CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY

Name(s)
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Project Number
J1102

Project Title
Comparison of Quality of Water in Fresno and Clovis

Abstract

Objectives/Goals
My objective was to test the quality of drinking water in Fresno and Clovis. Water is essential to the human body. all living organisms need it to survive. Furthermore the quality of the water people drink is a critical factor for kids to live a healthy life. In order to perceive the quality of water in Fresno and Clovis, I investigated the acidity, conductivity(total amount of ions), and hardness of the water.

Methods/Materials
To measure quality of water, I obtained samples from the San Joaquin River, Fresno and Clovis wells, and 10 schools in the Clovis Unified School District
In order to measure pH, pH paper was used for a qualitative analysis, and a pH meter was used for a quantitative analysis.
To measure conductivity, I used an instrument called a potentiostat and ran cyclic voltammetry.
For water hardness measurements, I titrated water samples with 0.01 M EDTA in pH 10 buffer and in the presence of Eriochrome Black T as an indicator.

Results
pH of water from 10 schools ranged from 7.44 to 8.89.
Conductivity of water from 10 schools ranged from 1.08E-7 to 3.70E-0.7 S.
The total amount of calcium and magnesium(water hardness) ranged from 0 ppm to 12.2 ppm.

Conclusions/Discussion
From the results obtained, it was concluded that:
1) pH was slightly basic, which is better for the body. If water is acidic, it can cause premature aging and diseases. Also, if water is too acidic, it can cause corrosion in water pipes causing them to rust. If this happens, people may be drinking rust water. Also, fixing/buying new water pipes may be very expensive.
2) Conductivity confirmed the presence of ions, likely mineral ions, in the water. The presence of minerals in the water is important to maintain good health. very human must have a small intake of minerals every day. Most minerals exist in the form of ions in water.
3) Titration showed that the water was very soft. According to the EPA standards, soft water contains less than 60 ppm of calcium and magnesium - but our samples contained at most 12.2 ppm. This is better for the body because too much consumption of water with calcium and magnesium can lead to stone diseases. Also, if water is too hard, soap cannot be dissolved as well, leading to lack of hygiene.

Summary Statement
The quality of drinking water in Fresno and Clovis was tested in terms of pH, conductivity, and water hardness.

Help Received
Used lab equipment at California State Univeristy, Fresno under the supervision of Dr. Choi.