

APPLICATION

Choosing the Right UHPLC Column for Multi-Class LC-MS/MS Screening - Pesticides Panel



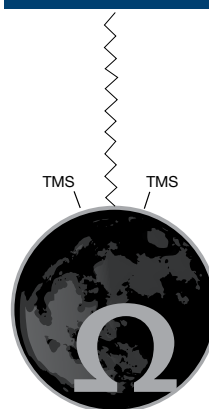
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Overview

The ability of the MS detector to accurately identify and quantify analytes, even when they co-elute, allows analysts to create extremely complex screening methods containing analytes with widely ranging polarity and acid/base character - methods that would be impossible using a UV detector. For example, in this multi-class pesticide panel, analytes vary in polarity from thiamethoxam (Log P -0.13) to etopenprox (Log P ~6.5), and the individual analytes also possess wide ranges of pKa values. For complex panels like this, it can sometimes be advantageous to use a buffer such as 5 – 10 mM Ammonium formate rather than the typical 0.1 % Formic acid used in so many LC-MS methods. The ammonium formate will often do a better job at suppressing unwanted secondary interactions between the analytes and residual silanol groups on the silica, interactions that might otherwise lead to peak tailing, and the increase in pH can also help to promote retention of poorly-retained polar basic species. The trade-off for the improvement in chromatography is that the ammonium formate buffer will sometimes reduce signal sensitivity compared to a simple 0.1 % Formic acid modifier, so both options should be evaluated during the method development process.

For multi-component screens like this, we would recommend performing your initial phase screening using our Luna[®] Omega 1.6 μm C18 (**Figure 2**), which provides a level of performance on par or better than a leading hybrid C18 material (Waters[®] ACQUITY[®] BEH 1.7 μm; **Figure 1**). In this sample set, retention of highly polar species is not a limiting factor for most of the analytes, but if that were the case, a polar modified C18, such as our Luna Omega 1.6 μm Polar C18 (**Figure 3**), can provide a slight increase in polar analyte retention, and is also stable in 100 % aqueous conditions. This would allow the gradient to begin in 100 % buffer A and provide an additional boost in retention for hard-to-retain early-eluting components.

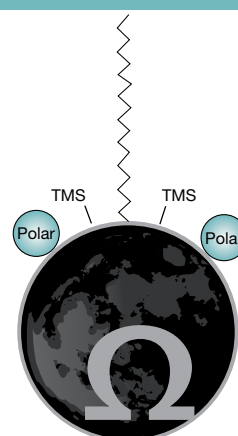
C18



Luna Omega C18

Rugged and highly efficient C18 with strong focus on hydrophobic retention of non-polar and polar compounds.

Polar C18



Luna Omega Polar C18

100 % aqueous stability and enhanced selectivity/retention for polar analytes without diminishing useful non-polar retention. The C18 ligand provides general hydrophobic interactions while a polar modified particle surface provides enhanced polar compound retention.



Figure 1.
Waters® ACQUITY® BEH 1.7µm C18; 424 Bar

HPLC Conditions

Column: As specified
Dimension: 50 x 2.1 mm
Mobile Phase: A: 10 mM Ammonium formate
 B: 0.1 % Formic acid in Acetonitrile
Gradient:

Time (min)	% B
0	3
5	100
7	100

Flow Rate: 0.5 mL/min
Temperature: 40 °C
Detection: MS/MS (SCIEX API 4000™)
Sample: 64 pesticides

