B123 The Characterization of Reloading Smokeless Powders Toward Brand Identification - Part 2

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After attending this presentation, attendees will have an understanding of the value of morphology, micrometry, and gas chromatography with a mass spectrometer (GC/MS) detector in the brand identification of unburned smokeless powders.

This presentation will impact the forensic community and/or humanity by comparing a questioned unburned smokeless powder sample against the database of information can provide analysts with the ability to brand identify smokeless powder or provide a short list of brands. Additionally, the database may be available on CD or DVD at a later time for use by laboratories.

While the government closely monitors explosives, canister smokeless powders can be purchased over-the-counter by sport shooters and hunters for reloading ammunition or by bombers for constructing improvised explosive devices. Explosive fillers from pipe bombs submitted to crime laboratories frequently contain smokeless powder. Canister smokeless powders offer a readily available, relatively inexpensive explosive for use by the criminal element.

For this study, smokeless powders were subjected to different methods of analysis to build a library database for brand identification or to provide a selective list of possible powders. By using a combination of morphology, micrometry, and acquired gas chromatography/mass spectrometry (GC/MS) data, unique brand identification or a short list of possible smokeless powders from an unknown powder is possible.

Macroscopic and microscopic features of various brands were noted. Unless a unique identifier, such as a colored 'dot', was present the macro- scale examination could not identify a single, unique brand. Microscopic morphology was used to categorize the smokeless powder kernels and several approaches were used in the brand identification. Using micro-mor- phology and then GC/MS data to attempt brand identification was one method. Micrometry was added to reduce the number of possible candi- dates before or after GC/MS analysis.

The samples were extracted with methanol:dichloromethane (30:70) solvent, minimally vortexed, and injected into a GC/MS. The number of peaks, retention time of the peaks, and the mass spectrum analysis of the content of each peak was made. After morphology and micrometry, GC/MS was useful in further distinguishing brands.

Smokeless Powder, Brand Identification, GC/MS