



**CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY**

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| Name(s) Sneha S. Bhetanabhotla | Project Number J0205 |
| Project Title A Study of Osmotic Energy | |
| Abstract Objectives/Goals The objective of my research is to study the effect of different solute concentrations on osmosis, generate osmotic energy and compare its feasibility with other types of energy. My ultimate goal is to find a new source of clean, green and renewable energy to help solve the world's energy problem. Methods/Materials I used NaCl and KCl as solutes and measured the rate of osmosis for different concentrations of these solutions. I also studied the rate of change of osmosis with time, and I calculated the amount of energy generated by osmosis. My experimental set up contained of a large jar which held fresh water. A cellulose dialysis membrane tube 10ft long contained the solution with a solute in it and was connected to a 1 cm diameter plastic tube. The plastic tube is graduated and was secured in an upright position with a balsa wood stand. Each experimental run took 90 minutes where I measured the height of water in tube at different intervals of time. I repeated this experiment for several solutions of different concentrations. I plotted graphs with the data I got from each of these experiments and analyzed them. Results NaCl solutions have higher rates of osmosis than KCl solutions. Solutions with higher concentrations of NaCl produced higher rates of osmosis. The osmosis rate decreased with time and the amount of energy generated also decreased with time. The amount of osmotic energy generated is very small. Conclusions/Discussion Sodium Chloride is an effective solute which can produce high osmotic pressures. Large membranes are needed to generate feasible amounts of energy. Osmotic power plants can be located at river mouths to generate electricity using the fresh water and sea water. Osmotic power can also be generated wherever waste, dirty water is processed. | |
| Summary Statement My project is a study of osmotic energy as an alternate, clean, green and renewable energy. | |
| Help Received My father helped me in obtaining the needed materials and with the experimental setup. | |