



# CALIFORNIA STATE SCIENCE FAIR 2016 PROJECT SUMMARY

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<b>Project Title</b> <b>Analyzing the Ecotoxicity of the Surfactant, Cocamidopropyl Betaine, on the Hatching of the Aquatic Crustacean <i>A. salina</i></b>	
<b>Abstract</b> <b>Objectives/Goals</b> Research was conducted in order to assess the toxicity of the surfactant, cocamidopropyl betaine (CAPB), to the arthropod species, <i>Artemia salina</i> , by observing the hatching amount of the organisms. Tests included the exposure of varying concentrations of CAPB, (5, 10, 15 and 20 mg/ 500 mL) to <i>A. salina</i> , while the separate control group consisted of an untreated species of <i>A. salina</i> . The control and treated groups of the crustaceans were maintained under the same conditions in regards to light exposure, temperature, etc. Outcomes of the experiment indicated a lower hatch rate and premature nauplii death with increasing concentrations of CAPB. Results demonstrated that CAPB is toxic to <i>A. salina</i> , endangering the overall conditions of the aquatic environment. <b>Methods/Materials</b> API Aquarium Salt ( $18 \pm .1$ g mix/ 500 mL) was placed in a 500 mL beaker. Deionized water was added to the 500 mL mark of each beaker, achieving the saltwater environment of the brine shrimp. The pH of the solutions were kept at a range of 7-8. pH was periodically monitored using pH paper and was adjusted accordingly with the addition of sodium bicarbonate. This procedure allows for a consistent saltwater environment. Microscope slides were obtained and cleaned. Graph paper was cut into a small square and adhered onto a slide using double sided tape. Twenty five brine shrimp eggs were placed on the tape using a toothpick and counted using a microscope. The slide was placed in a 100x15 mm petri dish. Thirty five mL of the 0 mg CAPB saltwater solution was poured into the petri dish and placed under a lamp at 25°C. The process was repeated for 5 mg, 10 mg, 15 mg, and 20 mg CAPB per 500 mL concentrations which were prepared in separate beakers. Each petri dish was labeled respectively. The number of live hatched nauplii was recorded at each concentration at 24, 48, and 96 hours. <b>Results</b> Results show a significant decline in hatched cysts with the introduction of CAPB into the environment. <b>Conclusions/Discussion</b> CAPB ultimately poses an ecotoxicological danger to <i>A. salina</i> as seen through the decrease in live nauplii over time at different concentrations. Although the concentrations of CAPB in nature are likely very small, it is nonetheless a toxic surfactant that can build up in surface waters and negatively impact wildlife such as <i>A. salina</i> .	
<b>Summary Statement</b> Surfactants, specifically CAPB, is ultimately toxic to <i>A. salina</i> , and this will be shown through the decreased number of hatched cysts that occurred as time and concentration increased.	
<b>Help Received</b> I used laboratory equipment at Thousand Oaks High School under supervision of Dr. Nikki Malhotra	