



K4 Detection of 18 Synthetic Cathinones and New Stimulants in Urine

Denise Caneparo, MS, Regione Gonzole 10/1, Orbassano, ITALY; Federica Borio, MS, Regione Gonzole 10/1, Orbassano, ITALY; Alberto Salomone, PhD, Regione Gonzole 10/1, Orbassano (TO), ITALY; Marco Vincenti, MS, Centro Regionale Antidoping, Regione Gonzole 10/1, Orbassano, Torino 10043, ITALY; and Roberto Testi, MD, PhD, Via Lessona 54/12, Torino, 0 10145, ITALY*

After attending this presentation, attendees will gain knowledge on the performance of a new analytical method developed in order to detect a wide range of new psychoactive substances in urine.

This presentation will impact the forensic community by describing which molecules among new synthetic cathinones or other new stimulants are likely to be the most used in the Piedmont Region of Northern Italy.

Recently, forensic laboratories have been challenged worldwide with the need to detect a variety of New Psychoactive Substances (NPSs) in different biological specimens. These compounds, frequently referred to as either “designer drugs” or “legal highs,” have little or no previous history of medicinal use. Although the consumption of these drugs has been tolerated for quite some time, currently the majority of them are progressively banned as serious side effects and acute intoxications (occasionally fatal) are becoming increasingly frequent. However, legal interdiction of specific substances is often thwarted because their chemical structure can be slightly modified with relative ease to create new, still-unbanned drugs with similar properties. Amphetamine derivatives, with backbone molecular structures of either piperazine or cathinone, represented the initial group of designer drugs. Although most of the latest drugs act as Central Nervous System (CNS) stimulants, their chemical structures are assorted, ranging from derivatives of pipradrol, ketamine, phencyclidine, arecoline, aminopropylbenzofuran, and ring-substituted aminoindans to thiophenyl bioisosteres of methamphetamine, as well as cocaine-related structures. Several analytical methods were developed to determine some NPSs and/or their metabolites in either blood or urine, but routine urine screening tests are rarely performed on large populations. Consequently, almost no prevalence studies are available. For the same reason, the potential association between NPS use and traffic or occupational accidents is totally unknown so far.

This study developed and validated a Gas Chromatography/Mass Spectrometry (GC/MS) method to detect 18 compounds in urine. The following parameters were investigated: selectivity; specificity; linearity range; detection and quantification limits (Limit of Detection (LOD) and Limit of Quantitation (LOQ)); intra-assay and inter-assay precision and accuracy; carry-over effect; recovery; and matrix effects. Finally, the method was applied to the analysis of 43 real urine samples, obtained from roadside drug controls and workplace drug testing. Four samples tested positive for butylone, one for mephedrone, and nine for cathine/ephedrine, including one sample also positive for 4-fluoroamphetamine.

This study demonstrated the spread of new synthetic cathinones or other new stimulants, likely as recreational drugs and potentially used as substitutes for cocaine and amphetamines, in the population of drug consumers in Piedmont, Northern Italy. Therefore, the progressive introduction of efficient screening and confirmation tests for the detection of acute and chronic abuse of the new “designer-drugs” appears to be crucial within the entire drug-prevention policy.

Cathinones, Bath Salts, Mephedrone