

A screening method using LC-MS/MS for illicit drugs in plasma and postmortem blood

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Screening of biological specimens in the presence of illicit drugs is of great importance, particularly in criminal cases. The most relevant matrices to be analyzed for this purpose are plasma or blood, due to providing a good correlation between their concentration and pharmacological effects. Plasma and blood can often be interchanged in most methods, however, postmortem blood associated to haemolysis, which can contribute such a problem exacerbate the analysis.

For majority of laboratories, a common method for screening illicit drugs has been immunoassay methods and Gas Chromatography–coupled with Mass Spectrometry (GC–MS) that is widely employed for confirmation purposes. GC-MS is still the most widely used method of reference. However, the widespread use of liquid chromatography coupled single-stage or tandem mass spectrometry (LC–MS, LC–MS–MS) is becoming increasingly significant for both qualitative and quantitative analysis of target analyte which could be polar and thermally labile.

Many LC–MS methods for the determination of illicit drugs in plasma/blood have been reported. However, published reports for the simultaneous determination of illicit drugs are few.

In this study, a screening LC-MS method for illicit drugs in human plasma and postmortem blood was developed. This assay method, consisted of morphine, (\pm)-amphetamine, (\pm)-methamphetamine, cocaine, benzoylecgonine, cocaethylene, (-)- Δ 9 THC, (-)-11-nor-9-carboxy- Δ 9-THC and (\pm)-11-Hydroxy- Δ 9-THC was based on the detection of LC-ESI-MS. For extraction, 500 μ L volume of blood sample was used. It was buffered with carbonate (0.01 M, pH 9.3) and solid-phase extraction was followed. Chromatographic separation was performed on a C 18 Column; the mobile phase composition was (4 mM, pH 4.6) ammonium acetate. The mobile phase isocratic conditions were as follows;

40% A (acetonitrile): 60% B (4 mM, pH 4.6 ammonium acetate) for 10 mins. Selected ion monitoring (SIM) detection was applied for ions at m/z 286 (morphine), 136 (amphetamine), 150 (methamphetamine), 304 (cocaine), 290 (benzoylecgonine), 318 (cocaethylene), 313 (THC), 345 (THC-COOH) and 331 (11-OH-THC). Those ions are considered to provide a sufficient confirmation of identity. The lower limit of detection (LLOD) were between 4-9 ng/mL and for linearity, correlation coefficient was $r^2=0.994$. The recovery rate ranged from 79 to 87 % for each analyte.

It can be concluded that, this method has been successfully applied to the clinical and legal autopsy cases as a screening method.

KEYWORDS: *Illicit drug screening, LC-MS, postmortem blood, plasma*

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