



CALIFORNIA STATE SCIENCE FAIR 2002 PROJECT SUMMARY

Name(s) Lisa S. Rotenstein	Project Number J0927
Project Title Living Lights from the Sea	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My study is designed to show the relationship between the large amounts of pollution that people dump down the storm drain everyday, and the lifespan and bioluminescence of single-celled algae, namely <i>Pyrocystis fusiformis</i>.</p> <p>Methods/Materials I used twenty-two bags of <i>Pyrocystis fusiformis</i>. I divided twenty of the bags into five groups of four bags each. The two bags left over, which I never opened, were used to measure bioluminescence intensity. To measure the algae's lifespan, I took a 0.1 mL sample from each bag with a pipette and put 1 drop on each well of a counting chamber slide. I then counted the number of algae in each well through a microscope. I repeated this for all bags. To measure bioluminescence I turned off all lights, shook the bags of <i>Pyrocystis</i>, and gave a grade for bioluminescence intensity on a scale of 1-10. The 5 intensity measurements were the unopened control bags and the 10 intensity measurements were a small keychain flashlight. I repeated this for all bags. I added a certain type of pollution into each group, either smoke, antifreeze, fertilizer or oil, and left one group of bags without pollution (control). After adding pollution, I took 6 more days of measurements, for a total of 7 days.</p> <p>Results As a whole, bioluminescence intensity declined. The bioluminescence for all bags followed irregular patterns, having no decided rate for growth or decline. Fertilizer bags were the only ones with no luminescence at the end of the experiment. Dead, empty, and dividing cells became less frequent or did not exist at all, depending on the bag. Cells lost their diamond shape, nuclei became smaller, and there was less material in the cytoplasm as a result of the pollution.</p> <p>Conclusions/Discussion In conclusion, pollution did affect the lifespan and bioluminescence of single-celled algae. The number of cells went up and down at different rates and there was no real pattern of growth or decline. My hypothesis that pollution would affect the bioluminescence of all bags was correct. My hypothesis that the lifespan for oil, antifreeze and smoke bags would decline was correct. My hypothesis that the lifespan for fertilizer bags would grow was not proven. Since these types of dinoflagellates clean up oil-spills, create oxygen, and create algal bloom-tides, there are both positive and negative effects to polluting the waters of the ocean, in effect killing <i>Pyrocystis fusiformis</i> and other dinoflagellates.</p>	
Summary Statement My project is about the effects of pollution on the lifespan and bioluminescence of single-celled algae.	
Help Received Michaela and Sergiu Rotenstein (parents) helped get materials and helped with problems. Howard Kaplan helped me take pictures of algae under a microscope and SunnysideSeaFarms answered questions about algae and providing algae.	