



CALIFORNIA STATE SCIENCE FAIR 2006 PROJECT SUMMARY

Name(s) Shaheen Jeeawoody	Project Number J0807
Project Title Bioremediation: Cleaning Up Oil Spills in Our Water Communities	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Biodegradation is a natural process whereby microorganisms break down organic molecules into harmless substances. To accelerate this process, materials can be added to contaminated environments, and this process is known as bioremediation. The purpose of my project is to investigate the factors affecting the process of bioremediation in an oil-contaminated water medium.</p> <p>Methods/Materials In the first part of my procedure, I filled 42 Mason jars with distilled water and motor oil. I varied the amount of <i>Pseudomonas putida</i> bacteria, oxygen, nutrients, temperature, and acidity in the jars. I took samples from each jar every week for the next 4 weeks by placing three drops of liquid from right below the water level in each jar on brown paper and I measured the diameter of the oil stain left behind after three hours. In the second part of my procedure, I wanted to find out whether there were oil-eating bacteria in soils. I collected soil samples from a gas station, commercial manure, homemade compost, dirt park, and forest park soil on the same sunny day. I filled six tubes with distilled water, 0.02% tetrazolium indicator, and motor oil. In the first five tubes, I placed a scoop of soil and capped the tubes. In the sixth tube, I placed <i>Pseudomonas putida</i> bacteria and capped the tube. I set aside the tubes and observed them for a week.</p> <p>Results The percentage of oil degraded increased with an increasing amount of bacteria present and when oxygen was bubbled in the jars. With nutrients, the percentage of oil degraded reached a maximum and then decreased. A temperature of 36°C and a pH of 7 to 9 had a faster effect on the biodegradation process. I also found that all soils, except for the homemade compost, contained oil-eating bacteria in varying amounts, with the most bacteria in the gas station soil sample.</p> <p>Conclusions/Discussion Bioremediation occurs efficiently and quickly if oil-eating bacteria are present in an environment with the right levels of oxygen, nutrient, temperature, and acidity. Bioremediation is an efficient process, as oil is naturally eaten by bacteria; it is also environmentally friendly, as the waste products, which include carbon dioxide and water, are harmless. It can be used in a variety of places and environmental conditions. With bioremediation as a secondary treatment method, we can get rid of oil or other contaminants in the environment efficiently.</p>	
Summary Statement The purpose of my project is to investigate the factors affecting the process of bioremediation in an oil-contaminated water medium.	
Help Received Teacher gave helpful tips; Mother purchased supplies and let me use a corner of her school lab for my experiments; Father proofread report and sister helped with glueing display board.	