Detection and Analysis of Gasoline Residues on Household Samples by Using Gas Chromatography

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Arson is an easy to commit crime. The required supplies are easily and cheaply available to the general public and no special knowledge such as hacking and marksmanship is required. It is also effective, as fires can quickly cause huge monetary damages and loss of life. Arson can be problematic to forensic investigators, as the nature of flames can destroy evidence such as fingerprints and hair at the scene of the crime. In nearly all cases of arson a liquid accelerant is used. Liquid accelerants, such as gasoline, speed up the process and increase the damage done during the time.

Our research focuses on the detection of gasoline residues on different household samples over various intervals of time. For this goal, regular unleaded regular gasoline (87 octane number) and four common household materials: carpet, plywood, newspaper, and cotton fabric were chosen. These household samples were cut into the same size pieces (1.5 x 1.5 cm^2). 50 μL of gasoline was splashed on them, and they were dried at room temperature for various time intervals (10 min, 30 min, 1 h, 2 h, 4 h, 6 h, 12 h, 24 h, and 48 h) prior to chemical analysis. Detection of gasoline residues from these samples were conducted via gas chromatography with headspace sampling and flame ionization detector. Our preliminary data has shown that a trace amount of gasoline was identified from a cotton fabric sample even after 48 hours of staying at room temperature.

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