



CALIFORNIA STATE SCIENCE FAIR 2016 PROJECT SUMMARY

Name(s) Ellie Silvester	Project Number J2019
Project Title Comparing Levels of Trace Contaminants in Bottled Water vs. Tap Water	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Many people prefer to drink bottled water versus tap water. But is bottled water really better, especially considering that it costs significantly more and that the production and distribution contribute to environmental pollution? The purpose of this project was to test the claims and quality of the most popular bottled water brands compared to tap water.</p> <p>Methods/Materials I tested 18 different water samples including samples from Fiji, Evian, Boxed Water Is Better, Dasini, Market Pantry and tap water. I generated more than 500 data points to evaluate trace substances contained in the water samples. I used an inductively coupled plasma mass spectrometer to determine the levels of nineteen different metals and other elements in each sample. I then used a gas chromatography instrument to measure the levels of organic volatile compounds in each sample, and an ion chromatography mass spectrometer to test for inorganic anions. I averaged my data and analyzed the results.</p> <p>Results My results revealed trace amounts of contaminants present in many of the samples, but all levels were will within the EPA and FDA guidelines and limits for safe drinking water. Tap water contained significantly higher levels of aluminum, copper, and zinc at 7.805 ppb, 15.638 ppb, and 4.295 ppb respectively. The two most expensive waters, Evian and Fiji, contained high levels of elements not represented in other test samples: Evian contained levels of barium at least 105 ppb higher than all the other samples, and Fiji had a level of vanadium at least 50 ppb higher than all other samples. Evian also contained nineteen times the level of uranium found in the tap water sample, and Fiji contained nearly twice the amount of lead found in tap water. Levels of organic compounds were undetectable in all samples tested.</p> <p>Conclusions/Discussion Based on my results, I would recommend not choosing Fiji, Evian, or Dasini water over other bottled water brands. They are much more expensive, yet still contain many contaminants. I would recommend drinking tap water, but to run the faucet for at least 30 seconds before pouring a glass of water in the morning because trace metal might build up in the water from the pipes overnight. If I had to choose one brand of bottled water from my test samples, I would recommend drinking Market Panty (Target#s store brand) because it is inexpensive and contained the lowest levels of contaminants.</p>	
Summary Statement In my project I compared trace levels of contaminants in bottled water and tap water.	
Help Received I designed and carried out the experiment myself. I had help from Thermo Fisher Scientific understanding how to set parameters for each instrument, and how to run each of the instruments.	