

APPLICATION

Choosing the Right UHPLC Column for Analyzing Highly Lipophilic (Non-Polar) Molecules

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Overview

Under reversed phase conditions, the overall chromatographic behavior of non-polar, lipophilic molecules is driven primarily through hydrophobic interactions between the analyte and stationary phase. Overall, these types of molecules, like steroids, fatty acids, and phospholipids tend to have fewer chromatographic difficulties than other classes of analytes that, for instance, may suffer from peak tailing issues (strong bases) or poor retention (highly polar molecules).

Good chromatography however, can still be a challenge, particularly when you need to separate groups of analogues that are structurally very similar. In such cases, using chromatographic media with an extremely high efficiency and hydrophobic selectivity can be useful to maximize resolution between closely-eluting peaks. The high surface area and dense C18 bonding, combined with the unmatched efficiency of its thermally-modified 1.6 μ m fully porous silica particle, makes Luna[®] Omega 1.6 μ m C18 an exceptional choice for analyzing complex mixtures of lipophilic molecules.

This is exemplified in this case for a group of naturally-occurring cannabinoids (Log P~7). You can see in **Figure 1** the separation of 11 cannabinoids on a leading UHPLC product – the Waters[®] ACQUITY[®] BEH C18 1.7 μ m 50 x 2.1 mm column. Below that is the same sample analyzed using the Luna[®] Omega 1.6 μ m C18 50 x 2.1 mm column under identical conditions (**Figure 2**). You can see that, for these types of molecules, both columns display very similar selectivity, but the higher surface area and higher efficiency of the Luna Omega 1.6 μ m media provides improved resolution of the critical pairs highlighted in pink and blue.

Evaluating phases with slightly different selectivity is an essential part of the method development process. In **Figure 3**, you can see the same separation performed using the Luna Omega 1.6 μ m PS

C18, which contains a proprietary, positively charged functional group on the surface, in addition to the C18 bonding. Under the exact same conditions, you can see the reversal in elution order of the peaks highlighted in the blue box. Note that the last two peaks are fully resolved on the Luna Omega PS C18 phase (yellow box), whereas they co-elute on both standard C18 phases.

When developing methods for the analysis of highly lipophilic molecules like these, we recommend evaluating both Luna Omega 1.6 μ m C18 and Luna Omega 1.6 μ m PS C18.

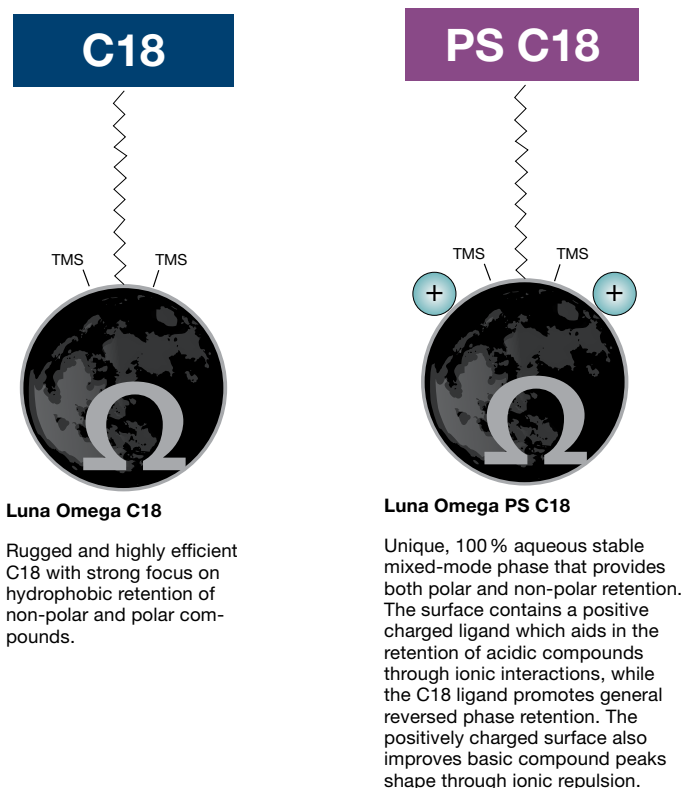


Figure 1.
Waters® ACQUITY® BEH 1.7 µm C18

Conditions for all columns
Column: As specified
Dimension: 50 x 2.1 mm
Mobile Phase: A: 0.1 % Phosphoric acid in Water
B: 0.1 % Phosphoric acid in Acetonitrile
Gradient: Time (min) % B
0 35
10 100
Flow Rate: 0.6 mL/min
Temperature: 50 °C
Detection: UV @ 210 nm
Sample: 11 Cannabinoids