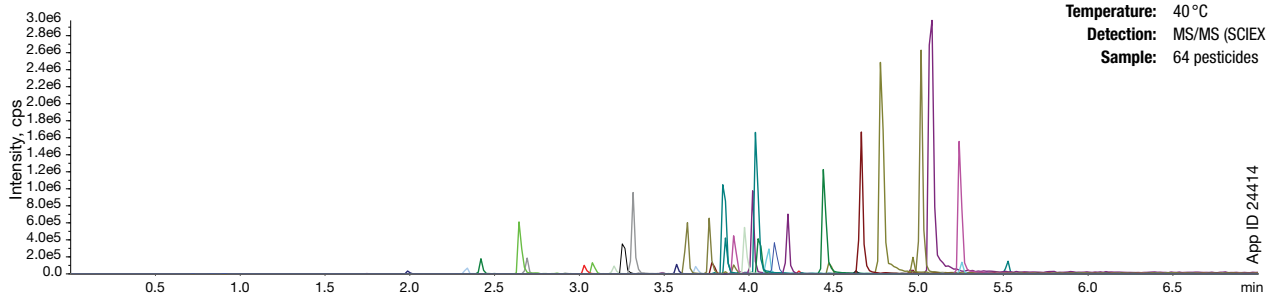


Figure 2.
Luna® Omega 1.6µm C18; 400 Bar

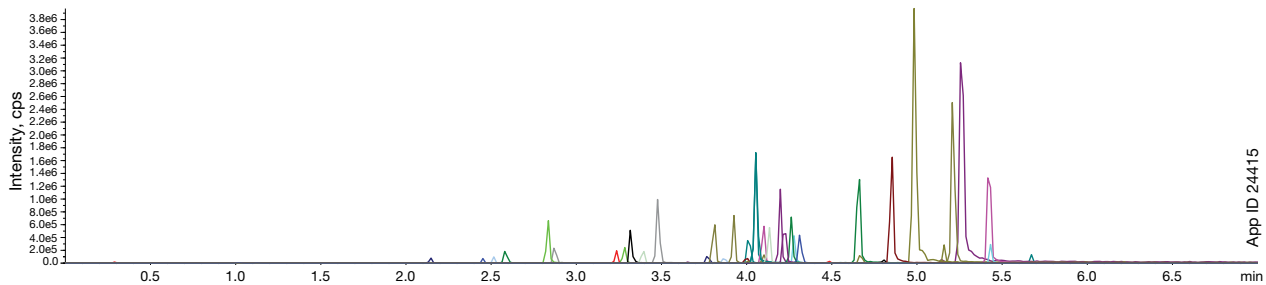
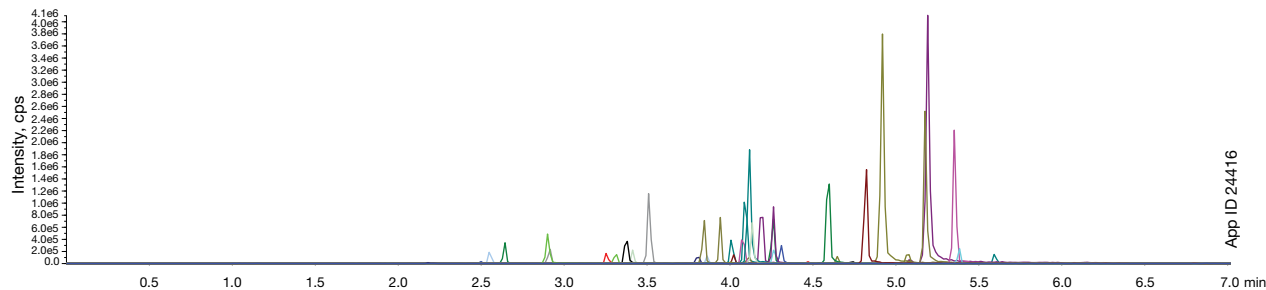


Figure 3.
Luna® Omega 1.6µm Polar C18; 380 Bar



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Disclaimer

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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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	AJO-9505
PS C18	00A-4752-AN	00B-4752-AN	00D-4752-AN	00F-4752-AN	AJO-9508
C18	00A-4742-AN	00B-4742-AN	00D-4742-AN	00F-4742-AN	AJO-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	AJO-7600
PS C18	00A-4758-AN	00B-4758-AN	00D-4758-AN	00F-4758-AN	AJO-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	AJO-7600
PS C18	00B-4758-Y0	00D-4758-Y0	00F-4758-Y0	AJO-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	AJO-7601
PS C18	00B-4758-E0	00D-4758-E0	00F-4758-E0	00G-4758-E0	AJO-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	AJO-7600
PS C18	00A-4753-AN	00B-4753-AN	00D-4753-AN	00F-4753-AN	AJO-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	AJO-7600
PS C18	00B-4753-Y0	00D-4753-Y0	00F-4753-Y0	AJO-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	AJO-7601
PS C18	00B-4753-E0	00D-4753-E0	00F-4753-E0	00G-4753-E0	AJO-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	AJO-7603
PS C18	00F-4753-P0-AX	00G-4753-P0-AX	AJO-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	AJO-7604
PS C18	00F-4753-U0-AX	00G-4753-U0-AX	00G-4753-V0-AX	AJO-7609

for ID: 30-49 mm

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

* SecurityGuard Analytical Cartridges require holder, Part No.: KJO-4282

** PREP SecurityGuard Cartridges require holder, Part No.: AJO-8223

◆ PREP SecurityGuard Cartridges require holder, Part No.: AJO-8277



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.

