

“Applying accurate mass time of flight spectrometry to routine screening and profiling for forensics, environmental and biological studies”

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The requirements for screening many hundreds of compounds in complex matrices, whether drugs of abuse or environmental contaminants, presents a key analytical challenge. The high sensitivity and quantitative ability of triple quadrupole mass spectrometers has led to their widespread use in screening applications. However, the number of compounds that can be effectively targeted by triple quadrupole instruments remains relatively low with chromatography presenting a key challenge in ensuring effective separations to overcome dwell time considerations. The full scan sensitivity of time of flight instruments allows thousands of compounds to be screened simultaneously without any compromise in instrument performance, with the additional benefit of elemental confirmation of each compound using accurate mass measurement. Indeed, the development of analog to digital ion detection with fast digitization rates has provided the further advantage of accurate mass MSMS analysis by tandem quadrupole time of flight mass spectrometers, leading to increased confidence in identification. We present various screening applications where time of flight mass spectrometry offers such advantages, including environmental and food analysis. The application of accurate mass screening is also discussed in the context of biomarker profiling, both at the protein and at the metabolic level.