# NEW SOLVENT GRADE TARGETED FOR TRACE ANALYSIS BY UHPLC-MS

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## NTRODUCTION

Ultra high performance liquid chromatography (UHPLC) is associated with submicron particle size column and high pressure flow resulting in increased resolution and sensitivity for complex sample mixtures and increased speed of analysis. Mass spectrometry (MS) enables the detection and identification of analytes at the parts per trillion level. UHPLC coupled with MS (UHPLC-MS) is a powerful tool in analytical chemistry that requires mobile phase solutions prepared with exceptionally pure solvents permitting trace analysis. We developed a new solvent grade for mobile phases targeting UHPLC-MS that will show a very low mass noise level in both positive and negative mode ionization, minimal metal ion content, and very low UHPLC-UV response using photodiode array detection.

## MATERIAL AND METHODS

- Mobile phase: acetonitrile (ACN), methanol, and water were evaluated; all three solvents are from a new grade, Optima<sup>®</sup> UHPLC-MS, that will provide very low mass noise level in both positive and negative mode ionization.
- Instrument: Thermo Scientific Accela UHPLC system comprised of an auto-sampler, photodiode array detector, and attached to an LTQ-XL mass spectrometer equipped with an electro-spray ionization interface.
- Column: Thermo Scientific Hypersil Gold<sup>TM</sup> column (50 mm x 2.1 mm, 1.9 micron), Catalog No: 26-102-052130.
- Standards: propazine (SPEX CertiPrep, S-3170,1000 µg/mL) as the positive mode standard and chloramphenicol (SPEX CertiPrep, S-4032, 1000  $\mu$ g/mL) as negative mode standard. These standards provided adequate ionization without any additive applied to the mobile phase.
- The mass spectrometer was operated in full scan ESI-MS from 100 to 1500 amu. The collision induced dissociation (CID) mass spectra were obtained with helium as the collision gas after isolation of the particular precursor ion. Other parameters including gas flow and capillary voltage were adjusted as required.
- HPLC Gradient:
- 0 0.5 min: 90% water, 10% ACN
- 0.5 min 2.0 min: 0% water, 100% ACN
- 2 min 5 min: 100% ACN
- Post run 5.1 min 10 min: 90% water, 10% ACN
- Flow rate: 0.6 mL/min for water/ACN, 0.5 mL/min for water/methanol Injection volume: 5 µl



## Results

- Mobile phase solvent purity was evaluated by linking UHPLC-MS sensitivity to trace analysis of positive and negative mode standards (Figs. 1-10).
- Propazine was used as positive mode standard (Figs. 3-6) and chloramphenicol as negative mode standard (Figs. 7-10) in order to assess interfering baseline peaks in both full scan ESI-MS and CID generated product ions.









- and chloramphenicol standards showed significant peak height without interfering