B140 The Detection of Volatile Organic Compounds (VOCs) Released From Mass Storage Devices Utilizing Headspace/Solid-Phase Microextraction (HS/SPME) and Its Implications for Canine Training and Contraband Detection

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Learning Overview: After attending this presentation, attendees will have more insight into the headspace analysis of various mass storage devices and the VOCs associated with them.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by providing recommendations for successfully training canines to detect mass storage devices.

Canines have been well known for their detection capabilities of illicit materials, such as explosives and narcotics. In recent years, canines have been trained to successfully recognize mass storage devices that may contain evidence of illegal activity. In cases of internet-based crimes, for example, evidence may be recovered as retrieved incriminating messages or files from the offender's mass storage device. These devices may be very small, as in the case of Secure Digital (SD) cards, and therefore very difficult to find as they may be hidden in areas not visible to the human eye. However, canines can be used to detect these clandestine devices by recognizing the odor (VOC) released by these devices. An example of this was observed in the home of former Subway® spokesperson, Jared Fogle, where a canine detected a hidden Universal Serial Bus (USB) drive containing incriminating pornographic material that was not previously found by investigators.

These canines have found regular usage within law enforcement correction facilities that employ them to find contraband devices being smuggled into the prisons. The method of training these canines for this purpose varies greatly, with limited scientific work done to validate the practice or determine the mechanism by which these canines detect these devices. As a result, theories as to the target material to be used for canine training are numerous, from training on entire devices for detection, such as a cellular phone, to training on only portions of the device, such as a lithium battery, creating even further variability and reliability in the detection capabilities of the canine.

The signature VOC and the specific odors that canines are alerting to in most of these devices remain to be scientifically determined. In addition, devices may produce different VOC profiles depending on the model, make, etc. This study analyzed a wide variety of cellular telephones, their components, such as batteries and Subscriber Identification Module (SIM) cards, as well as other commonly used mass storage devices. The results of this study will discuss the headspace VOC associated with these various devices and any common VOC that can potentially be used as a canine training aid to improve canine detection to a wider range of mass storage devices.

Canine Detection, Mass Storage Devices, Volatile Organic Compounds