



CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY

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Project Title The Effect of Anabaena inaequalis on Salvinia minima to Absorb Crude Oil in Freshwater	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Although there are existing methods of cleaning up oil spills, many methods of cleaning the spill up, such as chemical dispersants, can harm marine wildlife or leave large amounts of oil in the natural environment. In our project, we attempted to test and improve upon a method to help solve these issues. We decided to use a combination of algae and superoleophilic plants to clean up oil in freshwater. We hypothesized that if we grew <i>Salvinia minima</i> in freshwater with <i>Anabaena inaequalis</i>, then the mass of crude oil absorbed by a <i>S. minima</i> leaf would be greater than the mass absorbed by a <i>S. minima</i> leaf not grown with <i>A. inaequalis</i>.</p> <p>Methods/Materials In our experiment, we filled four containers with equal amounts of freshwater medium and <i>S. minima</i>, and then added increasing amounts of <i>A. inaequalis</i> from 0 mL to 6 mL. After letting the containers sit for 48 hours, we poured the same volume of freshwater medium into another container and added 15 mL of crude oil. Using forceps, we removed one leaf from the control, measured its mass, and placed it in the container with oil. After 20 seconds, we removed the leaf from the container and took the mass of the <i>S. minima</i> leaf with the absorbed oil. By subtracting the masses, we figured out how much oil was absorbed. This process was repeated for 6 leaves per container.</p> <p>Results Overall, there is a direct relationship between the amount of <i>A. inaequalis</i> grown with the <i>S. minima</i> and the mass of crude oil absorbed by a leaf of <i>S. minima</i>, showing how adding <i>A. inaequalis</i> increases the ability of <i>Salvinia minima</i> to absorb crude oil. There was approximately 0.073 grams of oil absorbed in 20 seconds with 0 mL of <i>Anabaena</i>, 0.086 grams with 2 mL, 0.097 grams with 4 mL, and 0.119 grams with 6 mL. An increase of 1 mL of <i>A. inaequalis</i>-freshwater-medium mixture added to grow with the <i>S. minima</i> increases the mass of crude oil absorbed by the <i>S. minima</i> leaf by around 0.007667 grams.</p> <p>Conclusions/Discussion Our results supported our hypothesis because the mass of crude oil absorbed by a leaf of <i>S. minima</i> after 20 seconds was the greatest when the <i>S. minima</i> was grown in 6 mL of <i>A. inaequalis</i> for 48 hours. This is most likely due to the cyanobacteria's nitrogen-fixing abilities that contribute to the overall health and growth of the <i>Salvinia minima</i>. The results show potential for a quick and effective method of remediation.</p>	
Summary Statement We proved that growing <i>Anabaena inaequalis</i> with <i>Salvinia minima</i> increased <i>S. minima</i> 's ability to absorb crude oil in freshwater.	
Help Received We came up and completed the experiment on our own. Our parents and Mr. Pallone, our STEM teacher, checked for accuracy and clarity.	