

## PROJECT REVIEW

### *"Analysis of doping control samples using SFC-MS"*

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Gas and liquid chromatography coupled to mass spectrometry (GC-MS, LC-MS) are the two main analytical techniques employed in World Anti-Doping Agency (WADA) accredited anti-doping laboratories for testing for the presence of prohibited compounds in biological matrices (mainly urine but also blood). These analytical methods should meet the detection criteria outlined in various WADA Technical Documents (e.g. TDMRPL).

However, supercritical fluid chromatography coupled to mass spectrometry (SFC-MS) has recently gained attention among researchers in the anti-doping community. In line with research and knowledge of the applicability of SFC, published results suggest that SFC-MS is suitable for the retention of polar compounds. These appear to show that ion suppression may be less of an issue when using SFC-MS than with conventional LC-MS; presumably because of the more volatile and smaller amount of eluting solvent. Also, the peak resolution achieved by the technique may be valuable when seeking greater sensitivity or separation of mixtures. Furthermore, instead of using solid phase extraction as a standard means of sample preparation for UHPLC MS, a simple "dilute and inject approach" avoiding sample preparation may be applied when analysing samples by SFC-MS.

This project intends to evaluate whether SFC-MS is a workable alternative to the widely applied routine LC-MS techniques in the WADA accredited laboratories. Furthermore, we would like to investigate if SFC-MS offers some features that are complementary or advantageous to LC-MS for anti-doping purposes including how well quantification of analytes may be achieved compared with the traditional approach.