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Improvements in GC-QqQ-MS screening, 1 year of experience

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Abstract

The previously presented screening method for doping substances using GC-MS/MS by Van Eenoo et al. has been one year in operation in our laboratory. This experience allowed us to make improvements to this method in terms of detection limits and quality control.

Now the method is able to detect over 150 compounds from different classes (steroids, narcotics, stimulants, beta-2-agonists and hormone antagonists) in a qualitative way. In the quantitative part, the traditional steroid profile with most important endogenous steroids is expanded with 6 minor metabolites which further improves the detection and identification of endogenous steroid abuse. Besides these also norandrosterone, salbutamol and the major metabolite of cannabis are quantified.
Methods developed for anti-doping purposes should be subjected to the highest level of quality. Here, the addition of a combination of (deuterated) internal standards allows for an accurate quality control of every single step of the whole methodology: hydrolysis efficiency, derivatisation efficiency and microbiological degradation are individually monitored in every single sample. Additionally, evaluation of the pre-analytical phase is important. Therefore, special attention is paid to the relation between parameters indicating degradation by micro-organisms and the reliability of the steroid profile. The impact of the degradation is therefore studied by evaluation of the quantities and percentages 5α-androstane-3,17-dione and 5β-androstane-3,17-dione.

In this presentation, the modifications, improvements and ‘tricks’ will be presented. The content of the lecture is based upon the following paper:

De Brabanter, N., Van Gansbeke, W., Geldof, L. and Van Eenoo, P., An improved gas chromatography screening method for doping substances using triple quadrupole mass spectrometry, with an emphasis on quality assurance. Biomed. Chromatogr. 2012 Nov;26(11):1416-35

 ISBN 978-3-86884-038-4