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Improved "General Unknown" Drug Screening Using GCxGCqMS

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Drug screening in the clinical setting is very often started or even solely performed with a limited selection of enzyme immunoassays in urine samples. As a general rule positive results must be confirmed by more specific and sensitive methods like GC/MS or LC/MS(-MS). GC/MS full scan mode giving the highest level of specificity often faces the problem of co-elution which esp. at high concentrations cannot be circumvented even with modern deconvolution software in many cases. However, broad, undirected "general unknown" screening for drugs of abuse not covered by the EIA/GC/MS-SIM combinations is of increasing importance. In the present study we therefore investigated if the common drawbacks encountered in a standard GC/MS full-scan method could be improved by increased chromatographic resolution by means of comprehensive GCxqGCMS in full-scan mode [1]. To perform comprehensive GCxGC measurements a two stage loop modulator (ZOEX cooperation USA) was used. By use of a modulation frequency of 6 seconds together with the selected GC parameters results in 3 modulated peaks per compound. The results out of the comprehensive GCxGCqMS were compared with the one dimensional data set.

[1] John B. Phillips and Zaiyou Liu. "Chromatographic Technique and Apparatus", US Patent No. 5135549, August 4 (1992).
[2] John B. Phillips and Zaiyou Liu. "Apparatus and Method for Multi-dimensional Chemical Separation", US Patent No. 5196039, March 23 (1993).