



### **B62 Do Hygiene Products Cause False Positives in Arson Investigations?**

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After attending this presentation, attendees will better understand the frequency with which male hygiene products contain compounds that can interfere with Ignitable Liquid Residue (ILR) analysis. Through this presentation, attendees will learn that although several classes of hygiene products are very unlikely to contain traces of ignitable liquids, other products do contain potential interference that can complicate the interpretation of ILRs found on a suspect's clothing.

This presentation will impact the forensic science community by presenting information that may lead to the ability to help arson investigators arrive at better conclusions about the presence of ILRs on a suspect's clothing.

Arson investigators often search for the presence of ILRs in fire debris samples that are collected from suspected arson scenes and suspects. Such residues most frequently involve gasoline but can include other petroleum distillates, such as the kerosene. As described in the American Society for Testing and Materials (ASTM) E1618, fire debris analysts typically use Gas Chromatography/Mass Spectrometry (GC/MS) data to analyze samples for compounds that are common in ignitable liquid residues. These compounds include aromatics, naphthalenes, straight chain alkanes, branched alkanes, and cyclic alkanes. During an investigation, a suspect's clothing is sometimes collected and analyzed for the presence of ILRs. Previous research has shown that certain matrices — including clothing, fabric and footwear — contain compounds similar to those found in ILRs. In these cases, it is therefore important to distinguish between “innocent” background residues of ILRs from possible transfer during the crime. Although examples of matrix interference have been quite well documented, there are fewer studies that assess the likelihood of interference from common products that suspects are exposed to on a daily basis.

This study surveys the frequency of occurrence of ILRs in more than 27 men's personal care products. After headspace analysis, GC/MS analysis enabled the different components of ILRs to be elucidated through the use of extracted ion chromatograms. The various samples were analyzed using common extracted profiles, such as  $m/z$  43, 91, and 142. The data were analyzed for the presence of toluene, ethylbenzene, *p/o*-xylene, *n*-alkanes, cycloalkanes, and branched alkyl naphthalenes. The results revealed that of the hygiene products tested, all samples were negative for each of the compounds in question. The absence of these compounds indicates that men's hygiene products are very unlikely to result in false positives for ILRs. Therefore, it is very unlikely that in an arson investigation, a male hygiene product would lead to a false positive in the suspect's clothing. In contrast, several hand cleaners and wipes designed for mechanics and construction workers were found to be formulated with petroleum distillates. These products have the potential to interfere with the determination of ILRs.

The results of this study may lead to the ability to help arson investigators arrive at better conclusions about the presence of ILRs on a suspect's clothing.

#### **Arson, Ignitable Liquid Residues, Interferences**