



CALIFORNIA STATE SCIENCE FAIR 2009 PROJECT SUMMARY

Name(s) Joseph B. Lee	Project Number J1118
Project Title From Sea Water to Drinking Water: Can Solar Power Help?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My project was to determine if I could desalinate ocean water using a contained environment to duplicate the water cycle, and in addition determine if using solar power would make this process work more efficiently. My hypothesis is that the majority of the saline content of the sea water will be removed. I also expect that solar heating will speed up the evaporation and condensation in the desalination process.</p> <p>Methods/Materials I constructed a solar oven using basic household items such as cardboard boxes and foil. I then constructed 6 Desalination Units (DU's) using plastic water containers, E-flasks, small collection cups and plastic cling wrap. 2 DU's were placed in the solar oven; 2 DU's were exposed to the sun; 2 DU's were in the shade for control. Measurements were taken and noted 3 times/day for 6 days (ambient temp., solar oven temp. and water temp.). At the conclusion of the experiment, the condensate of each DU was measured, and the salinity and conductivity noted as well as compared to other types of water.</p> <p>Results The quantity of condensate was measured at the conclusion of the experiment, with the sample collected by the DUs in the solar oven yielding the greatest quantity (5.8 ml); The DUs under direct sun collected less (2.4 mg avg); The DUs in the shade collected almost nothing. I then tested the salinity of samples collected in the DUs, which were greatly less than the salinity of sea water. I compared the salinity of the condensate to various types of water, in order from greatest salinity to least: Sea water(29.5ppt), Saline treated pool water (1.6 ppt), Condensate (880-970ppm), Tap water (527ppm) and Filtered drinking water (56.5ppm).</p> <p>Conclusions/Discussion My conclusion is that desalination of ocean water can be accomplished by duplicating the water cycle, shown by the much lower salinity the condensed water collected had compared to ocean water. Also, the increased temperatures produced by the solar oven caused more condensation to occur, shown by the larger amount of condensate collected by DUs in the solar oven compared to those that were under direct sun and shade. This proves that increased solar influences improve the efficiency of the desalination process.</p>	
Summary Statement My project shows that ocean water can be desalinated by duplicating the water cycle in a contained environment, and that using solar power helps yield a larger quantity of condensate collected.	
Help Received My parents helped to take the 11am and 1pm temperature readings while I was at school; my science teacher lent me 6 Ehrlemeyer flasks;	