Balancing Selectivity, Retention and Method Run Time of Two HPLC and UHPLC Particle Architectures

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Overview

In order to achieve higher sensitivity, the use of sub-2 µm and high-pressure instruments to maximize performance has increased. Also, the increase in availability of different sub-2 µm particle architectures, allows for the selection of a particle and bonding ligand that balances the required method results. In this application, we investigate the balance of retention and method run time, with respect to particle architecture or morphology. The comparison below includes two of our most popular particle morphologies, the Kinetex Core-Shell and Luna Omega Thermally Modified Fully Porous UHPLC products. The sample was a general selectivity probe mix that combines seven different compounds of different classification – acidic, basic, and neutral compounds.

- Two Particle Morphologies
- Fully Scalable – HPLC to UHPLC
- High Performance & Reproducibility

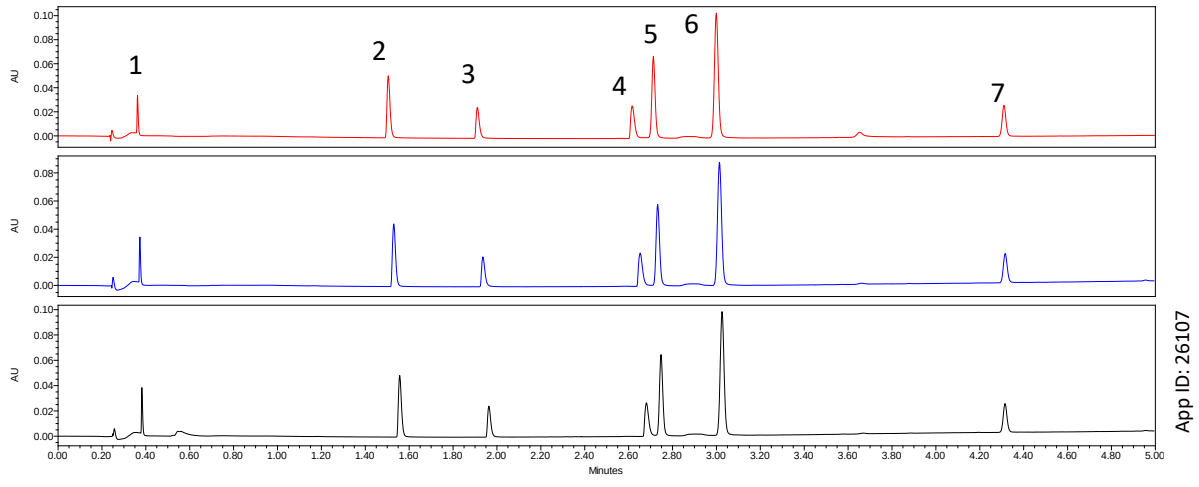
LC Conditions

Column: Luna® Omega 1.6 µm C18
Kinetex® 1.7 µm C18
Dimension: 50 x 2.1 mm
Part No.: 00B-4742-AN
00B-4475-AN
Mobile Phase: A: Water with 0.1 % Formic Acid
B: Acetonitrile with 0.1 % Formic Acid
Gradient:

