



**CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY**

Name(s) Erin C. Rush	Project Number J2130
Project Title Is There Arsenic in Your Juice?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My objective was to determine the presence and levels of inorganic (harmful) arsenic in apple and grape juice. I hypothesized that organic juice, from fruit grown without pesticides, is less likely to contain arsenic than non-organic juice.</p> <p>Methods/Materials Thirty-nine juice samples were tested, including 13 different brands, six organic (4 apple; 2 grape) and seven non-organic (5 apple; 2 grape). Bottled water was used as a control. Three samples of each juice were tested using a government EPA approved, verified test kit for inorganic arsenic. Each sample contained 100 ml of juice, and temperature was constant. Three Chemical Reagents were added at specific times during the testing of each sample. Inorganic Arsenic compounds in the juice were converted to Arsine (AsH₃) gas by the reaction of Zinc Dust and Tartaric Acid. Mercuric Bromide strips react with Arsine gas by changing color after 10 minutes if arsenic is present. The kit included a color chart to measure arsenic levels (range: 0-500 ppb).</p> <p>Results The average amount of inorganic arsenic was less in organic juice than non-organic juice (3.2 ppb versus 7.9 ppb), but the results were inconsistent. Contrary to my hypothesis, one organic sample had a high arsenic level of 20 ppb, and several non-organic samples had zero arsenic. Closer analysis revealed that 18 samples of juice were from concentrate, and 21 samples were not-from-concentrate. All the juice from concentrate had arsenic, ranging from 1 ppb to 60 ppb. All of the juice not-from-concentrate had zero arsenic. This experiment is still in progress.</p> <p>Conclusions/Discussion The most important variable predicting the presence of arsenic in juice is whether or not the juice is made from concentrate. Even juice labeled #organic# contains arsenic if the juice is made from concentrate. The arsenic found in American bottled juice comes from the dehydrated juice concentrates which are imported primarily from China (apple) and Argentina (grape), and then reconstituted in the U.S. before bottling.</p>	
Summary Statement My project investigated the presence, levels, and source of inorganic arsenic in bottled apple and grape juice.	
Help Received Mother bought arsenic testing kit; Mother monitored me while using toxic chemicals for testing.	