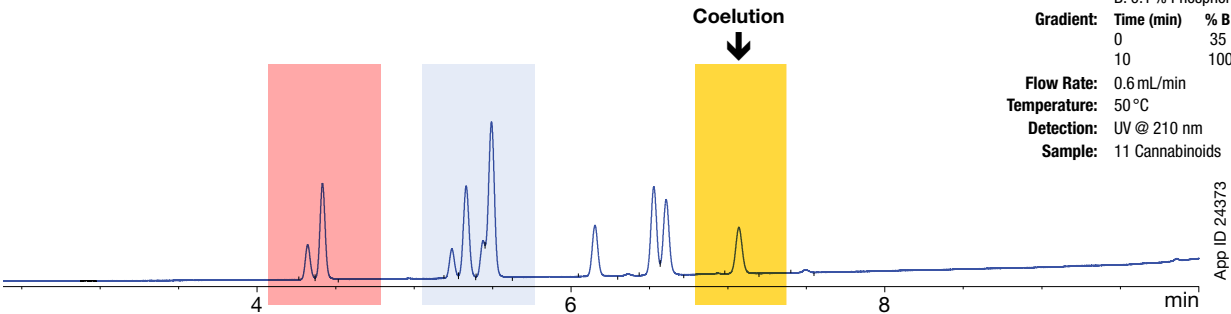


Figure 2.
Luna® Omega 1.6 µm C18

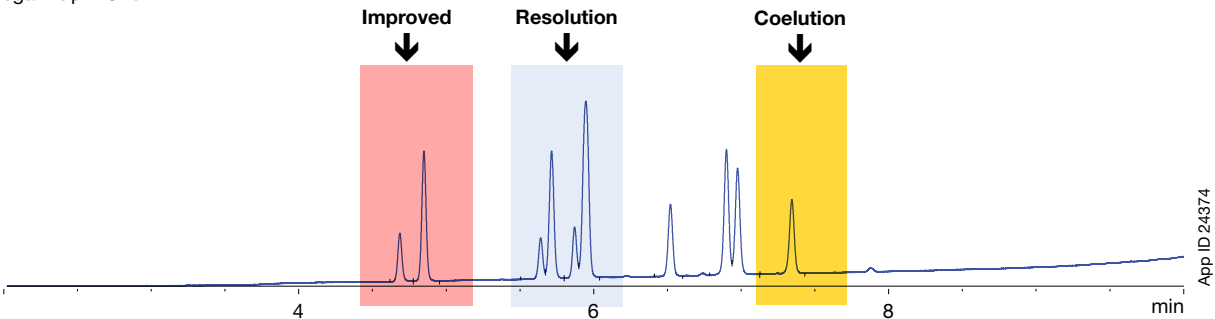
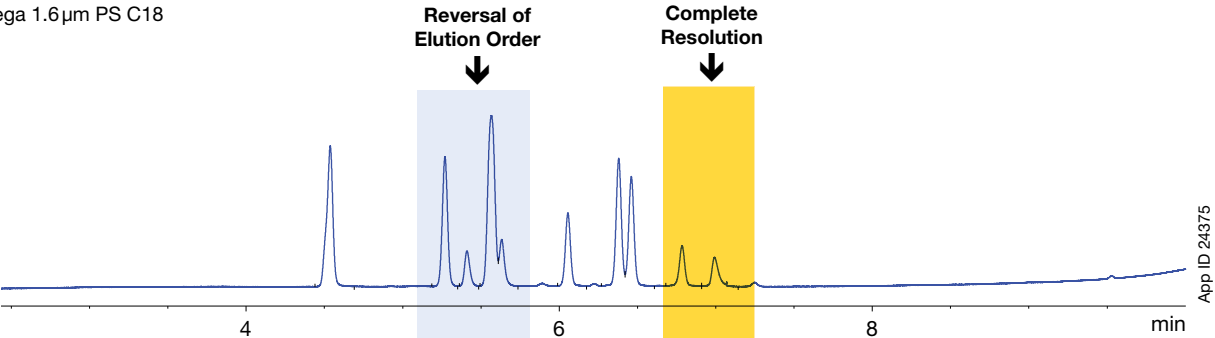


Figure 3.
Luna Omega 1.6 µm PS C18



Phenomenex is not affiliated with Waters Technologies Corporation. Comparative separations may not be representative of all applications.

