

Determination of Opiates, Amphetamines, Cocaine, Phencyclidine, and Metabolites in Hair by LC-MS-MS

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Hair testing was developed as a compensation method of urine testing to understand the history of a drug-abuser. It could also be applied on the study of drug abuse prevalence for public health purpose. Because the lower detection limit and simpler analysis procedure, developing a hair testing method using liquid chromatography/tandem mass spectrometry (LC-MS-MS) is better than gas chromatography/mass spectrometry.

We have successfully developed the hair testing methods of amphetamines (methamphetamine, amphetamine, MDMA, MDA), opiates (morphine, codeine, 6-acetylmorphine), phencyclidine, cocaine and benzoylecgonine. The analysis of these drugs is based on cleaning the specimen with dichloromethane, then grinding it in liquid nitrogen, these 10 compounds are then extracted with methanol, and then detected using LC-MS-MS by multiple reaction monitoring mode (MRM). The linear ranges are 200-12,000 pg/mg, The low ends could meet the cut-off criteria of the Proposed Revisions to Mandatory Guidelines for Federal Workplace Drug Testing Programs of SAMHSA, USA. All of the R² values of the linear range of target compounds are more than 0.997, and the accuracy are within 20 % for quality control samples.

The proposed procedure was also applied to test 85 volunteers' hair. In 50 samples collected from USA, 8 are MDMA positive, 6 are cocaine positive, and 1 is Methamphetamine positive. In 35 samples supplied by local hospital, 26 are MDMA positive and associated with 9 methamphetamine/amphetamine positive and 1 morphine positive, and 2 are methamphetamine and 6-acetylmorphine positive.

KEYWORDS: *Hair testing, Amphetamine, Methamphetamine, MDA, MDMA, Morphine, Codeine, 6-Acetylmorphine, Phencyclidine, Cocaine, Benzoylecgonine, LC-MS-MS*

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