B49 Variability in the Organic Impurity Profile in Amphetamine Sulfate Made by the Same Chemist

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After attending this presentation, attendees will understand drug profiling, amphetamines, and clandestine synthesis.

This presentation will impact the forensic community and/or humanity by demonstrating some valuable insights into the variations that can occur in organic impurity profiles produced for samples synthesized by the same chemist.

One of the most important underpinning assumptions in organic impurity profiling of synthetic drugs such as amphetamine, methylamphetamine and MDMA is that drugs produced by the same chemist or same clandestine laboratory can be linked together through analysis of the reaction products. This research explores this assumption through simulating the production of one of these controlled substances, amphetamine sulfate.

A common route of synthesis for amphetamine sulfate is via the Leuckart reaction. The reaction is easily achievable even by the relatively inexperienced chemist. The synthetic reaction produces a range of reaction impurities, some of which are exclusive to the production method. In many clandestine laboratories engaged in the production of amphetamine sulfate an experienced chemist may have an initial advisory rather than hands on role. That is to say they may be involved in the training of more inexperienced individuals who will engage in the day to day synthetic chemistry involved in the manufacture of the drug in question.

In this work a chemist inexperienced in the manufacture of amphetamine sulfate was schooled in its production. A number of batches of amphetamine sulfate were synthesized within the university laboratories, by the same chemist using the two step Leuckart synthesis. The starting products (benzyl methyl ketone, formamide, and formic acid) were all purchased in the UK. The reaction follows a simple two stage process: a formylation stage, in which an *N*-alkylformamide is the main reaction product, followed by acid hydrolysis, and finally extraction of the sulfate salt from ether using sulfuric acid.

The reaction impurities for each sample were extracted and analyzed using GCMS to recover the organic impurity profile. Data analysis, including HCA and PCA, was conducted to determine whether or not the samples could be linked together. The results of these analyses and their wider implications for organic impurity profiling of amphetamine sulfate samples are presented in this paper.

Drug Profiling, Clandestine Synthesis, Amphetamine

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