K25 An LC/MS/MS Analytical Method for Mephedrone and Naphyrone Metabolite Analysis in Urine

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The goal of this presentation is to show a strategy for detecting metabolites of mephedrone and naphyrone in a urine matrix with tandem MS technology. Attendees will learn the identity of some of the prominent metabolites and their characteristic ions.

This presentation will impact the forensic science community by showing how mephedrone and naphyrone and their metabolites can be detected with tandem mass spectroscopy. Additionally the work will give forensic scientists confidence in the analysis of such compounds with qualifying and quantifying ion transitions.

Designer drug chemistry has been dominated by substituted phenylethylamines and tryptamines. The production, availability, and use of cathinone as a framework drug have been perceived as the next big thing. They include the beta-keto version of amphetamines which includes mephedrone. In 2010, mephedrone was made illegal in many countries. Naphyrone (also known as NRG-1, Energy-1, or O-2482) is a cathinone derivative that emerged in late 2010 as a new legal high in the UK after the banning of mephedrone. Naphyrone is a new designer drug and stimulant with many cases of abuse reported in the UK.

Until July 2010, naphyrone was not controlled by the misuse of Drug Act 1971 and was therefore not illegal for someone to possess. Since the Medicines Act prevented naphyrone for being sold for human consumption, it was often sold as a "pond cleaner." Currently very little safety or toxicity data are available for naphyrone, but its high potency by comparison with previous cathinones or MDMA (ecstasy) suggests that its use is likely to be associated with a higher risk of accidental overdose.

LC/MS/MS analysis can provide a fast analysis time as well as accurate, precise, and reproducible results. Here we present a method for the analysis of mephedrone and naphyrone metabolites in urine using a triple-quadrupole-ion trap mass spectrometer.

The method development process evaluated different sample preparation procedures, calibration curve construction, column selection, mobile phase selection, and ion suppression.

This analysis was performed on a reversed phase column analyzed by LC/MS/MS with a run time under five minutes. The mass spectrometer was operated in multiple reaction monitoring mode (MRM) in positive ion mode. The assay was shown to be accurate and precise with %CV and % accuracy within ±15% of nominal across the full linear range.

Bath Salts, Synthetic Drugs, Mass Spectrometry

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