OSAC RESEARCH NEEDS ASSESSMENT FORM

Title of research need: Concentration of Extracts Containing Triacetone Triperoxide (TATP)

Keyword(s): Explosives, Concentration of extracts, TATP, Triacetone Triperoxide

Submitting subcommittee(s): Ignitable Liquids, Explosives, & Gunshot Residue

Date Approved: 3/02/2021

(If SAC review identifies additional subcommittees, add them to the box above.)

Background Information:

1. Does this research need address a gap(s) in a current or planned standard? (ex.: Field identification system for on scene opioid detection and confirmation)

Yes. A general method to concentrate an analyte in solution is evaporation, with or without added heat, to remove excess solvent. Triacetone Triperoxide (TATP) has sufficient volatility that it may evaporate at a rate comparable to that of the solvent. Thus, an attempt to increase the concentration of TATP to easily detectable levels through solvent evaporation may result in the loss of TATP. A study is needed to identify the optimal methods of concentrating TATP solutions, including the most appropriate solvent.

2. Are you aware of any ongoing research that may address this research need that has not yet been published (e.g., research presented in conference proceedings, studies that you or a colleague have participated in but have yet to be published)?

No.

3. Key bibliographic references relating to this research need: (ex.: Toll, L., Standifer, K. M., Massotte, D., eds. (2019). Current Topics in Opioid Research. Lausanne: Frontiers Media SA. doi: 10.3389/978-2-88963-180-3)

[1] Fan, W., Young, M., Canino, J., Smith, J., Oxley, J., Almirall, J.R. "Fast Detection of Triacetone Triperoxide (TATP) from Headspace using Planar Solid Phase Microextraction (PSPME) Coupled to an IMS Detector", Anal. Bioanal. Chem. **2012** 403(2), 401-408.
[2] Oxley, J.C., Smith, J.L., Moran, J., Shinde, K. "Determination of the Vapor Density of Triacetone Triperoxide (TATP) Using A Gas Chromatography Headspace Technique" *Propellants, Explosives, Pyrotechnics*, **2005**, 30:2, 127-130.

4. Review the annual operational/research needs published by the National Institute of Justice (NIJ) at https://nij.ojp.gov/topics/articles/forensic-science-research-and-development-technology-working-group-operational#latest? Is your research need identified by NIJ?

No.

5. In what ways would the research results improve current laboratory capabilities?

The results of this research would provide the analyst with guidance as to the optimal methods for sample preparation and concentration of solutions of TATP for chemical analysis.

6. In what ways would the research results improve understanding of the scientific basis for the subcommittee(s)?

Not only will this research aid the practicing forensic scientists in individual cases, but it will also provide a better scientific understanding of the characteristics/properties of TATP.

7. In what ways would the research results improve services to the criminal justice system?

Forensic analysts would be more likely to detect and/or identify the presence of TATP in a post-blast matrix. This should aid law enforcement in their investigation of an explosion.

8. Status assessment (I, II, III, or IV): I

	Major gap in current knowledge	Minor gap in current knowledge
No or limited current research is being conducted	I	III
Existing current research is being conducted	II	IV

This research need has been identified by one or more subcommittees of OSAC and is being provided as an informational resource to the community.