Specific screening for illegal drugs and psychoactive medicines in whole blood using LC/MS/MS

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AIM: To evaluate a rapid and sensitive method for specific screening of blood samples from apprehended drivers suspected to be under the influence of drugs other than alcohol. The method should cover frequently used illegal and medicinal drugs important for traffic safety, detecting drugs that are included in the different present screening and confirmation methods, using immunological, LC/MS and GC/MS-procedures.

METHOD: The procedure included liquid/liquid extraction followed by electrospray LC/MS/MS in the positive ion-mode including detection of one transition ion from each compound. The following drugs and some of their metabolites were included: Amphetamines, ecstasy and similar compounds, tetrahydrocannabinol (THC), cocaine and benzoylecgonine, LSD, morphine, 6-monoacetylmorphine (6-MAM), codeine, methadone and buprenorphine, commonly used benzodiazepines (BZDs) and some of their metabolites, zopiclone, zolpidem, carisoprodol and meprobamate, totally 32 compounds and 8 different deuterated internal standards. 213 blood samples from apprehended drivers due to suspicion of driving under the influence have been analysed simultaneously for comparison with the present standard methods used for such cases.

RESULTS: The described LC/MS/MS- method showed sufficient sensitivity demanded for the samples, compared with low calibrators ranging from 0,3 ng/ml – 65 ng/ml depending of the compound. Comparison of results from parallel analyses of the blood samples using the described method and the standard routine procedures, showed that drugs that were detected by the standard methods were also detected by the evaluated method. However, some few deviations were recorded due to different cut-off levels. Approximately 80% of the samples evaluated were positive for one or more drugs included in the analytical program. The most frequently detected drugs were one or more BZDs (62 % positive), amphetamines (40% positive), THC (31 % positive) cocaine/benzoylecgonin (10% positive), opiates (morphine/6-MAM/codeine) (8,5 % positive). The quantitative results for some of the compounds showed deviations compared to the standard quantitative methods, as the best analytical conditions could not be obtained for all compounds simultaneously.

CONCLUSION: The method is flexible and time-saving for the detection of many different compounds at a wide concentration rage, and several screening methods can be substituted by one single method. This is of major importance as many apprehended drivers are multi-drug users. New compounds can easily be included in the method. An additional advantage is the use of compound specific screening, compared to group specific screening which is commonly for immunological screening. However, for quantification/confirmation analyses, several methods adjusted for the individual drugs /drug groups are necessary to give reproducible quantitative results.

KEYWORDS: *Illegal drugs, Medicines, LC/MS/MS-screening, Whole blood*

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