



CALIFORNIA STATE SCIENCE FAIR 2011 PROJECT SUMMARY

Name(s) Tyler G. Urban	Project Number S1724
Project Title Microscopic Matchup: Plankton vs. Oil Dispersant	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this experiment was to determine the effects of a widely used oil dispersant (Dispersit SPC 1000) on a specific autotrophic plankton genus (Gloeocapsa) which is one of the most important organisms at the base of many freshwater environment food webs.</p> <p>Methods/Materials Twenty petri dishes were placed under the timed growth lights. The petri dishes were filled with varying concentration ratios (dispersant: 0%, 1%, 5%, 10%, 20%) by volume of spring water and the dispersant. All dishes were then injected with identical amounts of cyanobacteria culture and allowed four days to multiply and be measured. The first day was allowed to grow unmeasured to allow for and confirm reliably measurable growth. Thereafter, five sample sets were collected and analyzed over the remaining time span.</p> <p>Results The most significant results were those of the average colony counts per 64mm². The amount of growth difference in the number of colonies was calculated for all sets and was found to be 32 for the control (0% conc.), 30 for the 1% dispersant concentration, 36 for the 5%, 10 for the 10%, and 4 for the 20% conc. This calculated to be that the growth difference of the low conc. end (1%) was actually 94% of the control's growth difference, and the high conc. end (20%) was only 12% of the control's growth difference. The initial measurements taken especially showed this lag of growth between the control and the other sets with additives. After the first growing day, the control showed 10 colonies per 64mm² while progressively from 1% to 20% the others showed only 4, 3, 2, and 2 colonies.</p> <p>Conclusions/Discussion Overall, the growth curve of the Gloeocapsa cyanobacteria was inversely affected by the concentration of the Dispersit SPC 1000. The data show that the dispersant concentration inhibited (and virtually stopped when high) growth of the autotrophic plankton at increasingly higher concentrations. The effects could possibly be attributed to biological toxicity of the dispersant but are more likely due to the opacity of the solution that is created when the spring water and dispersant are mixed, which would limit the cyanobacteria's ability to photosynthesize and therefore reproduce. Because of plankton's position at the base of the food web, at worst this could cause a chain reaction die-off along the food web as food supplies of plankton ran out.</p>	
Summary Statement The project's aim was to observe the effects of Dispersit SPC 1000 to Gloeocapsa genus cyanobacteria.	
Help Received Advising teacher Mark Grubb helped find an oil dispersant to use; other science teacher Debbie Lewis allowed the use of her microscope.	