

PROJECT REVIEW

“Rapid Multi-Residue Extraction and Analysis Method for Prohibited Substances in Urine”

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The existing procedures used for detecting the wide range of WADA prohibited substances in urine rely on a combination of extraction methods and analysis techniques. These techniques are reliable and proven however it does mean that every out-of-competition sample may require at least two and frequently three analysis methods whilst in-competition urine samples may have to be analysed using up to five different methods. The expansion of the Prohibited List coupled with developments in analytical technology particularly liquid chromatography tandem mass spectrometry (LC/MS/MS) has meant that laboratories have developed new methods to cope with increased demand without increasing the unit cost of analysis. An additional factor has been the desire to reduce the environmental impact of such testing by minimising the use of environmentally damaging and toxic organic solvents and derivatising agents which are increasingly expensive to purchase and dispose of.

The ultimate aim of this project is to develop a single extraction and analysis method which has the ability to detect all the compounds listed in the anabolic agents and diuretics sections of the Prohibited List. The method will be based on the use of the latest solid phase extraction (SPE) techniques along with the use of LC/MS/MS for the analysis. The use of SPE will minimise solvent use and permit ready automation of the method thus further reducing the cost of analysis. New developments in LC/MS/MS, particularly the combination of tandem systems and ion traps, mean that the potential exists to detect anabolic agents at levels below 2 ng/mL without the need for chemical derivatisation. Such a method would mean that out-of-competition samples, which form the majority of samples analysed by WADA laboratories, would only need to be extracted and analysed once, apart from hormone analysis which is beyond the scope of this project.