CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
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Project Number
J0705

Project Title
Plug into Water: Generating Electricity through Electrokinetics

Abstract

Objectives/Goals
The hypothesis of this project was if different types of salts were added to water, then there will be an increase in the efficiency of generating electricity using the Kelvin Water Dropper.

Methods/Materials
500g of magnesium sulfate was added to 12.0L distilled water to make the magnesium solution. Also, 500g of sodium chloride was also added to 12.0L distilled water to make up the sodium solution. When the tests were run, the water tank had to have the same amount of pressure for each trial in order to get efficient results. Three trials were run for each solution with the following results:

Results
Average Number of Discharges in the allotted time
Distilled Water: 68.33 Discharges
Tap Water: 65.33 Discharges
Sodium Chloride: 62.33 Discharges
Magnesium Sulfate: 63.00 Discharges

From these results, sodium chloride or NaCl was the least efficient in generating electricity. Magnesium sulfate or MgSO(4) was next then came tap water. Distilled water was the most efficient in producing electricity the fastest.

Conclusions/Discussion
The hypothesis was not proven by this experiment. The distilled water is pure and has naturally occurring positive hydrogen ions (H^+) and negative hydroxide ions (OH^-) which allowed the Kelvin Water Dropper to function properly. When dissolved in water, salts spilt and create positive and negative ions, Na^+ and Cl^- for sodium chloride and Mg^(2+) and SO(4)^(2-) for magnesium sulfate. However, rather than increase the number of ions in the water, they may have mixed in with other elements such as the copper in the wire or the metal in the can to form new compounds reducing the number of free ions in the water.

Summary Statement
In this project, an attempt was made to increase the efficiency of the Kelvin Water Dropper by mixing salt solutions to increase the number of free ions available to generate electricity faster.

Help Received
My father taught me how to use the power tools to build the Water Dropper, check over my report, and encourage me when things weren't going well.