



B119 Fire Debris Analysis Using GC/MS/MS: Detailed Case Study Interpretations

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Attendees will gain a better appreciation and measure of the increase in specificity gained through the use of the GC/MS/MS method, how it is used, and the benefits of potentially using this method in their practice. The conferee will also gain an insight into recent research published on the use of GC/MS/MS on fire debris.

This presentation will impact the forensic community and/or humanity by providing forensic scientists with a mean to better evaluate and consider the importance of the use of GC/MS/MS for the analysis of ignitable liquids in fire debris. These scientists are being asked to vote on the publication of this method as an ASTM guideline and it will afford them the chance to interact and see detailed results from the use of this method as explained by one of the most experienced forensic scientist in the use of this technique. Scientists in this field will then further understand it's capabilities as a more specific analysis with an associated higher level of confidence in the result and how it applies to presentation in the courtroom. Through ASTM publication this method will reduce the occurrence of false negative results and allow this forensic field to keep abreast with the current level of science.

The use of GC/MS/MS in the analysis of fire debris is being proposed by an ASTM sub-committee of the Criminalistics section. A guideline has been written, reviewed, revised and is now pending appropriate voting by members. This instrumentation and use of GC/MS/MS is well proven and has been used in other fields of testing such as Environmental, Pharmaceutical and the Drug Testing field for several years. The analysis of fire debris using GC/MS/MS itself has now been published in journals for over seven years. The use of a second coupled mass spectrometer based segment significantly improves the selectivity of the analysis and is the instrument of choice when presented with the objectives to detect and identify trace contaminants within highly complex matrices. The analysis for ignitable liquids in fire debris fits this situation and GC/MS/MS is the instrument of ultimate choice for such mixture analysis. The advent of GC/MS in this field, through today's wide use of ASTM E-1618 represented a significant step forward in the reliability of the analysis of fire debris. However, when these samples are highly weathered or contain possible trace quantities of an ignitable liquid in a particularly complex debris sample, GC/MS may not yield confident court presentable results or may not illustrate to the scientist enough ignitable liquid characteristics to determine a confident positive identification. In such circumstances the scientist may often suspect the presence of an ignitable liquid but without sufficient presentable characteristics the result may be undetermined. The use of GC/MS/MS may often more clearly illustrate the required characteristics for the identification of an ignitable liquid when present and thus potentially avoid the reporting of a false negative determination. This method can provide profiles of superior comparability to reference ignitable liquid analyses than with GC/MS as the effects of pyrolysates on the profiles of various compound class characteristics of ignitable liquids can be vastly reduced. The aspect of presentability is becoming more important for the courtroom so that the judge and members of the jury can clearly conclude similarity of the results of fire debris analysis to reference ignitable liquids and thus have more confidence in the result and better information to make their conclusions. The use of GC/MS/MS has already been presented in court specifically for the analysis of fire debris samples.

This presentation will focus on the step-by-step interpretation, using a class pattern recognition approach, of two samples from different case studies that will illustrate the specific advantages and limitations of the analysis of fire debris using GC/MS/MS versus the GC/MS method outlined in ASTM E-1618. The presentation will also address previous concerns of sensitivity with reference to the abilities of the trained K9 often used to locate samples at the scene.

Analysis, GC/MS/MS, Debris