

APPLICATIONS

Kinetex® 2.6µm PS C18 Core-Shell Column's Chromatographic Performance and Unique Reversed Phase Selectivity in Comparison to a Conventional Fully Porous UHPLC Column

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Overview

In this application, we investigated the Kinetex 2.6µm PS C18 HPLC/UHPLC column's improved chromatographic performance and unique multi-interaction selectivity when applied to a screen of 36 tricyclic antidepressants (TCA). Because the Kinetex 2.6µm core-shell (superficially porous) particle morphology provides ultra-high column efficiency on any HPLC or UHPLC system¹, the investigation also included a comparison to a conventional fully porous 1.9µm UHPLC column.

Both columns tested were of the same dimension (100 x 2.1 mm) and ran under identical conditions, on the same UHPLC system, and during the same period of time. The gradient consisted of Water with 0.1 % Formic acid as the weak solvent and Acetonitrile with 0.1 % Formic acid as the strong organic solvent. A flow rate of 0.5 mL/min was used, and the column heater was set to an ambient temperature of 25 °C. An Agilent® 1200 HPLC system was used for the investigation with a SCIEX™ API 4000™ mass spectrometer (MS) for detection.

The Kinetex PS C18 is a USP classified L1 column, that provides both a unique polar and non-polar selectivity as well as 100% aqueous stability.²

Kinetex PS C18

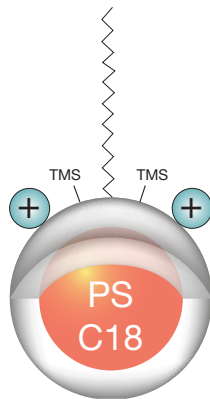


Table 1.
36 Tricyclic Antidepressants (TCA)

Q1	Q3	TCA
197.0	117.9	1,3-chlorphenylpiperazine
278.1	105.0	Amitriptyline
314.0	270.9	Amoxapine
256.0	129.9	Hydroxybupropion
325.1	108.9	Citalopram
331.1	109.0	Citalopram-D6
264.1	91.0	Nortriptyline
267.1	105.0	Nortriptyline-D3
311.1	109.0	Desmethylcitalopram
315.1	86.0	Clomipramine
301.0	72.0	Desmethylclomipramine
267.1	72.0	Desipramine
280.1	107.0	Doxepin
266.1	106.9	Desmethyldoxepin
298.0	153.9	Duloxetine
310.0	147.9	Fluoxetine
296.0	133.9	Norfluoxetine
319.1	71.0	Fluvoxamine
305.0	229.0	Norfluvoxamine
281.1	86.0	Imipramine
284.1	89.0	Imipramine-D3
278.1	191.0	Maprotiline
266.1	195.0	Mirtazapine
330.1	192.0	Paroxetine
264.1	191.0	Protriptyline
306.0	158.8	Sertraline
292.0	158.8	Desmethylsertraline
372.1	176.0	Trazodone
378.1	182.0	Trazodone-D6
295.1	100.0	Trimipramine
278.1	58.0	Venlafaxine
284.1	64.0	Venlafaxine-D6
264.1	58.1	Desmethylvenlafaxine
270.1	64.1	Desmethylvenlafaxine-D6
442.1	154.9	Vilazodone
299.1	149.9	Vortioxetine

Figure 1.
Overlay of 36 TCAs.

