The Dissolution of Calcium Carbonate Shells

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Abstract:

Hypothesis: *As the acidity of seawater increases, the more likely it is for calcium carbonate shells to decrease in mass.*

Objective: *Assess how the the pH of seawater can affect calcium carbonate shells*

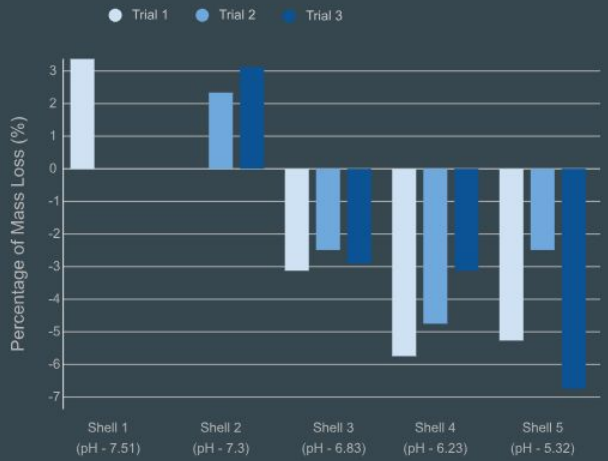
Method:

Materials: *graduated cylinder, pH probe, scale, ocean water, Coquina clam shells, hydrometer., lemon juice, cups*

Experiment: *Begin by measuring salinity of ocean water with hydrometer and recording it. Then, measure out 50 mL with graduated cylinder in each of 5 cups,. Cup 1 will be the control, with no drops of lemon juice. Add varying drops of juice to other cups (1 to cup 2, 2 to cup 3, 3 to cup 4, 4 to cup 5). After the solution has been mixed around. Use the pH probe to measure acidity of each cup and record. Once the cups are set up, record the mass of the shells in grams and leave in solution for a week. Once dried for 24 hours., record mass in grams and calculate percent of mass change.*

Repeat two more times.

$$\frac{(im - fm)}{im} \times 100$$



Results: *The graph shows a comparison between the percentage of mass loss of each shell between the three different trials. The first two shells had a mass change of 0% or above. However, Trial 2 had a jump from 0% mass change in Shell 1 to a +2.38% in Shell 2, despite the latter having been in a more acidic solution.*

The final shells showed a greater change in mass percentage, with the highest being -6.67%.

Conclusion: *Based on the collected data, the increase in acidity causes the calcium carbonate build up of shells and skeletons to dissolve and lose mass.*

Limitations:

- *Instead of using carbon dioxide to lower pH is it does with ocean acidification, lemon juice was used. This makes it difficult to compare simulated acidification with the real process.*

Discussion: *Now knowing that ocean water with a lower pH can dissolve the build up of calcium carbonate shells and skeletons, we can take the measures needed to prevent this destruction as much as possible. Coral reefs are a major victim of ocean acidification due to them being a habitat for thousands of marine species. This degradation can lower biodiversity and affect the food chain and fish population. So what can be done to slow the effects? Decreasing carbon emissions in the atmosphere to prevent the ocean from absorbing excess carbon.*