B117 Analysis of Triacetone Triperoxide (TATP) for Information on the Synthetic Route and Precursor Identity

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After attending this presentation, attendees will gain a better understanding of the various methods available for the forensic analysis and the identification of the organic peroxide explosive triacetone triperoxide.

This presentation will impact the forensic community by giving them enhanced methods for the detection of the "home-made" explosive TATP, as well as demonstrating the capability in certain cases to determine the particular synthetic route and precursor materials used by terrorist in preparation of the explosive.

Triacetone triperoxide (TATP) has found use in recent terrorist acts in Europe and is a potential risk to U.S. institutions. This research is focused on the analysis of initiated and uninitiated TATP for the purpose of identifying the precursors and synthetic route. GC-MS, ESI-MS and IMS analytical methodologies developed and optimized for this research will be discussed and results will be presented to demonstrate some success in meeting the stated objectives.

GC-MS with ammonia CI provides an analytical method for the determination of TATP with low picogram detection levels and the formation of an ammonium adduct ion. ESI-MS, which has not previously been considered to be an optimal method of TATP analysis, is shown to provide information on synthetic intermediates remaining in the reaction mixture at the time the synthetic reaction is quenched. IMS is also shown to be a valuable method for the detection of TATP. Results from isotopic labeling studies will be presented in support of the structural and fragmentation mechanisms observed by ESI-MS. Optical microscopic methods for the analysis of TATP will also be presented along with sample preparation methodologies.

The internet provides a wealth of information concerning recipes for TATP and the sources of precursors. The precursors used in unauthorized TATP synthesis are generally commercial products and often include additives which can carry through the TATP synthesis and may be determined in both initiated and uninitiated samples. Results will be presented to demonstrate successes and limitations of this approach, and the potential forensic value of the analyses will be discussed.

This research was supported by the National Institute of Justice, Office of Justice Programs under award 2006-DN-BX-K009. The research was conducted at the National Center for Forensic Science, a member of the Forensic Resource Network. Views presented do not reflect the position of the government or infer endorsement.

Triacetone Triperoxide, Mass Spectrometry, Explosives

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