Combined analysis of synthetic cannabinoids and other designer drugs

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Abstract

Aim: Development of an analytical method for a qualitative and quantitative determination of synthetic cannabinoids and other drugs (cathinones, piperazines, amphetamines, pyrovalerones) in human serum, based on a single sample preparation and one chromatographic run for all substances which can pass a positive electrospray ionisation.

Methods: An Applied Biosystems API 4000 QTrap tandem mass spectrometer with electrospray ionisation combined with a Shimadzu UFLC Prominence System were used for all purposes. The scheduled multiple reaction monitoring mode was used for the detection. The separation was performed on a Luna 5 µm C18 (2) 100 A, 150 mm x 2 mm column. The mobile phase consisted of A (H_2O/methanol = 95/5, v/v) and B (H_2O/methanol = 3/97, v/v), both with 10 mM ammonium acetate and 0.1% acetic acid (pH = 3.2). A binary flow pumping mode with a total flow rate of 0.400 mL/min was used. Human serum samples were extracted with 1-chlorobutane.

Results: All substances were characterised by a good linearity in the validated calibration range: 0.05 – 1 ng/mL (synthetic cannabinoids) and 1 – 50 ng/mL (other designer drugs). The limit of detection was not grater than 0.02/0.40 ng/mL and the limit of quantification not greater than 0.05/0.50 ng/mL for synthetic cannabinoids/other designer drugs respectively. The developed analytical method was applied successfully for samples provided by forensic psychiatric centres, therapy centres, hospitals and the police of Lower Saxony.

Conclusion: The presented method ensures a sensitive drug qualification in human serum. The scheduled MRM algorithm makes a safe method upgrade possible.

In the meantime, this study was published as original paper:

Dziadosz M, Weller JP, Klintschar M, Teske J. Scheduled multiple reaction monitoring algorithm as a way to analyse new designer drugs combined with synthetic cannabinoids in human serum with liquid chromatography-tandem mass spectrometry. J Chromatogr B 2013;929:84-89.