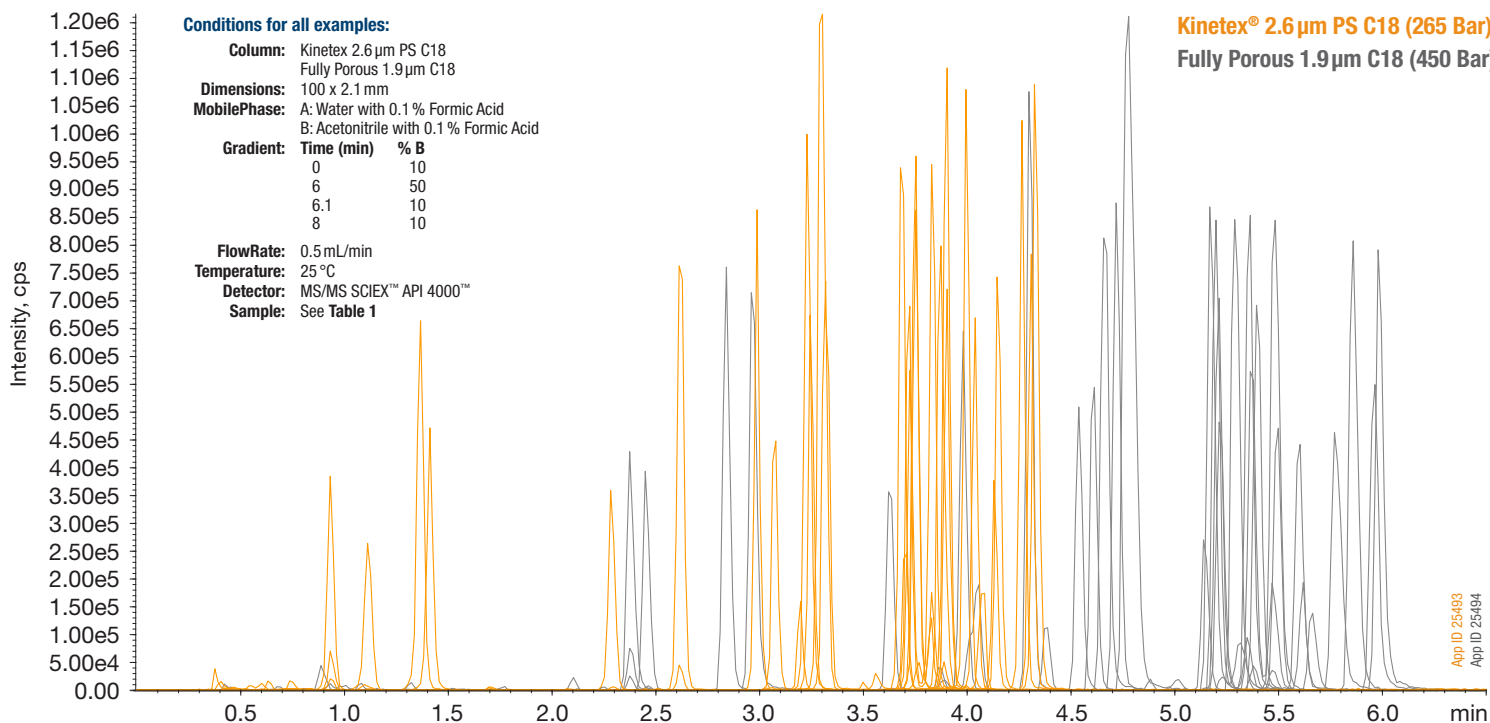
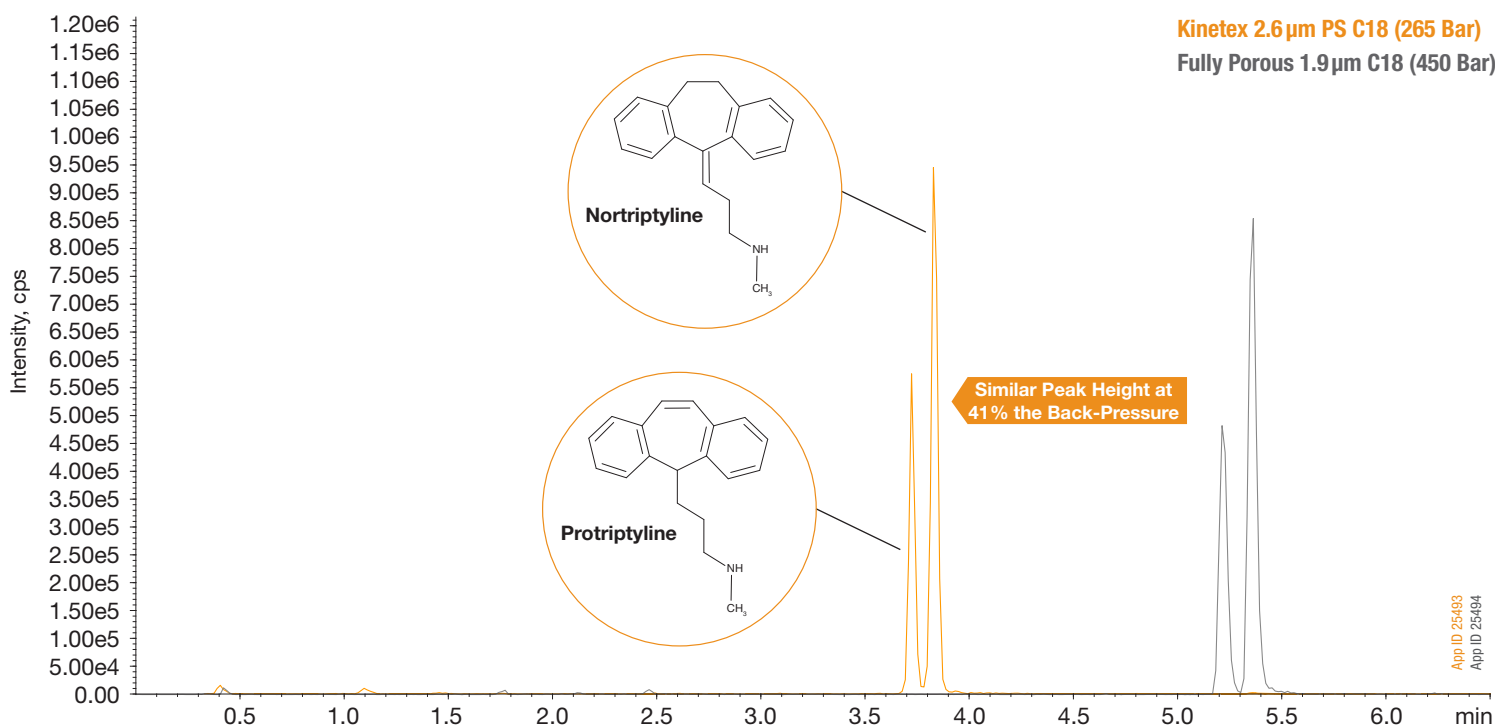


