A41 Cocaine Contamination of Paper Currency in Birmingham, Alabama

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After attending this presentation, attendes will have learned about analyte loss through different extraction methods. In addition, the methods can also be adapted and applied in any classroom setting to teach drug chemistry, techniques for extractions and GS/MS usage, and practical hands-on experience with techniques applied in forensic laboratories. The long term aim of this project is to develop purification methods for profiling impurities and precursor materials.

This presentation will impact the forensic community by adding Birmingham, AL to the major U.S. cities that have been tested for the presence of cocaine in the local currency. In addition, the researcher will be able to analyze the pros and cons for dry extraction versus acid/base extraction methods, allowing analysts in forensic labs to choose between detection limit and injecting unknown impurities in sensitive lab equipment which may result in carry over to subsequent runs.

The objective of this project was to test $1 bills in Birmingham, AL for trace amounts of cocaine and to compare both purification of the sample and sample loss on a qualitative basis using a dry extraction and an acid base extraction for both cocaine on $1 bills and levmethamfetamine (l-meth) in nasal decongestive inhalers. The attendee will learn about analyte loss through different extraction methods. In addition, the methods can also be adapted and applied in any classroom setting to teach drug chemistry, techniques for extractions and GS/MS usage, and practical hands-on experience with techniques applied in forensic laboratories. The long term aim of this project is to develop purification methods for profiling impurities and precursor materials.

There have been numerous reports of the percentage of paper currency that is contaminated with cocaine and other controlled substances in both the U.S. and internationally. However, the term “dirty money,” covers more than just the presence of a controlled substance. Contamination found on currency includes nicotine, bug repellent, sunscreen, Ritalin, procaine, plasticizers, cosmetics, glycerol, and other substances (JOEL). Potentially pathogenic bacteria were found on 94% of $1 dollar bills tested in west Ohio (Pope et al. 2002) and germs of fecal, respiratory, and skin origin were found on bills from Chicago, New York City, and Washington, DC (Turner 2001).

Twenty $1 bills randomly retrieved from a Wachovia bank in the Birmingham AL area were extracted with 10 ml of methanol. The methanol extract was divided into two equal portions and the methanol evaporated. One portion was then analyzed by dry extraction into $CHCl_3$ and the other portion underwent an acid base extraction. Results from GC/MS analysis of the extractions indicate that 80% of the bills were positive for cocaine when analyzed with the dry extraction, however, the chromatogram had many impurities. Some of the impurities carried over into the blank injected between each sample. The number of bills testing positive for cocaine was much less using the acid base extraction, however, the chromatograms were cleaner and there was no carryover.

Similar extraction experiments were performed using nasal decongestion Inhalers to compare the results of dry extraction versus acid/base extraction for l-meth. Similar results were obtained: there was loss of the l-meth after acid/base extraction relative to the dry extraction. The levels of some impurities were decreased relative to the l-meth. There were some impurities that were not affected by the acid/base extraction and may, in fact, have even been enhanced. Carryover was not a problem in either of the extraction methods. This work is ongoing.

In conclusion, two methods were used to extract cocaine and l-meth from $1 bills and Vicks decongestive inhalers, respectively. For both sets of date, the acid/base extraction results in a cleaner GC/MS spectrum, is better to run on the GC column, but yields less intensity in chromatogram peaks due to sample loss through the multi-step cleaning process. Carryover of the impurities was seen in blank injections between cocaine sample runs.

Cocaine, Currency, Extraction

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