



# CALIFORNIA STATE SCIENCE FAIR 2011 PROJECT SUMMARY

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<b>Project Title</b> <b>The Current Cholera Crisis: A Possible Solution</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of our project is to find cost-effective methods to sterilize or pasteurize water and make it potable. Specifically these methods must be easy to use in countries such as Haiti where potable water is not easily available.</p> <p><b>Methods/Materials</b> We obtained water from a fish tank and treated it using four methods: SODIS, Bleach, Polar Pure Iodine Crystals(PP) and Lemon Juice. SODIS (Solar Water Disinfection) is the process of placing a one liter PET bottle full of contaminated water in the sun for 6 hours. The Bleach method consists of adding three drops of bleach to a liter of water. The PP method uses an Iodine crystal and water solution which is added to each liter of water. Finally the Lemon Juice Method consists of adding 30 milliliters of lemon juice to one liter of water. First one milliliter of untreated water was used to inoculate each Petrifilm. Then we used one milliliter of treated water to inoculate the Petrifilm. Both sets were observed for bacterial growth. Each experimental method was repeated three times and the results discussed below are the average.</p> <p><b>Results</b> The results of our experiments showed that the Polar Pure Iodine Crystals eradicated all bacterial colonies found in contaminated water. The Bleach method killed all except 17 colonies of bacteria, the Lemon Juice Method eliminated all except 243 colonies, and the SODIS method killed all except 303 colonies. For comparison, the untreated water had 914 colonies.</p> <p><b>Conclusions/Discussion</b> Availability of clean potable water could prevent 3.6 million deaths from water-borne diseases yearly. Based on our results the PP method was both the most cost-effective and successful in eliminating all the bacteria. The Bleach method was next best. Lemon Juice was the third-most effective. Finally SODIS was least affective in our studies, but has been proven to destroy up to 99% of bacteria when tested in warmer climates such as sub Saharan Africa. We intend to repeat it under warmer conditions and expect it to be an effective method in killing bacteria as well as being cost-effective. In conclusion, both the chemical methods tested (Polar Pure Iodine Crystals and Bleach) were the most cost effective methods to obtain potable water. If this is not feasible, then we recommend the SODIS method as a good alternative in underdeveloped countries.</p>	
<b>Summary Statement</b> The purpose of our project is to find cost effective methods for sterilizing water for use in developing countries.	
<b>Help Received</b> Mother was advisor, Mr. Aochi, Science teacher, gave us use of his lab. Dr. Robert Metcalf gave experiences, advice about which methods worked best in his studies and gave us supplies. Bob Wallace gave us indepth information on use of his product, Polar Pure.	