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ANALYSIS OF BLOOD PLASMA- COMPARING GC-MS AND SIFT-MS

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INTRODUCTION

Samples of plasma were provided to Anatune containing unknown concentrations of a solvent and its metabolite. Concentrations of the solvent and its metabolite were determined using two techniques; by automated headspace extraction coupled to either Gas Chromatography-Mass Spectrometry (GC-MS) or Selected Ion Flow Tube Mass Spectrometry (SIFT-MS). The concentrations of the solvent and its metabolites determined by each technique were compared.

INSTRUMENTATION

SIFT-MS: Syft Technologies Voice200*Ultra* with MPS Robotic autosampler
GC-MS: Agilent Technologies 7890A GC and 7000 MS with MPS Robotic autosampler

RESULTS

Two batch of plasma samples were provided as 1 mL in Headspace vials, these were analysed by SIFT-MS and GC-MS and the concentrations calculated against calibration standards in 0.1 M sodium chloride. The results of the concentration measured by each technique are compared in Figures 1-4.

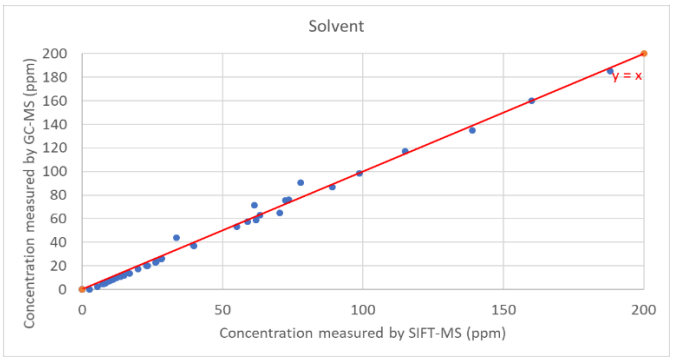

Figure 1: Sample target solvent concentration comparing between SIFT-MS and GC-MS on all samples from first batch

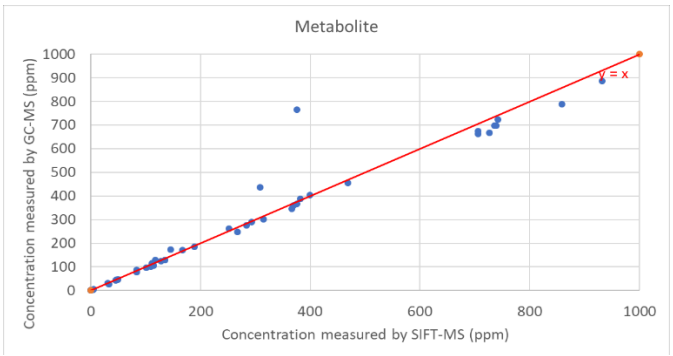

Figure 2: Sample metabolite concentration comparing between SIFT-MS and GC-MS on all samples from first batch

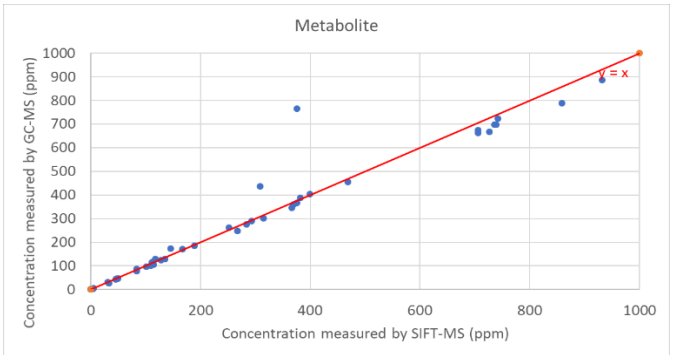

Figure 3: Comparison of solvent concentration measured by SIFT-MS and GC-MS on all samples from second batch of plasma

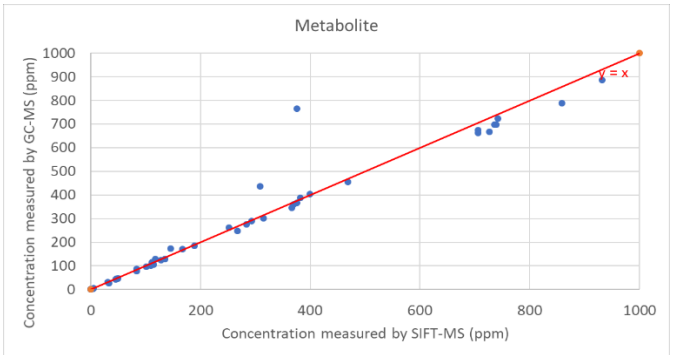

Figure 4: Comparison of metabolite concentration measured by SIFT-MS and GC-MS on all samples from second batch of plasma

CONCLUSION

A near 1:1 relationship is observed in the measured concentration determined by each technique. This demonstrates the applicability of both approaches for the analysis.

Both techniques have their merits, SIFT-MS allows a greater throughput of analysis as 70 samples were analysed in 6 hours compared to 24 hours for the same number of samples by GC/MS (four-fold difference). Due to the chromatograpic separation GC/MS provides slightly greater selectivity in analyte identification, however SIFT-MS multiple reagent ions provides specificity.

As a result of the significantly higher concentration of metabolite in the second batch of samples, carry-over appears to be a potential issue with the analysis, as many of the QC standards analysed after a high sample showed an elevated concentration from nominal. The level of carry-over appeared to be half as significant in the SIFT-MS analysis compared to that of GC-MS.