A126 The Effects of Containment System Selection for the Storage of Surrogate Continuation Aids

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After attending this presentation, attendees will understand the steps taken to determine the optimal containment system for storing various detection canine surrogate continuation aids. The determination of the proper containment system is a critical step in determining both the effects of containment on the odor availability of the surrogate continuation aid and the ease at which the aids become contaminated. Headspace analyses using solid-phase microextraction (SPME) coupled with gas chromatography with either electron capture or mass spectrometry detection was used to identify and quantify the odorant emanating from the secondary containment system over a series of weeks. Headspace analyses of the surrogate continuation aids were also performed to determine if cross-contamination of the surrogate continuation aids held within the containment vessel was also occurring.

This presentation will impact the forensic science community by reducing the current gap in knowledge in the field, allowing for reliable system of training aid containment to be implemented in the field. Maintenance of the integrity of the surrogate continuation aid odors is imperative to ensure standardization of training, increasing the reliability of the canine to detect the various illicit odors.

The goal of this study is to determine the optimal containment system for storing various detection canine surrogate continuation aids. Selection of the proper storage system is necessary for the maintenance of potency, efficacy, and functional integrity of canine surrogate continuation aids as cross-contamination of the surrogate continuation aids are always of great concern. Currently canine handlers and trainers use a variety of containment systems (glass, plastic, cloth, etc.) for surrogate continuation aid storage; however, an in-depth and systematic study is required to determine the optimal containment system, taking into consideration different factors that potentially play important roles in the potency and efficacy of the surrogate continuation aids.

In order to establish a consistent and optimal practice among canine handlers, law enforcement agencies and other allied parties formed the Scientific Working Group on Dog and Orthogonal Detector Guidelines (SWGDOG) which has produced a series of best practice guidelines covering different aspects of canine and orthogonal detectors. While SWGDOG has identified several areas of continued research, the effects of containment system on odor availability and the development of methods to monitor the levels of contamination of surrogate continuation aids have been identified as critical research topics. Both of these critical research topics have been addressed in this research study.

The determination of the proper containment system is a critical step in determining both the effects of containment on the odor availability of surrogate continuation aids and the ease at which the aids become contaminated. Three levels of containment have been identified for the proper and adequate storage of a canine surrogate continuation aids. The primary level of containment should deliver a known and controllable amount of odor to the atmosphere, for example through selective permeation. The secondary level of containment encloses the surrogate continuation aid in primary containment. Requirements for secondary containment include: airtightness, sufficient size to hold the surrogate continuation aids, portability, and have no adverse effect on the surrogate continuation aid. The final, tertiary level of containment must be airtight, sufficiently large to hold the surrogate continuation aids in secondary containment, and portable.

Airtightness tests were performed on the secondary containment systems to initially screen viable options since permeation out of the secondary containment system will be reduced if the system is found to be airtight. Once potential secondary containment systems were selected, a cross-contamination study was performed to determine which secondary containment system demonstrates the least permeation of the volatile odorants out of the containment system. Volatile odorants selected for testing included the surrogate continuation aids found in the International Forensic Research Institute (IFRI) Prototype Surrogate Explosives Kit as these results are needed to advance the technology of Controlled Odor Permeation Systems (COMPS) and a standardized training kit. Headspace analyses using solid-phase microextraction (SPME) coupled with gas chromatography with either electron capture or mass spectrometry detection was used to identify and quantify the odorant emanating from the secondary containment system over a series of weeks. Headspace analyses of the surrogate continuation aids were also performed to determine if cross-contamination of the surrogate continuation aids held within the containment vessel was also occurring. Permeation rate comparisons, through gravimetric analyses, were made between various containment media to determine if the containment vessel affects the effective life-span of the aid.

From the small scale studies completed, the canning jars demonstrate the best performance for being the optimal secondary containment system; however, these jars have metal lids that potentially form rust over time and may add unwanted odor to the surrogate continuation aids. To abate this concern, we have expanded the selection of containment systems beyond ones currently used in the field for testing.

Maintenance of the integrity of the surrogate continuation aid odors is imperative to ensure standardization of training, increasing the reliability of the canine to detect the various illicit odors. This study reduces the current gap in

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knowledge in the field, allowing for reliable system of surrogate continuation aid containment to be implemented in the field.

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Detection Canines, Storage, Explosive Surrogate Continuation Aids

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