Correcting Ocean Acidification with Potassium Carbonate

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Ocean Acidification (OA) is caused by the increase of carbon dioxide (CO2) in the atmosphere due to industrialization. CO2 dissolves in the oceans to form carbonic acid. Carbonic acid dissociates in water to form H+ ions (an acid) and bicarbonate, HCO3-(a base). Seawater contains another base, carbonate ion (CO3-2) that acts like an antacid to neutralize the H+, forming more bicarbonate. As the carbonate is depleted by the acidification, the seawater begins to lose two calcium carbonate minerals vital for shell building, aragonite and calcite. This acid is lowering the oceans' pH. The ocean's pH should be about 8.2. By 2100, the pH will be 7.7 if this trend continues. This experiment was conducted to determine if this acidification could be corrected using chemicals that are environmentally friendly. This experiment utilized "pH-Up" solution to increase the pH from 7.7 to 8.2. This solution is 10%-30% Potassium Carbonate. Three sample groups were used: Regular ocean water (C), acidified (with white vinegar to pH 7.7) water (A), and water that had been acidified and then corrected with pH-up (CO). Each sample had equal weights of shells and the original calcium hardness recorded. After sealing the samples for one month, data indicated that the CO samples exhibited less mass loss than the A samples and less calcium hardness increase than both A and C samples. Finally, this experiment was successful in demonstrating that OA can be corrected. However, in a continuation of the research, stronger chemicals, and more precise measurement should be used.

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