Name(s)	Project Number
Sarah C. Bruno	**J1204**

Project Title

How Water Quality Changes along an Open Water System

Abstract

Objectives/Goals

The experiment determined how water quality changes along an open water system that supplies drinking water (prior to treatment). Samples were obtained at different locations along the water system and were evaluated for changes in bacteriological content, pH and hardness.

Methods/Materials

Alkalinity - Determine amount of Sulfuric Acid necessary to add to water sample to reach a pH of 4.5. Calculate total alkalinity using formula.

Hardness - Prepare water sample and determine the amount of titration with EDTA needed to satisfy test. Use formula to determine hardness.

Bacteriological- 1. Inoculate the Lauryl Tryptose Broth media with water using 5 tubes with 10 mLs and 5 tubes with 1 mL; 2. Incubate test and culture tubes for 24 hours; 3. Check to see if gas has formed in the culture tubes. If gas has formed, move to Step 4. If not, record data and dispose of the test tubes; 4. Use a sterilized inoculation loop to transfer the culture into three different media (BGB - total, EC - fecal, and EC MUG - E. coli); 5. Move the EC and EC MUG to the fecal bath, and move the BGB tubes to the incubator; 6. Check the tubes in 24 hours. If the EC and EC MUG test tubes don't prove positive for bacteria in the coliform family, record the data and dispose of the test tubes. If the BGB tubes don't prove positive, incubate for another 24 hours; 7. If gas is observed in the culture tubes, repeat Steps 4-6; 8. If gas is still observed, repeat Steps 4-6. This is the last day, so if the test tubes don't prove positive, record your data and dispose of the test tubes; 9. Use the Most Probable Number chart to find the number of bacteria colonies in the water samples.

Results

I discovered from my data that it is hard to find an easy answer to which location has the best water quality. The results for water hardness were the most clear as it doubled as the water traveled downstream. As for the bacteriological content, the total coliform bacteria reached more than 15 times Lyon's total bacterial value at Old Oak Ranch, before reducing to about 3 times at San Diego Reservoir. However, the majority of fecal and E. coli bacteria was found at the 5.5 mile mark. The alkalinity stayed consistent in all four tests.

Conclusions/Discussion

Water quality along an open water system varied with distance, except hardness and alkalinity. Further testing could reveal if UV exposure or other factors influenced the bacterial content.

Summary Statement

After testing water at different locations along an open water system, the data show that quality does not worsen with distance, but varies.

Help Received

Tests performed at Aqua Lab under supervision. I also received assistance from my parents to reach sampling locations and proofreading.