



Seashells: Antacids of the Ocean

Introduction

Have you ever wondered what coral or seashells are made of? Coral and some seashells contain a mineral called calcium carbonate, which makes up chewable antacid tablets like Tums[®]. Because of the nature of calcium carbonate, coral and some seashells can be affected by increased carbon dioxide in the air. Follow these instructions to see how calcium carbonate is affected by carbon dioxide.

CAUTION! HEALTH & SAFETY

Be Safe! Safety goggles are required. Do not eat or drink any of the materials used in this activity.

Materials

- 2 small clear plastic cups
- 1 permanent marker
- 2 chewable calcium carbonate antacid tablets, fruit flavor and color
- seltzer water
- tap water

Procedure

1. Using the permanent marker, label one cup **Tap Water** and the other cup **Seltzer Water**.
2. Place one chewable calcium carbonate tablet in each cup.
3. Half-fill each labeled cup with either tap water or seltzer water. Do not stir.
4. Observe what happens. Is there any difference in how fast the tablets dissolve? What do you think happens to shells as ocean water becomes more acidic?

Where's the Chemistry?

Regular tap water is neutral or slightly basic (with a pH value of 7). However, when carbon dioxide is added to water to create the bubbles in seltzer water, carbonic acid is formed, which lowers the pH value of the water making it acidic (with a pH value of 4).

The antacid tablets contain calcium carbonate, which is a base (with a pH value of 11). As bases react with acid, the acidic seltzer water dissolves the calcium carbonate tablet faster than the tap water.

Similarly, if there is more carbon dioxide in the air, the ocean will absorb the carbon dioxide, and carbonic acid will form, thus making the ocean water more acidic. Chemists call this process "acidification."

This simple experiment demonstrates that dissolving more carbon dioxide in water could destroy seashells or coral, as they are made of calcium carbonate. Based on this principle, farmers sometimes use ground up seashells to make their soil less acidic. They work as antacids on land, too!