Luna® Omega Ordering Information

1.6 µm Microbore Columns (mm)			
Phases	50 x 1.0	100 x 1.0	150 x 1.0
Polar C18	00B-4748-A0	00D-4748-A0	00F-4748-A0
C18	00B-4742-A0	00D-4742-A0	00F-4742-A0

1.6 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
Polar C18	00A-4748-AN	00B-4748-AN	00D-4748-AN	00F-4748-AN	AJ0-9505
PS C18	00A-4752-AN	00B-4752-AN	00D-4752-AN	00F-4752-AN	AJ0-9508
C18	00A-4742-AN	00B-4742-AN	00D-4742-AN	00F-4742-AN	AJ0-9502
					for 2.1 mm ID

3 µm Minibore Columns (mm)					SecurityGuard Cartridges (mm)
Phases	30 x 2.1	50 x 2.1	100 x 2.1	150 x 2.1	4 x 2.0*
Polar C18	00A-4760-AN	00B-4760-AN	00D-4760-AN	00F-4760-AN	AJ0-7600
PS C18	00A-4758-AN	00B-4758-AN	00D-4758-AN	00F-4758-AN	AJ0-7605
for ID:					2.0 - 3.0 mm

3 µm MidBore™ Columns (mm)				SecurityGuard™ Cartridges (mm)
Phases	50 x 3.0	100 x 3.0	150 x 3.0	4 x 2.0*
Polar C18	00B-4760-Y0	00D-4760-Y0	00F-4760-Y0	AJ0-7600
PS C18	00B-4758-Y0	00D-4758-Y0	00F-4758-Y0	AJ0-7605
				for ID: 2.0 - 3.0 mm

3 µm Analytical Columns (mm)					SecurityGuard Cartridges (mm)
Phases	50 x 4.6	100 x 4.6	150 x 4.6	250 x 4.6	4 x 3.0*
Polar C18	00B-4760-E0	00D-4760-E0	00F-4760-E0	00G-4760-E0	AJ0-7601
PS C18	00B-4758-E0	00D-4758-E0	00F-4758-E0	00G-4758-E0	AJ0-7606
for ID:					3.2-8.0 mm

5 µm Minibore Columns (mm)					SecurityGuard Cartridges (mm)
Phases	30 x 2.1	50 x 2.1	100 x 2.1	150 x 2.1	4 x 2.0*
Polar C18	00A-4754-AN	00B-4754-AN	00D-4754-AN	00F-4754-AN	AJ0-7600
PS C18	00A-4753-AN	00B-4753-AN	00D-4753-AN	00F-4753-AN	AJ0-7605
for ID:					2.0 - 3.0 mm

5 µm MidBore™ Columns (mm)				SecurityGuard™ Cartridges (mm)
Phases	50 x 3.0	100 x 3.0	150 x 3.0	4 x 2.0*
Polar C18	00B-4754-Y0	00D-4754-Y0	00F-4754-Y0	AJ0-7600
PS C18	00B-4753-Y0	00D-4753-Y0	00F-4753-Y0	AJ0-7605
				for ID: 2.0 - 3.0 mm

5 µm Analytical Columns (mm)					SecurityGuard Cartridges (mm)
Phases	50 x 4.6	100 x 4.6	150 x 4.6	250 x 4.6	4 x 3.0*
Polar C18	00B-4754-E0	00D-4754-E0	00F-4754-E0	00G-4754-E0	AJ0-7601
PS C18	00B-4753-E0	00D-4753-E0	00F-4753-E0	00G-4753-E0	AJ0-7606
for ID:					3.2-8.0 mm

5 µm Axia™ Packed Preparative Columns (mm)			SecurityGuard™ Cartridges (mm)
Phases	150 x 21.2	250 x 21.2	15 x 21.2**
Polar C18	00F-4754-P0-AX	00G-4754-P0-AX	AJ0-7603
PS C18	00F-4753-P0-AX	00G-4753-P0-AX	AJ0-7608
			for ID: 18-29 mm

5 µm Axia™ Packed Preparative Columns (mm)				SecurityGuard™ Cartridges (mm)
Phases	150 x 30	250 x 30	250 x 50	15 x 30.0*
Polar C18	00F-4754-U0-AX	00G-4754-U0-AX	00G-4754-V0-AX	AJ0-7604
PS C18	00F-4753-U0-AX	00G-4753-U0-AX	00G-4753-V0-AX	AJ0-7609
				for ID: 30-49 mm

[†] SecurityGuard ULTRA Cartridges require holder, Part No.: AJ0-9000
^{*} SecurityGuard Analytical Cartridges require holder, Part No.: KJ0-4282
^{**} PREP SecurityGuard Cartridges require holder, Part No.: AJ0-8223
[♦] PREP SecurityGuard Cartridges require holder, Part No.: AJ0-8277



For additional technical notes, visit www.phenomenex.com



If Luna analytical columns do not provide at least an equivalent separation as compared to a competing column of the same particle size, similar phase and dimensions, return the column with comparative data within 45 days for a FULL REFUND.

APPLICATION

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Comparative separations may not be representative of all applications.

Phenomenex is not affiliated with Waters Technologies Corporation.

Axia column and packing technology is patented by Phenomenex.

U.S. Patent No. 7, 674, 383

SecurityGuard is patented by Phenomenex. U.S. Patent No. 6,162,362

CAUTION: this patent only applies to the analytical-sized guard cartridge holder, and does not apply to SemiPrep, PREP or ULTRA holders, or to any cartridges.

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