



CALIFORNIA STATE SCIENCE FAIR 2016 PROJECT SUMMARY

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| Name(s) Sakina Bambot | Project Number S0602 |
| Project Title Bisphenol A Transfer from Receipts: Detection Using TOF-SIMS | |
| Abstract Objectives/Goals The objective of this experiment is to see whether Bisphenol A (BPA) from receipts will transfer onto surfaces such as your hand. Another objective is to see if BPA levels in receipts have decreased over the years. Methods/Materials Receipts from 1980, 1981, 1995, 1997, 2001, July 2015, November 2015, and December 2015 were used. Each receipt was rubbed against a piece of silicon wafer. Additionally, three control wafers which were not rubbed on receipts were used. The silicon wafer pieces were then mounted onto the TOF-SIMS instrument holder and a 0.2 by 0.2 millimeter area on each silicon piece was analyzed. It was examined for the presence of BPA by looking for a peak at mass 213 (a peak at mass 213 is indicative of BPA presence). The ratio of the counts under the peak at mass 213 to the total number of counts in the spectra was calculated in order to determine the normalized intensity. This intensity was compared among the samples. Results BPA was observed in all of the receipts. There was no clear trend observed in the level of BPA with the progression of years. The December 2015 receipt showed a much lower level of BPA than the other receipts while the one from November 2015 showed the highest level. In some cases, a high standard deviation was seen, suggesting a high trial to trial variability in the transfer of BPA. Conclusions/Discussion The fact that BPA levels were found in receipts from all the years, indicates that nothing has been done to eliminate BPA from receipts. Higher and lower levels of BPA within 2015 may have been due to the differing receipt manufacturers as these receipts were from different stores. In the future, this procedure can be used to determine what other harmful substances are transferred from receipts. | |
| Summary Statement Using the TOF-SIMS technique, I found that receipts from the year 1980 to 2015 did transfer Bisphenol A, and that transfer did not decrease over the years. | |
| Help Received Evans Analytical Group allowed me to use their TOF-SIMS instrument under the supervision of Dr. Ginwalla and provided me with clean pieces of silicon. My parents for drove me around and supported me. Ms. Bisaha provided me with older receipts. | |