CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)

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Project Number

J1410

Project Title

Got Pure H(2)0? Surveying the Microbiological Quality of Residential Water and Environmental Water Bodies

Abstract

Objectives/Goals

Is tap water free of biological contaminants and safe for drinking? The quality of drinking water varies from place to place, depending on the primary source of water and treatment it receives. As a curious consumer and an aspiring young scientist, I analyzed drinking water as well as environmental water bodies which simulate primary water sources for the presence of biological contamination.

Methods/Materials

Materials

Residential and environmental water samples,Colorimetric culture media(Readycult Coliforms),Kovacs indole reagent,MacConkey agar plates,Glass sample vials with caps,Transfer pipettes,UV long wave light source,Bacterial Incubator,Positive control:Laboratory strain E. coli

Procedure

.Collect 10 mL water samples from a variety of sources.

.Immerse a 10 microliter inoculating loop into the water sample and spread it on the MacConkey plate by streaking. Check for bacterial growth on the plate after 24 hour incubation at 37°C.

.To each sample add Readycult colorimetric culture media and incubate as above

.A color change to green-blue color indicates presence of coliforms.

.Blue florescence under UV light indicates presence of E. coli.

.Add a few drops of the Kovacs reagent to the top of the sample and look for a red ring to confirm E. coli presence.

Results

Tap water did not undergo the blue-green color change in the Readycult Coliforms media nor did it fluoresce under UV light. These samples also did not produce a red ring in the indole test. Thus, tap water was free of bacterial contamination. In contrast, run off-water as well as water from community lakes produced a blue-green color in Readycult media, fluoresced under UV light, and produced a red ring in the indole test, suggesting E. coli presence. Water samples from the ocean remained yellowish in the colorimetric media but did not fluoresce under UV light.

Conclusions/Discussion

Drinking (tap) water in my home is free from bacterial contamination. Water samples from lakes and bays were consistently unsanitary and usually contaminated with fecal matter. Ocean water was cleaner in that it did not have any fecal coliforms.

Summary Statement

A rigorous test to survey the microbiological quality of residential water and environmental water sources.

Help Received

Mr. Mark Hobbs, science teacher, provided support and supervision. Parents helped with acquiring materials, reviewing documents and ongoing discussions about the project.