CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)

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Project Number

35209

Project Title

More Water, Please?

Abstract

Objectives/Goals

My experiment tests if solar water disinfection (SODIS) can be improved by changing roof-types, bottle condition, or adding salt.

Methods/Materials

I collected water from Averill Park, filtered the solids, and poured it into 7 properly-labeled PET bottles using roof-types, bottle condition, and adding salt as variables. I performed both chemical and coliform tests on each. I used Waterworks test strips to check hardness, chlorine, alkalinity, pH, nitrate, nitrite, and chromium. To check for E. coli, I used MicrologyLabs Easygel by dropping 3 ml samples from each bottle into the appropriate medium and subsequently pouring each into labeled petri-dishes. I later analyzed the petri-dishes after being left in a home-made incubator for twenty-four hours. I exposed six bottles to direct sunlight and put one in a dark closet. I had 2 controls, one for temperature and one in the closet. I checked the temperature of the control on the roof hourly. After 6 hours of sunlight exposure, I performed both tests again. I did the experiment twice.

Results

SODIS worked both times. The first was on a very hot day; all petri-dishes were completely disinfected except for the control in the dark closet. The second time was on a foggy day; the scratched bottle still had few E coli left. The chemicals upon collection were within the allowed levels except for hardness and chromium. Hardness only affects taste but chromium may be harmful. After SODIS, the chemical levels remained the same.

Conclusions/Discussion

SODIS removed the bacteria regardless of roof-types, bottle condition, or adding salt. But it left chemicals behind that could make the water taste bad or worse, harmful. Next time, I will test if SODIS combined with ion-exchange treatment will work better.

Summary Statement

SODIS is proven to be an effective method of making water accessible to people without it -- but can it be improved, potentially saving more lives?

Help Received

Work at school lab supervised by Ms. Lindsay Martin and Dr. Hanan Sedik, a medical doctor; Parents funded the experiment; and Father drove me everywhere I needed to go