



CALIFORNIA STATE SCIENCE FAIR 2011 PROJECT SUMMARY

Name(s) Iryna Ivasyk	Project Number S1118
Project Title Analysis of the Energy Production Potential of the Tijuana River	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Diseases such as malaria and diarrhea are among the leading causes of death for the indigenous people of developing countries. Many of such diseases are spread primarily through contaminated water as a result of the high expenses of water treatment. The ultimate purpose of this project is to study biological fuel cells as well as wastewater qualities, and their potential integration into providing the electricity needed for a water treatment plant to function.</p> <p>Methods/Materials The primary purpose of this experiment was to test the Tijuana River water to see its potential application in wastewater treatment. Containers were built to hold the anode and cathode which will be submerged in wastewater and water respectively. The current was measured on three incidences using two different samples as well as a control which only used water.</p> <p>Results The fluctuations present in the data for the biological fuel cell as opposed to the unanimous measurement of the water powered cell presents the idea the hypothesis was not proven correct because the wrong type of fuel cell was used. The salinity, PH and DO were also monitored and unexpected results demonstrated an odd relationship between the concentration of the solution and how PH changes.</p> <p>Conclusions/Discussion The data reveal that the current seems to increase slightly over time for the containers but does not reach a specific point. This continuous change is what makes the current difficult to quantify specifically and the hypothesis difficult to prove or disprove. Although the difference is so negligible between water and wastewater that the hypothesis cannot be proven, another hypothesis originated as a result. a difference between the water from the Tijuana River and the current it conducts and regular water with salt ions in it. The PH did not surpass the hypothesized barrier created by the first trial. This observation of the same phenomena leads me to believe that my hypothesis of the pH that the bacteria create for themselves might have valid roots. Hopefully, after further considerations of other fuel cell designs, one will be able to create the necessary output of electricity to begin incorporating it into the wastewater treatment plant its self.</p>	
Summary Statement A biological fuel cell was built and run using water and mudd samples from the Tijuana river to create electricity; the central focus was to study biological fuel cells as an alternative energy source for wastewater treatment plant.	
Help Received I would like to thank Ms. Wendy Slijk for supervising my project and giving me ideas about where to continue. I would also like to thank Andrey Misyutin for helping me obtain samples for the project and Canyon Crest Academy QUEST program for providing an environment for me to create my project.	