CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
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Project Number
J0905

Project Title
Conserve Water, Nourish Plants: Can Gray Water Grow Great Gardens?

Abstract

Objectives/Goals
For my project, I experimented with gray water, which is household wastewater from showers, sinks, and laundry. My primary testable question was "Can you sustain a garden using gray water in an environmentally safe manner?" If we can use gray water to water plants then we can reduce our consumption of fresh water.

Methods/Materials
I watered four types of plants for eight weeks using two experimental types of water (gray water, and gray water filtered by activated carbon), and two control types of water (reverse osmosis water, and reverse osmosis water filtered by activated carbon). I also sent these four water samples to a water quality lab to test for bacteria and nitrates to see how dangerous the gray water really is and if filtering removed any of the harmful components. I measured the plant growth to determine the health of these plants.

Results
I found that plants grew best with unfiltered reverse osmosis water, which was my control. Compared to the control, the plants watered with gray unfiltered water grew 80.7% as well; with filtered gray water grew 95.74% as well; with filtered reverse osmosis water grew 96.52% as well. The plants grown with gray filtered water had more leaves, on average, than all other types of water. The lab report showed that gray filtered water had >2419.2 coliforms and 122.3 E.coli; the gray water had 686.7 coliforms and <1 E.coli; the filtered reverse osmosis water had 5.2 coliforms and <1 E.coli; the reverse osmosis water had <1 coliforms and <1 E.coli. None of the gray water had any nitrates, while the reverse osmosis water had 3 ppm. The gray water was slightly alkaline.

Conclusions/Discussion
My hypothesis is correct because the plants watered with gray water grew on average 80.7% as well as control water. Therefore, by using no additional fresh water, I successfully grew a variety of common garden plants. However, the results depended on the type of plants, probably because some plants like acidic water and gray water is slightly alkaline. Filtering made gray water grow larger plants. From the lab results, I learned that gray water contains harmful bacteria and that my filter was contaminated. Even though it saves water, you must handle gray water with caution and not allow it to return to the environment. State laws regulate the use of gray water and before starting on a gray water reuse project, you must first comply with the state regulations.

Summary Statement
I tested if plants can grow successfully when watered with gray water, and whether or not filtering the gray water with a simple activated carbon filter had any effect on plant growth and bacteria count

Help Received
Monterey County Health Department (Mr. Guibert and Mr. LeWarne) gave me interviews and helped with laboratory tests.