



**CALIFORNIA STATE SCIENCE FAIR  
2014 PROJECT SUMMARY**

<b>Name(s)</b> Grace Brock; Gabriella Donato	<b>Project Number</b> <b>J2102</b>
<b>Project Title</b> <b>The Story of My (Aspirin's) Life: Changes in the Composition of Aspirin over Time</b>	
<b>Objectives/Goals</b> The purpose of this project was to determine the percent decomposition of samples of aspirin that had passed their expiration date. Aspirin's active ingredient is acetylsalicylic acid, which decomposes into salicylic and acetic acid over time. The amount of acetylsalicylic acid can be found using back titration. We used this method to test a control sample (not expired) and then four samples that had passed expiration. Our hypothesis was that the older samples would show a greater percent decomposition (less acetylsalicylic acid).	
<b>Abstract</b> <b>Methods/Materials</b> We titrated aspirin samples with sodium hydroxide, using phenolphthalein as an indicator. Then we performed a back titration by adding excess sodium hydroxide, heating, and titrating back to colorless with HCl. We calculated the number of moles of base needed for each titration and used the difference to find the percent decomposition.  We used a new bottle of aspirin (expiration date June 2015) as the control. We obtained four more bottles with enough aspirin for testing, with expiration dates 4, 17, 19, and 33 months before our experiment date, for comparison. We tested four samples from each bottle and found the average percent acid and average percent decomposition in each sample.	
<b>Results</b> We found that the older samples did show a greater percent decomposition, and that this trend was mostly linear. The average percent decomposition for the control sample was 5.4, vs. 7.5, 9.8, 9.4, and 13.4 for the older samples (in chronological order).	
<b>Conclusions/Discussion</b> Our data does support our hypothesis that older samples show greater percent decomposition and higher acidity. The expiration date did seem to be a good indicator that samples had less than 10% decomposition. Samples very close to the expiration date (within 4 months) are probably still safe to use, but the samples from 17 months past and older all showed more than 100% acid and should be avoided. However, we had a lot of error, some inherent in the procedure and some due to our technique.	
<b>Summary Statement</b> We used titration to determine how much acetylsalicylic acid had decomposed in samples of aspirin at various dates past expiration.	
<b>Help Received</b> Science teacher supplied equipment, supervised titrations, and gave feedback.	