Time (min)	B %
0	5
0.5	5
5.5	95
6.5	95
7.0	5
9.0	5

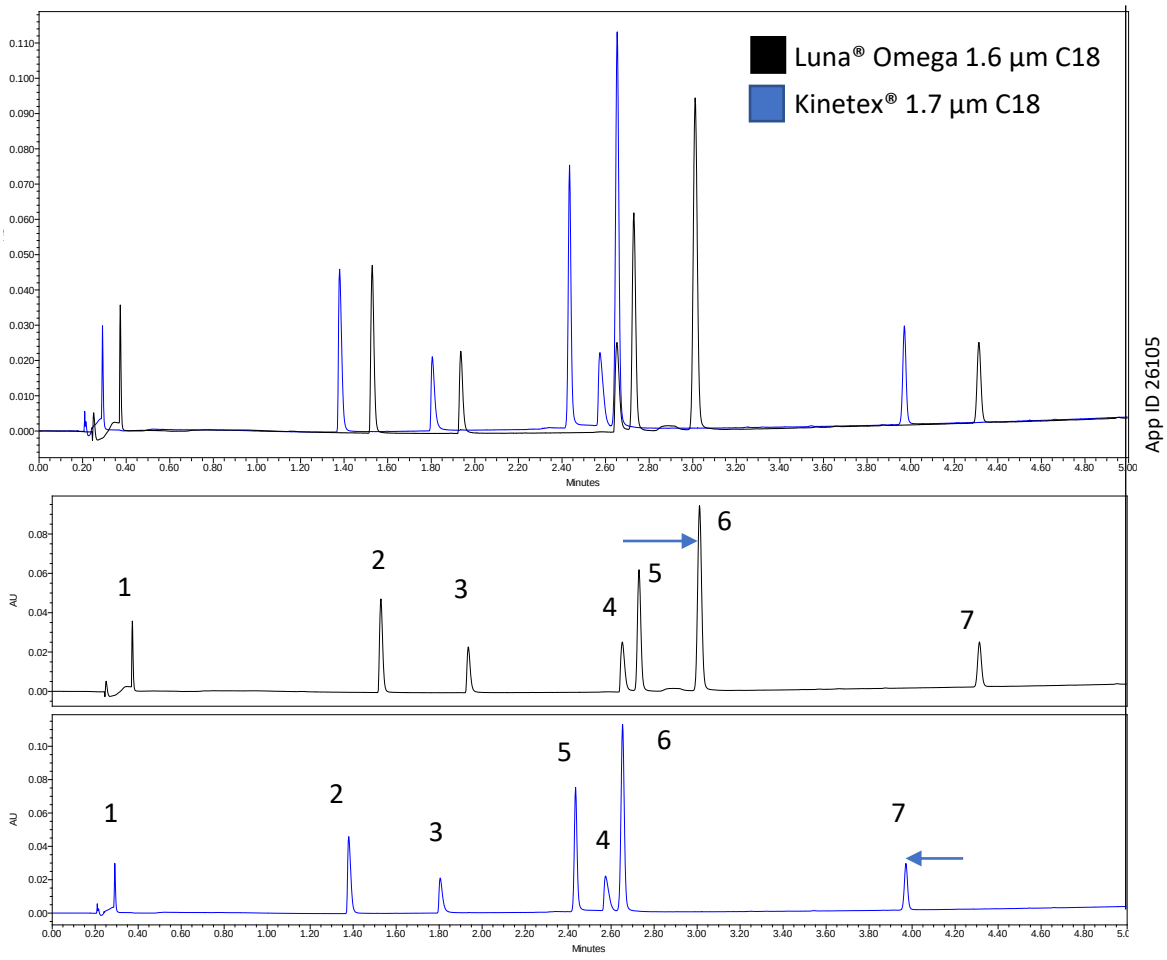
Flow Rate: 5.0 mL/min
Temperature: 30 °C
Detector: UV @ 256 nm
Injection Volume: 0.3 µL (5 µg/mL)
Sample: 1. Uracil
2. Pindolol
3. Chlorpheniramine
4. Nortriptyline
5. 3-Methyl-4-Nitrobenzoic Acid
6. 2-Hydroxy-5-Methylbenzaldehyde
7. Hexanophenone

Luna Omega 1.6 µm C18 Three Batch Comparison:



Retention and Selectivity Overlay

This overlay was generated at the same time and using the same standard mixture dissolved in water with 0.1 % formic acid. A 0.5 µL injection volume of 5 µg/mL standard solution was used in all examples. The same Waters® ACQUITY® I-Class instrument and chromatographic conditions were used in all examples.



Conclusion

Both the Luna Omega and Kinetex C18 portrayed broad compound selectivity and retention with a diverse mixture of seven representative selectivity probes. The Kinetex 1.7 µm C18 demonstrated an overall faster runtime in comparison to the more retentive Luna Omega 1.6 µm C18. However, retention difference also alludes to a slight difference in selectivity, and in the case of peaks 4 and 5, a reversal of compound elution order under the same chromatographic conditions. Therefore, allowing method developers two options that help narrow down selection of a particle architecture and phase selectivity that most apparently fits the analytical demands of their method. Starting your initial method investigation with Luna Omega 1.6 µm and Kinetex 1.7 µm C18 ensures you are starting on both a fully UHPLC to HPLC scalable and batch-to-batch reproducible column particle platform.

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