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Stability of amphetamine impurity profiles during 12 months of storage

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Highlights:

Changes in amphetamine impurity profiles under different storage conditions are examined.

Amphetamine impurity profiles are unstable when stored under different conditions.

Unstable profiles may complicate the comparative analysis.

Abstract

Impurity profiling is a well described forensic tool that may be applied to gain information about the illegal drug market. However, it requires experience to assess the correlation between chemical profiles thereby separating linked from unlinked samples. One of the challenges in this context is that the chemical profiles may change over time, thus complicating an assessment if samples are stored under different conditions. In this study, the impact of different storage conditions on the stability of amphetamine impurity profiles was investigated. We examined the influence of storage time, temperature, sample purity, sample quantity and the presence of methanol on the amphetamine profile stability when stored for up to 12 months.

We find that the target compounds in amphetamine impurity profiles are susceptible to all the examined storage conditions. Consequently, this unstable nature of amphetamine profiles may complicate the assessment when comparing amphetamine seizures that has been separated for longer time periods or stored under different conditions prior to seizure. Knowledge about the seizure history is rarely available to the forensic analyst. Therefore, sample stability issues should be taken into account when comparisons of chemical profiles are made.

Keywords: illicit drugs, amphetamine, profiling, comparative analysis, gas chromatography-mass spectrometry