CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY

Name(s)
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Project Number
J1013

Project Title
Using Oyster Shells to Neutralize Acidity in Water Collection and Treatment Systems

Abstract

Objectives/Goals
I wanted to create a filter that would use shells to reduce acidity in water by a factor of ten (increase by 1.0 on the pH scale) within 5 hours, leave no sediments in the water, have less than $10 in materials, and be simple in its design.

Methods/Materials
I did preliminary tests to prove my concept of neutralization with shells. After these tests, I made preliminary prototypes to get my first ideas tested. With these results, I determined the primary design elements, created final prototypes to finalize my ideas, and developed an overall neutralizing design. I added vinegar to water to create my acidic water, and oyster shells were used as the neutralizing substance. A bucket, several plastic bottles, and plastic tubing were used as the materials for the final prototypes.

Results
I was able to create an overall design that can neutralize acidic water by a factor of 1 on the pH scale in 2 hours. Testing indicated that about 200 grams of shells are required per 1 liter of acidic water (pH = 4.5) to raise the pH level to 5.5 in 2 hours. It leaves no residues in the water output, the materials cost less than $6, and it is extremely simple in design.

Conclusions/Discussion
My results showed I could create a very low-cost filter that can significantly reduce acidity in water. The design is simple and effective, and with a few guidelines can be adjusted for the materials and water filtration needs of a specific area.

Summary Statement
I designed a simple, low-cost filter that can be added to existing water treatment systems to neutralize acidic water with shells.

Help Received
My mother purchased materials, and my father helped me with cutting and drilling of materials for building the prototypes.