



B172 Recent Advances in Liquid Phase Separations for MDMA Profiling

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After attending this presentation, attendees will better understand the utility of liquid phase separations including high performance liquid chromatography (HPLC), ultra performance liquid chromatography (UPLC™), and capillary electrophoresis (CE) for the profiling of MDMA samples.

This presentation will impact the forensic community and/or humanity by assisting the forensic community by providing potential new tools for law enforcement for the analysis of illicit drugs.

Liquid phase separations allow the selective and/or sensitive determination of synthetic impurities, inorganic anions, and sugars in MDMA samples without prior extraction and/or derivatization. The high loadability of HPLC separations, coupled with selective and highly sensitive fluorescence detection, allows for the profiling of MDMA HCl samples even at purities as high as 98%. The presence of the methylenedioxy moiety on the benzene ring of MDMA and synthetic impurities gives rise to an approximate 75X increase in signal-to-noise when using fluorescence detection versus UV detection. The comparison of profiles is facilitated by the use of isoexcitation and emission plots. These colored “3D” diagrams give snapshots of time, wavelength, and either excitation or emission intensity. The profile comparisons are aided by the use of a complementary CE screen for inorganic anions and sugars. Tablets with similar physical characteristics can exhibit similar fluorescence and anion profiles potentially indicating common synthetic origin and tableting material. Conversely, tablets with similar physical characteristics may also exhibit distinctly different anion and/or fluorescence profiles, indicating different tableting materials or different synthetic origin. Similarly, powders with comparable MDMA HCl content can exhibit different fluorescence profiles, indicating different synthetic origin.

Due to the lower particle size columns (1.7 μm), high pressure capability (< 15000 psi), and reduced dead volumes, UPLC™ affords higher peak capacity and lower separation times than conventional HPLC operating at < 6000 psi. For MDMA profiling using photo diode array (PDA) UV detection, UPLC™ provides approximately twice the peak capacity of HPLC in approximately half the analysis time. UPLC™, in combination with highly selective tandem MS detection, provides up to a 260X increase in signal-to-noise over PDA UV detection. This is accomplished using multiple reaction monitoring (MRM), where specific parent daughter combinations are monitored in the static mode.

MDMA, Profiling, Liquid Phase Separations