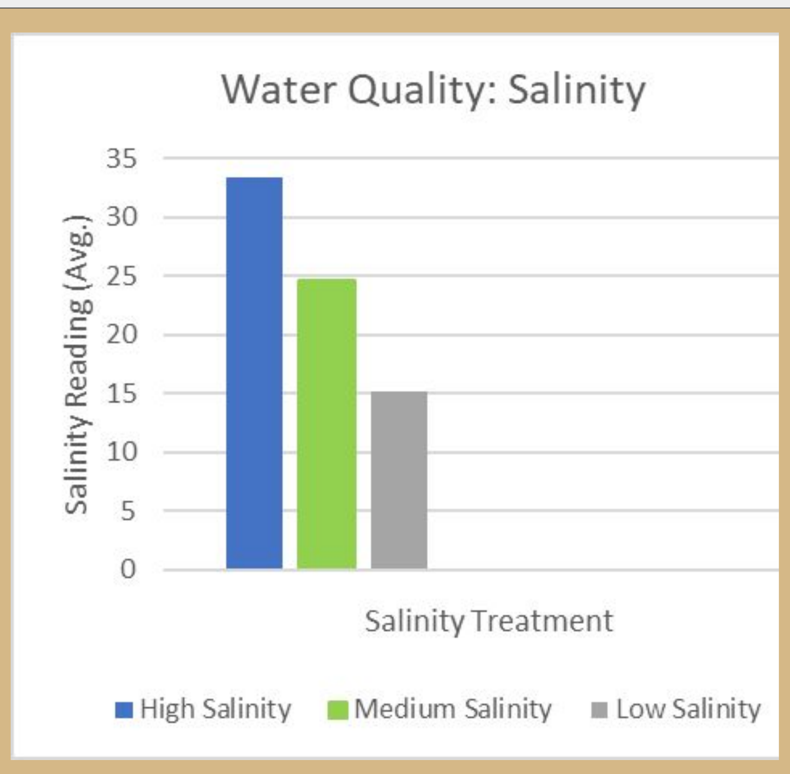


Figure 2. Average recorded salinity at each different salinity treatment over the course of the experiment.

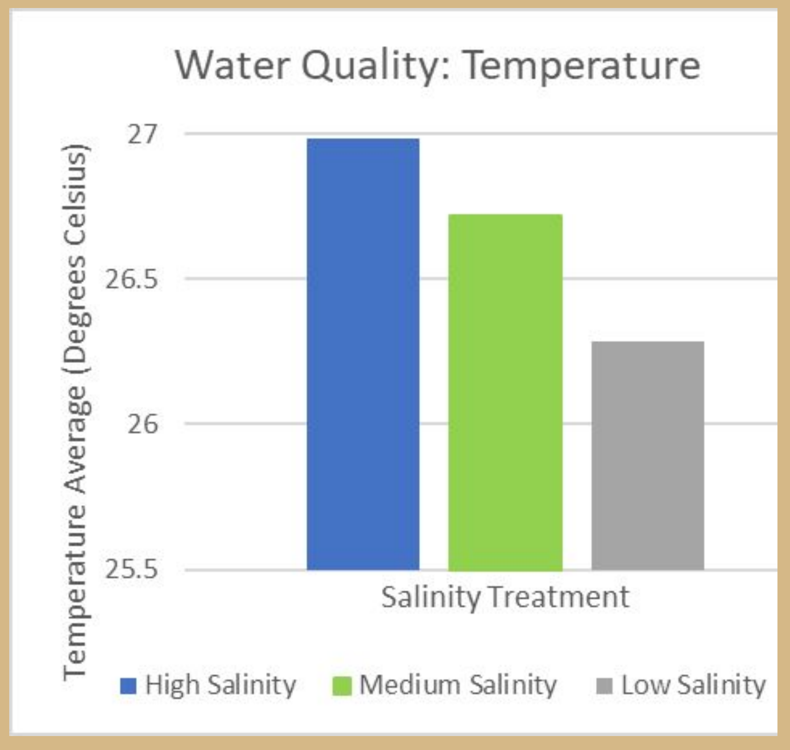


Figure 3. Average temperature recorded at each salinity treatment

Future Considerations

In future experiments, this knowledge that there is no difference in algal density at low, medium, and high salinity will help reduce salinity as a confounding variable when experimenting with oysters. There is a lack of studies concerned with the optimal salinity level of algae within the pre existing body of literature, so these results will be helpful for a variety of experiments involving algae.

References

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