



# CALIFORNIA STATE SCIENCE FAIR 2014 PROJECT SUMMARY

<b>Name(s)</b> <b>Ananya J. Rao</b>	<b>Project Number</b> <b>J1729</b>
<b>Project Title</b> <b>Effects of Diesel Oil on Hatching and Survival of Brine Shrimp</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective was to measure the effects of diesel oil on the hatching of brine shrimp eggs and the survival of live brine shrimp. The hypothesis of this experiment was that the presence of diesel will slow down the hatching and survival of brine shrimp starting at a concentration of 5 mL of diesel in 1 liter of water, and that brine shrimp will not survive at any concentration greater than 8 mL of diesel in 1 liter of water.</p> <p><b>Methods/Materials</b> Brine shrimp eggs, live adult brine shrimp, and diesel were purchased. 11 glass beakers with 400 mL capacity were used to hold the seawater, brine shrimp, and varying concentrations of diesel oil (0.17 mL/L to 56.67 mL/L). The newly hatched brine shrimp (7 repeats) were examined under a microscope and counted at 24, 36, and 48 hours. The adult brine shrimp (3 repeats) were counted at 6, 12, 18, and 24 hours.</p> <p><b>Results</b> It was observed that both newly hatched brine shrimp &amp; adult brine shrimp died even at the lowest tested diesel concentration of 0.17 mL/L. The results also showed that some of the hatched brine shrimp continued to survive even at the highest concentration of 56.67 mL of diesel in 1 liter of seawater. It was noticed that the longer the exposure to diesel, the higher the death rate. The results did not support the hypothesis.</p> <p><b>Conclusions/Discussion</b> The results showed that diesel oil concentration of 0.17 mL/L was enough to show a negative effect on hatching and survival rates. For newly hatched brine shrimp, results after 48 hours showed that about 71% survived at the lowest tested diesel concentration 0.17 mL/L, and about 18% survived at the highest tested diesel concentration 56.67 mL/L. For the adult brine shrimp, results after 24 hours showed that about 66% survived at the lowest tested diesel concentration 0.17 mL/L, and about 32% survived at the highest tested diesel concentration 1.67 mL/L. 24hour LC50 for diesel oil on adult brine shrimp is estimated to be between 0.50 and 0.75 mL/L diesel oil concentration. It was observed that diesel oil bubbles surround the appendages of newly-hatched and adult brine shrimp. It is possible that this in turn has a negative effect on locomotion, respiration, feeding, and blood circulation which leads to death. Oil bubbles have a similar effect on hatching. The results from this experiment show that even small amounts of oil pollution can have a harmful effect on marine ecosystems.</p>	
<b>Summary Statement</b> The presence of diesel oil, even in small amounts, has a harmful effect on hatching and survival of brine shrimp.	
<b>Help Received</b> I received encouragement and guidance on the project from Mrs. Gillum. Dr. Aluwihare (Scripps Institute of Oceanography) provided mentoring, and my parents provided support, proofreading, and advice about statistical calculations.	