



K40 Detection of Fentanyl and Lidocaine in Dried Blood Spots Using High Performance Liquid Chromatography Tandem Mass Spectrometry

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After attending this presentation, attendees will understand a unique toxicological analysis on an alternate sample matrix using HPLC/MS/MS.

The goal of this presentation is to communicate the validation and analysis of dried blood spots which were deposited onto household tissue paper. The circumstances of the donor's death were suspicious; a unique analytical opportunity was presented to the laboratory to either confirm or refute a suspect's version of the events.

This presentation will impact the forensic toxicology community in several ways. Firstly, it demonstrates that even in the absence of traditional toxicological samples such as liquid blood or urine, valuable information can be extracted from materials that more closely resemble trace evidence. Secondly, it demonstrates the sensitivity capable when state of the art instrumentation is used, suggesting that high performance liquid chromatography tandem mass spectrometry can allow for drastically reduced sample amounts. Lastly, the simplicity of the sample preparation points to streamlined extraction procedures for general drug screens.

Dried blood spots (DBS) on paper have been routinely used in DNA analysis for some time. Stain cards are routinely used by forensic laboratories for both analysis and archival of blood samples. Recently, the use of DBS samples has been also applied to clinical toxicological studies. A primary advantage of DBS analysis is that much smaller blood volumes are necessary; 15 microliters of blood can be sufficient. Another advantage of DBS analysis is the collection, transport, and storage of the stained paper material. A final benefit of the DBS analysis is the opportunity for significantly simplified sample treatment procedures due to the reduced matrix effects. The extraction employed a simple methanolic solvent extraction followed by centrifugation of a punch taken from the DBS. The success of clinical DBS analysis suggests that utility may also be found in the forensic toxicology arena.

An application of the DBS paper analysis technique was used to answer a unique analytical question posed by law enforcement during the investigation of a suspicious death. Blood stained tissue paper was recovered from the victim during the process of emergency medical treatment and law enforcement investigation. DNA analysis confirmed that the dried blood was from the expired donor. Statements from the victim's spouse seemed to be in conflict with the observed events. Establishing the veracity of the spouse's statements was dependent upon determining the precise timing of the blood deposition on the tissue paper. Emergency room medical treatment included the application of 8 drugs, including fentanyl and lidocaine. The presence or absence of these drugs in the dried blood deposited on the tissue would either confirm or refute the suspect's statements.

The analytical approach, validation, and outcome will be presented highlighting the advantages of the technique and suggesting directions for simplified drug screening methods.

Dried Blood Spots, Alternate Matrix, Tandem Mass Spectrometry