



CALIFORNIA STATE SCIENCE FAIR 2009 PROJECT SUMMARY

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| Name(s) Connie Ho; Steven Hu; Spencer Moh | Project Number S1813 |
| Project Title The Effect of Environmental Contaminants on Freshwater Species of Daphnia | |
| <p style="text-align: center;">Abstract</p> <p>Objectives/Goals Daphnia magna are small crustaceans often found in freshwater environments. Their sensitivity to changes in the water and their transparent exoskeleton (which allows viewing of the beating heart) make daphnia an ideal indicator species. Many households dump medication and detergents down drains or into toilets as a method of disposal - a practice which allows many of these substances to enter aquatic habitats. This experiment aims to test the effect of such substances on aquatic organisms by using daphnia as an indicator species. We hypothesized that if daphnia magna are brought into contact with water containing Advil (ibuprofen), Sudafed (pseudoephedrine hydrochloride), Tide (dodecyl benzene) and Cascade (phosphoric acid), then their heart rates will increase.</p> <p>Methods/Materials We first measured the resting heart rate of each individual daphnia using a light microscope, then placed the daphnia into varying concentrations of each substance and measured the resulting heart rate. To control variation, each daphnia was compared against its resting heart rate and used as its own control; the percent change in heart rate was calculated and graphed. The amount of each substance dissolved for each concentration was also controlled along with the accuracy of the heart rate counted (by using multiple trials and different counters).</p> <p>Results The results of our experiment do not support our hypothesis. In general, our data showed that the heart rate actually decreased when substances were added. The optimum percent change in heart rate occurred at the concentration of 50 mg / 250 mL H₂O for Tide and remained consistent between both batches. Both batches placed in Cascade showed an overall decrease in heart rate with optimum percent change at the lower amount of 50 mg / 250 mL H₂O; the overall shape of the graphs of percent change in heart rate is also consistent between both batches. Data obtained by both Advil and Sudafed produced contradictory results.</p> <p>Conclusions/Discussion Despite inconsistencies in our results, addition of these substances into the daphnia's environment does hold an effect and causes changes in their heart rate. While the impact of these substances remains uncertain, it is still important to recognize the harmful effect they have on aquatic organisms. Consumers should avoid pouring them down drains and properly dispose of substances by sealing them in plastic bags and placing them in the trash.</p> | |
| Summary Statement By bringing Daphnia magna into contact with substances that humans can easily pollute freshwater environments with, this experiment aims to observe how common products can affect an aquatic environment and its organisms. | |
| Help Received No outside help received. | |