



B185 What's in the Bag? Screening Trace Drug Contamination in Baggies by Thermal Desorption Combined With Direct Analysis in Real Time-Mass Spectrometry (TD/DART[®]-MS)

Edward Sisco, MS, NIST, 100 Bureau Drive, MS 6431, Gaithersburg, MD 20899; Marcela Najarro, MFS, NIST, 100 Bureau Drive, MS 8371, Gaithersburg, MD 20899; and Jennifer R. Verkouteren, MS, 100 Bureau Drive, Mailstop 8371, Gaithersburg, MD 20899*

After attending this presentation, attendees will better understand how TD/DART[®]-MS can be used to analyze the trace contaminants present on the outside of bags to identify the drugs present within.

This presentation will impact the forensic science community by providing a method for rapid presumptive screening of evidence for the presence and identification of narcotics.

As the presence of increasingly dangerous and toxic narcotics enter forensic laboratories, analysts must be aware of the hazards they may present. Because most evidence looks similar in nature, either pills or powders, it is often difficult for an analyst to know to what degree the evidence must be treated as a hazardous substance. Knowing the contents of the container is crucial to understanding the level of personal protection that is required. Currently, the package (typically a baggie) must be opened to retrieve a small amount of unknown evidence for testing. Spectroscopy techniques, such as Raman spectroscopy, have the ability to analyze the contents through the bag, but struggle to interpret mixtures. This work proposes a new analytical scheme through which a presumptive identification of the compounds inside the bag or container can be made without opening the evidence container.

The theory of trace contamination is well rooted within forensic science. When someone handles a material (in this case, a powder or pills) a trace amount of residue will be transferred onto the person's hands, then onto other surfaces that are subsequently touched. Furthermore, when a powder or pills are poured into a bag, a small amount of fine particulate is suspended in the air and can potentially resettle onto the outside of the bag. This work seeks to take advantage of these principles to establish whether the trace contamination on the outside of a bag or container can provide reliable information as to the constituents of the evidence inside.

In this work, samples of the trace contamination of simulated and real-world samples (bags or containers containing suspected narcotics) were obtained by swiping the exteriors with a meta-aramid wipe. These wipes were subsequently analyzed with TD/DART[®]-MS. TD/DART[®]-MS providing a rapid analysis (less than five seconds) with no sample preparation. It has been shown to have sub-nanogram detection limits and can readily handle complex multi-component mixtures. The compounds identified from the exterior of the bag were then compared to compounds identified by analyzing the actual powders or pills by TD/DART[®]-MS and/or Gas Chromatography/Mass Spectrometry (GC/MS). The ability to correlate the exterior signature to the interior signature was then established.

To date, screening results from swiping the exterior of the bags have matched the TD/DART[®]-MS and GC/MS results of the interior of the bag. While the sample set is small, current work is focused on expanding the number and variety of samples being tested. Additionally, quantification of the amount of trace contamination on the exterior of bags is also being investigated to establish the level of narcotics present.

DART[®]-MS, Drug Analysis, Screening