



D56 Analysis of Non-Toxic Ammunition by Double Shot Pyrolysis Gas Chromatography/ Mass Spectroscopy (DS-PY GC/MS)

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After attending this presentation, attendees will understand how pyrolysis can be used in determining qualitative differences in smokeless powder.

This presentation will impact the forensic science community by providing a new testable method for the analysis of lead free ammunition where traditional methods might be lacking.

A Pyrolysis Gas Chromatography Mass Spectroscopy (Py-GC/MS) has been applied to the analysis of trace additive in smokeless gunpowder. The experiment used evolving gas analysis (EGA), single shot pyrolysis (SS-Py), and double shot pyrolysis (DS-Py) to determine the qualitative difference between conventional gunpowder and non-toxic gunpowder. Only 0.28 mg (about three grains of gunpowder) of the sample was needed for the analysis. The organic gunshot residue components, such as ethyl centralite and methyl centralite, which are important markers in determining the presence of gun shot residue, could be detected by double shot pyrolysis. Based on intensities and peak observations, gunpowder additive, such as diphenylamine, methyl/ethyl centralite, dibutyl phthalate, 2 nitro-diphenyl amine, and 4 nitro-diphenyl amine, were different. Differences between manufacturers can be determined. Differentiation between conventional and non toxic ammunition could only be seen in FIOCCHI brand ammunition.

Double Shot Pyrolysis, Non Toxic Ammunition, Lead Free