



CALIFORNIA STATE SCIENCE FAIR 2011 PROJECT SUMMARY

Name(s) Anushka Das	Project Number J1003
Project Title A Study of Oil Spill Bioremediation Using Algae	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective was to study the effectiveness of 3 common algae - Chlorella, Scenedesmus and Ulothrix - in bioremediation of motor oil in pond water.</p> <p>Methods/Materials There were 2 identical setups with pond water and distilled water. Each setup had 4 groups, each having 3 jars with 3 different amounts of fertilizer and same amount of motor oil. Group 1 had no algae, and groups 2, 3 and 4 had same amount of the 3 algae respectively. 2 jars with only pond and distilled water were kept to check how pH and DO changed in my environment without oil, fertilizer, and algae. pH and DO were measured on Day 1 and Day 29. On Day 8, 15, 22 and 29, oil content per water droplet of each jar with oil was measured. On Day 29, the total remaining volume of oil was measured.</p> <p>Results For distilled water setup, oil content per droplet and total oil loss did not show much difference between jars on Day 29. For pond water setup, result showed that different algae impacted differently. For oil content per droplet, Chlorella group had 14% less oil than no algae group, whereas Scenedesmus and Ulothrix group had 1% and 5% less respectively. For oil loss measurement, Chlorella decreased 42% more oil than no algae group. Scenedesmus and Ulothrix had reduced 8% and 21% more respectively. For pond water on Day 29, pH had decreased slightly in all jars compared to that of pond water on Day 1. For distilled water, a slight increase in pH was seen in all jars with oil, compared to that of distilled water on Day 1. For pond water, DO had decreased in almost all jars on Day 29 compared to that of pond water on Day 1, whereas for distilled water setup, DO had increased in almost all jars with algae compared to that of distilled water on Day 1.</p> <p>Conclusions/Discussion Data showed that algae were able to influence biodegradation of oil in pond water. The absence of bacteria in distilled water setup was the possible reason for algae not being able to reduce oil there. The bacteria in pond water were able to utilize algae as oxygen source and break oil into CO₂ and H₂O. The most effective was Chlorella followed by Ulothrix and Scenedesmus. Overall the jars with more fertilizer suffered more oil loss within the same algae group with pond water.</p>	
Summary Statement The purpose of my project was to study whether the common algae can accelerate the bioremediation of motor oil and to gather quantitative measurements of the effectiveness.	
Help Received My science teacher Ms. Rossi and mentor Ms. Katherine Rostkowski guided me during the project. Parents bought me the materials and helped me during experiment.	