DEVELOPMENT OF A FINGERPRINTING METHOD TO INVESTIGATE ARSONS

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Abstract

One of the most difficult tasks faced by the fire investigator is to analyze the debris collected from the scene of a fire of a suspected arson.

The study illustrates a chromatographic technique to analyze fire debris for residual petrol, kerosene and diesel. The sampling technique employed was direct headspace where the headspaces generated by heating the fire debris in nylon bags were directly injected to the gas chromatograph (GC) for the separation and the column effluents were monitored by flame ionization detector (FID).Three common fire debris (fabric, timber and soil) were selected as substrates for the simulation of arson fires.

Presence of a particular type of flammable liquid in fire debris can be identified by comparison of the GC finger print of the unknown fire debris sample with that of the known accelerant standards. Furthermore, it was found that the retention indices and peak area ratios of closely eluting peaks are useful criteria in the interpretation of fingerprints and confirming the fire accelerants.

This study shows that it is possible to isolate residues of volatile fire accelerants such as petrol, diesel and kerosene by heating the fire debris in nylon bags. Although the flame ionization detector (FID) is nonspecific, the GC/ FID fingerprint of the heated headspace of the simulated arson debris shows that, fire accelerant traces from fire debris can be positively identified by this method. Use of several authentic standards and their retention times can be utilized to establish the presence of prominent components of the accelerants.