CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY

Name(s)
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Project Number
J2115

Project Title
Are Parents Poisoning Children with Baby Food? Investigation of Arsenic Concentrations in Store Bought Apple Sauce

Abstract

Objectives/Goals
In September 2011, The Dr. Oz show investigated levels of Arsenic in many brands of apple juice. Their studies indicated that Arsenic has been found in apple juice at concentrations higher than the allowable limit in drinking water. Performing a literature search on baby food apple sauce and Arsenic did not return with extensive information. My experiment focuses on investigating the concentration of Arsenic in store bought apple sauces that are fed to babies. I hypothesize I will find detectable levels of Arsenic in the apple sauces by digesting the samples with acids and analyzing them using an ICP-MS.

Methods/Materials
1.Apple sauce samples were weighed and transferred to digestion vessels.
2.Concentrated nitric acid was added to baby food and allowed to digest at 95C. Additional acid was added to the baby food samples until no further dark smoke was emitted during the heated digestion. Hydrogen peroxide was added to the samples to ensure complete digestion and brought to 100mL final volume. A blank and a laboratory control spike sample were also analyzed with the samples. The blank sample contained the same amount of acids as the samples but did not contain any apple sauce. The laboratory control spike contained a known concentration of Arsenic. The blank was used to ensure there would not be false positives results. The spike was used to ensure that the method worked well.
3.Once cooled, they were filtered and analyzed on an ICP-MS.

Results
The Agilent ICP-MS was calibrated with known concentrations of Arsenic to produce a calibration curve for the analysis of the samples. Three apple sauce vendors of the baby food contained Arsenic at low levels. Beech Nut had the highest Arsenic concentration average at 1.92 parts per billion, Full Circle had an average 1.51 parts per billion of Arsenic, and with the lowest average at 1.01 parts per billion was Gerber.

Conclusions/Discussion
Although the levels of Arsenic found in the different apple sauces were very low in comparison maximum allowable concentrations as published by the FDA, I believe that there is insufficient data with respect to exposure and long term effects in infants. Infants have a lower body mass, do not have developed immune systems, and the cells are still developing. These can lead toward increased possibility of contracting any of the diseases associated with Arsenic exposure.

Summary Statement
Investigation of Arsenic Concentrations in Store Bought Apple Sauce Baby Food using an ICP-MS.

Help Received
The instrumentation and chemicals were supplied by Agriculture & Priority Pollutants Laboratory in Clovis, CA and was mentored by Stephane Maupas and Leonard Fong.