

Determination of Persistence Capacity of Kerosene on Different Fabrics

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In arson crime, petroleum derivatives are often used as fire accelerants. Common accelerants available are gasoline, diesel, and kerosene, which are highly used for setting a fire crime because, they are cheap, easily ignite and highly available in the market. The most common fire crime, ignitable liquids are used to accelerate the fire and spread it in the considerable area to commit a crime. Kerosene is one of the most used accelerant in arson crimes in Sri Lanka because, kerosene has low flash points, and therefore usually they are evaporate quickly and is easy for flammability. During the intentional fire, small amount of used ignitable liquid may be splashed on the arsonist's clothes, shoes and gloves etc. Therefore, the presences of ignitable liquids on these evidence can be considered robust to conform to the arsonist responsible for fire crime. This research aims to determine how the persistence of kerosene residues on the perpetrator's clothes could help investigate fire crimes and prove beneficial for forensic cases. Therefore in this study, the persistence of kerosene residues on commonly used two different types of fabrics (cotton and polyester) is investigated. Samples were prepared by spiking four different volumes of kerosene (10, 30, 50 and 100 μl) on the fabric. After that, these samples were kept to expose to air to evaporate in a controlled period (up to three weeks) at room temperature. Next, extraction and characterization of kerosene residue from test samples were conducted via passive headspace extraction and gas chromatography-mass spectrometry method, respectively. Further, kerosene residues were detected in cotton and polyester fabric samples after up to 24 and 16 hours of drying for 100 μl . The obtained results showed that the persistence capacity of kerosene is higher on cotton fabric than the polyester fabric.

Keywords: Arson, Kerosene, Fabric, Gas Chromatography-Mass Spectrometry, Passive Headspace Extraction