



**CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY**

Name(s) Clarissa M. Tacto	Project Number S0625
Project Title The Intermolecular Attraction of Aspirin and Acetaminophen in Plastics	
Objectives/Goals The amount of acetaminophen and aspirin that is retained by plastics placed in saturated solutions was measured to determine if plastics treated with either of these molecules could serve as an alternative to over the counter tablets. I also hoped to find a correlation between the concentration of the solution to the amount of the molecule retained.	
Abstract Methods/Materials Aspirin's ability to remain on a plastic surface is tested independently of the amount of acetaminophen that is retained. Laboratory grade aspirin and acetaminophen are placed in distilled water with varying concentrations, creating an aqueous solution. These solutions are treated with ferric chloride which creates a violet color as a result of the iron(III)-phenol complex formed. The intensity of the violet produced is dependent on the concentration of the acetaminophen or aspirin so each solution was analyzed under a spectrophotometer. The results were placed on a Beer's Law Plot and used as the control. 80 square centimeters of polystyrene or polyethylene were placed in saturated solutions and placed on a magnetic stirrer to ensure that the solution was homogeneous. The plastic was then extracted, placed in distilled water, and treated with ferric chloride. The intensity of the purple was compared using the Beer's Law Plot to determine the amount of aspirin or acetaminophen that the plastic was able to retain.	
Results The Beer's Law Plot was used to calculate the amount acetaminophen or aspirin that was retained by a plastic. While different plastics were used in this experiment, the correlation between the concentration of the solution that the plastics were placed in and the amount that was retained remained the same. Aspirin was retained at higher quantities for both plastics. The difference in plastics did not produce a significant difference in the amount of acetaminophen retained.	
Conclusions/Discussion The amount of aspirin or acetaminophen retained by plastic is directly proportional to the concentration of saturated solution that it was originally exposed to. Because more aspirin is retained by both plastics, I conclude that it is more attracted to the plastic than the acetaminophen. While a significant amount of aspirin and acetaminophen was retained by the plastic, it is less than the amount in over the counter tablets, making it an inadequate alternative.	
Summary Statement I tested the intermolecular attraction between acetaminophen and aspirin in plastics and concluded that aspirin is more attracted to plastic.	
Help Received My former chemistry teacher, Dr. Gian Grant, supervised me in the lab.	