Figure 2.
Comparison of Isobaric Separation of Nortriptyline and Protriptyline.



Conclusion

In this application, we compared a Kinetex 2.6 μm PS C18 HPLC/UHPLC column to a conventional fully porous 1.9 μm UHPLC column. Both columns were designated USP L1 columns but differed by particle morphology and size. Under the same reversed phase conditions, on the same system, both columns gave similar peak height and performance but the Kinetex did so with a much lower backpressure and in a shorter window of time (**Figure 1**).

This comparison also reiterates and confirms that a Kinetex 2.6 μm core-shell particle can provide high-efficiency, UHPLC separations at lower back-pressures than conventional sub-2 μm fully porous products. **Figure 2** compares the isobaric separation of nortriptyline and protriptyline which requires chromatographic separation because they have the same MRM transitions.

Kinetex® Core-Shell LC Column Ordering Information

2.6 µm Minibore Columns (mm)					SecurityGuard™ ULTRA Cartridges†
Phases	30 x 2.1	50 x 2.1	100 x 2.1	150 x 2.1	3/pk
PS C18	00A-4780-AN	00B-4780-AN	00D-4780-AN	00F-4780-AN	AJO-8951
for 2.1 mm ID					

2.6 µm MidBore™ Columns (mm)				SecurityGuard™ ULTRA Cartridges†
Phases	50 x 3.0	100 x 3.0	150 x 3.0	3/pk
PS C18	00B-4780-YO	00D-4780-YO	00F-4780-YO	AJO-8950
for 3.0 mm ID				

2.6 µm Analytical Columns (mm)					SecurityGuard™ ULTRA Cartridges†
Phases	50 x 4.6	100 x 4.6	150 x 4.6	250 x 4.6	3/pk
PS C18	00B-4780-E0	00D-4780-E0	00F-4780-E0	00G-4780-E0	AJO-8949
for 4.6 mm ID					

† SecurityGuard ULTRA Cartridges require holder, Part No.: AJO-9000.

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References

1. Fabrice Gritti, Georges Guiochon. Facts and Legends About Columns Packed with sub-3-µm Core-Shell Particles. *LC-GC North America*. 2012, 30(7), 586-595.
2. Sy Do, Lawrence Loo, and Ryan Splitstone. Demonstrating the Kinetex PS C18 HPLC/UHPLC Column's Resistance to Dewetting and 100 % Aqueous Stability. Available at: www.Phenomenex.com/KinetexPSC18AQStability



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