



**CALIFORNIA STATE SCIENCE FAIR  
2014 PROJECT SUMMARY**

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| <b>Name(s)</b><br>Catherine Stimson; Natalie Usher  | <b>Project Number</b><br><br>34147 |
| <b>Project Title</b><br>Effects of Sodium Hypochlorite and Chloramine on Pimephales promelas and Escherichia coli   |                                    |
| <b>Abstract</b><br><b>Objectives/Goals</b><br>The objective was to prove sodium hypochlorite is a more effective water disinfectant than chloramine, a product that forms when ammonia and sodium hypochlorite react.<br><b>Methods/Materials</b><br>12 fathead minnows were placed in 6 separate .5 gallon tanks (2 for chloramine, 2 for sodium hypochlorite, and 2 for the control) and a dose response experiment was conducted using chloramine, and sodium hypochlorite. The concentrations of chemicals started at 0.0 mg/L and slowly increased to 1.0 mg/L.<br>20 LB agar plates were poured and set. From a standing culture of E. coli, serial dilutions were conducted until there were a small number of cells present. Then the cells were streaked across the surface of the plates that were pre-infused with the chemicals in concentrations of .1, .2, .5, and 1.0 mg/L. The plates were then incubated at 37 degrees Celsius overnight.<br><b>Results</b><br>The experiment found that chloramine was both more effective and less toxic compared to sodium hypochlorite in the fish section of the experiment (thus disproving our hypothesis). In regards to the E. coli section of the experiment it was found that chloramine was more effective in stopping bacterial growth at higher concentrations therefore being the better disinfectant.<br><b>Conclusions/Discussion</b><br>In conclusion, though both chemicals are effective at killing bacteria, chloramine is more beneficial at sustaining aquatic life when compared to sodium hypochlorite. |                                    |
| <b>Summary Statement</b><br>The hazardous effects as well as the effectiveness of two common and controversial water disinfectants were examined.   |                                    |
| <b>Help Received</b><br>Teachers helped in obtaining sodium hypochlorite and E. coli cells.   |                                    |