CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
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Project Number
J0919

Project Title
Can Fabrics Be Used for Water Filters?

Abstract

Objectives/Goals
The objective of my environmental engineering project is to determine which fabrics will do the best job of filtering the turbidity out of the water. My hypothesis is: If the cloth has a tight weave the water will come out clean, but slightly slower.

Methods/Materials
I prepared a control mixture of 2L of pure tap water and 0.1Kg of sandy loam soil in a 3L bottle. I shook the bottle, and then poured a sample into a 250mL beaker. I shook the beaker and extracted 26mL with a 2.5mL eyedropper and evenly divided it in 2 clean 13ml test tubes. Then, I took a 6#x 6# piece of fabric and placed it on top of a screen support lid and place the lid on top of another 250mL beaker. I gently push the fabric down into place with a deadbolt lock casing and secured the fabric with a rubber band. Then, I shook the 2 test tubes and poured them through the fabric, timing the gravity flow rate, measuring net mL, writing and photographing every observation. Then repeated the procedure on seven randomly selected fabrics. After testing the seven fabrics, I made a super filter using the three best filtering fabrics. The procedure was repeated.

Results
I found that I could clean water using combinations of fabrics or using one fabric alone such as silk. The silk fabric did the best job of filtering the water. It had the lowest visual turbidity at one percent. The silk had a tight weave, and I observed that it had an average of a ten minute gravity flow rate through the fabric and the net flow was twenty-two mL. I believe that the silk alone did better than my final super filter. Although the silk worked better, it was costly at $15.99 per yard.

Conclusions/Discussion
My hypothesis was partially proven; the tighter weave did improve the fabric#s ability to filter out turbidity, but it did not slow the flow rate in every instance. My environmental engineering project proved that certain cloths could filter turbid water better than others. I truly believe my project will lead to future studies of water filtration to end world water pollution. As demand for consuming water supplies increase, our planet will need other alternatives, possibly cheaper and faster. In Bangladesh, they are using sari cloth to filter out cholera bacteria that attaches to algae. My project#s continuing research could one day save lives.

Summary Statement
My project researched which fabrics or combination of fabrics filter out water turbidity most efficiently.

Help Received
Mom took me to the craft store and library. Dad set up Paul Lambert's interview. Dr. Rita Colwell lab e-mailed a copy of the Bangladesh research on sari filtering.