Effects of Ocean Acidification on Primary Consumers in a Marine Ecosystem

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Oceans make up seventy percent of our world, containing the most diverse ecosystems. The ocean also serves as a gigantic carbon ‘sponge’, absorbing humanities excess carbon dioxide. At the current rate of global CO2 production, within the next fifty years, our oceans might become too acidic for those ecosystems to thrive. This project aims to study the effects of ocean acidification on Artemia salina. Using a custom made apparatus, nine 500ml salt water tanks were split into three different pH groups: 7.1, 7.6, and 8.1. The ph was maintained in each tank using a custom apparatus of combining CO2 gas with air. This mixture was then selectively delivered to each tank via a three-way valve. Artemia cysts were then introduced into each tank and allowed to grow over a two week period. At the end of that period, the dry mass of 50 combined organisms from each tank was collected. This process was then repeated with new cysts allowing these organisms to grow for a 4 week period to better understand the effect of ocean acidification throughout an organism's life span. A one-sample ANOVA was conducted to compare each of the weights from the Artemia populations. At 2 weeks of development, the control pH of 8.1 had a mean weight of 10.033+/- 513 mg, at a pH of 7.6 the mean weight of Artemia was 7.133+/- 293 mg, and at the pH of 7.1 the mean weight was 4.567 +/-216 mg. When looked at the organisms that grew for 4 weeks; which is close to full maturity for Artemia salina. The pH of 8.1 had a mean weight of 45.154+/-1.559 mg, at a pH of 7.6 the mean weight was 13.1241+/-820 mg, and the pH of 7.1 had a mean weight of 4.554+/-1.263mg. A definite inhibition of growth is evident in each population as the pH decreases. Without intervention, our oceans could be in grave danger.

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