



**CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY**

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| Name(s) Tanay Tandon | Project Number 31344 |
| Project Title A Cost and Energy Efficient Water Purification System Utilizing Novel Methods of Electrolysis Based Techniques | |
| <p style="text-align: center;">Abstract</p> <p>Objectives/Goals Through this chemical engineering project I plan to experiment the effect of the Electrolysis Mediated Fenton Reaction on water borne microbial organisms. The research I conduct will show the effectiveness of this novel electrical based approach to water treatment, and will be used to engineer a Crank Shaft Generator powered Water Purification system for use in disease and disaster stricken areas.</p> <p>Methods/Materials In order to test and engineer the experimental portion of my project, I used Non Pathogenic concentrations of E. coli as inoculated impurities in water. I then performed the Electrolysis based reaction onto the water sample and recorded the effect of the reaction on the bacterial colony count in the water. The data and research conducted in these experimentations were then applied into the construction of the Crank Shaft Powered system for disease and disaster devastated areas.</p> <p>Results The experiment resulted in several sets of data that showed the rate of purification and the effectiveness of the reaction. All 15 data groups showed strong trends that supported the reactions effectiveness of elimination on bacterial populations. Most groups showed between 70-100% elimination of E. coli populations, and several data groups brought the E. coli levels within EPA standards. These results were used in the engineering of the Crank Shaft Powered system which can apply the novel approach of the reaction into real life disaster scenarios.</p> <p>Conclusions/Discussion The data received through this project supports the ability of the explored reaction in its ability to remove microbial impurities from water. Through this experiment it can be determined that the Electrolysis Mediated Fenton Reaction has potential to be applied in small scale water treatment situations, and should be further explored as a cheap alternative method of water purification. The research that I have conducted, and the system that I constructed has the ability to be of great benefit to developing countries in need of cheap and efficient water purification solutions, and can also serve as a quick way to keep water clean in areas susceptible to the spread of water borne diseases.</p> | |
| Summary Statement My project is about the experimentation and construction of a water purification system that implements the novel method of the Electrolysis mediated Fenton Reaction. | |
| Help Received My teacher, Dr. Fohner, supervised my experimentation in the school Labratory, and my mother helped me glue my project board. | |