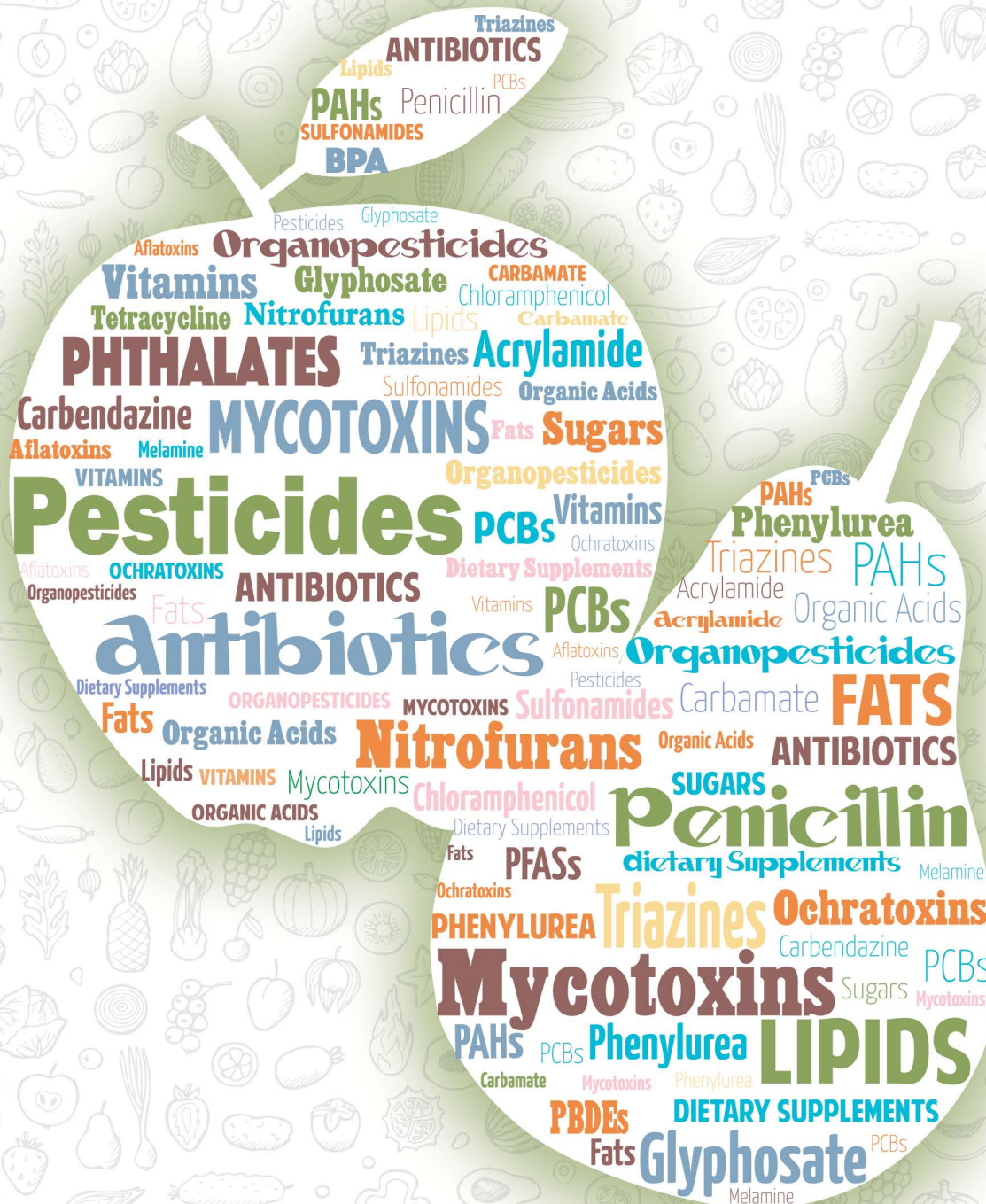


Food Testing

Applications Guide

Sample Prep, LC, and GC



 **phenomenex**[®]
...breaking with traditionSM

www.phenomenex.com/Food



Our Commitment

Food is the lifeline of our society. As one of our primary focuses, we strive to support our local and global food safety and quality organizations with tools and resources to ensure that our food is safe and food labels are accurate.

Phenomenex is committed to support the industry needs through a comprehensive product portfolio of Sample Preparation, HPLC/UHPLC, LC/MS, and GC/MS columns and accessories, along with application and method development services to meet food industry guidelines.



guarantee

We guarantee that if Phenomenex products in this guide do not provide at least an equivalent separation as compared to other products of the same phase and dimensions, return the product with comparative data within 45 days for a FULL REFUND!

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For complete details on applications visit:

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Search: 

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Contaminants

Food Safety Hazards can come from a variety of sources; the environment, the manufacturing process, and even organisms that are present in the raw ingredients.

Multi-Class Mycotoxins Screening by LC/MS/MS

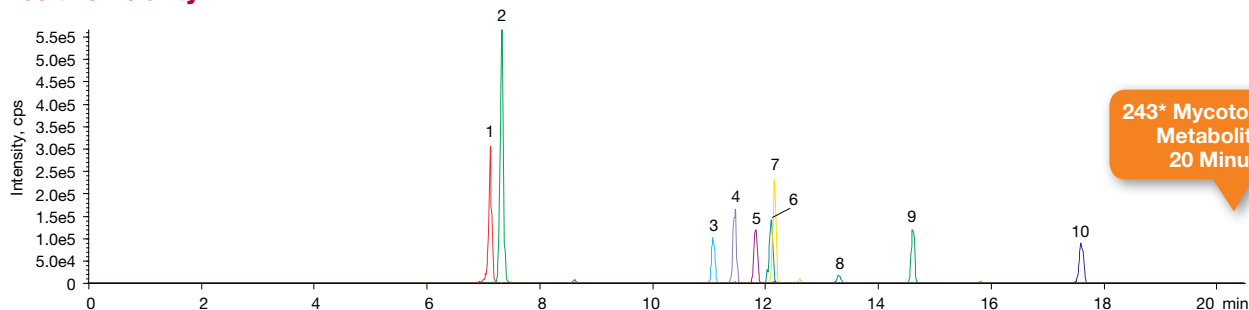
Column: Gemini® 5 µm C18
Dimensions: 150 x 4.6 mm
Part No.: 00F-4435-EO
Mobile Phase: A: Water/Methanol (90:10) containing 5 mM Ammonium acetate and 1 % Acetic acid
 B: Water/Methanol (3:97) containing 5 mM Ammonium acetate and 1 % Acetic acid
Gradient:

Time (min)	% B
0	0
2	0
14	100
18	100
18.1	0
20.5	0

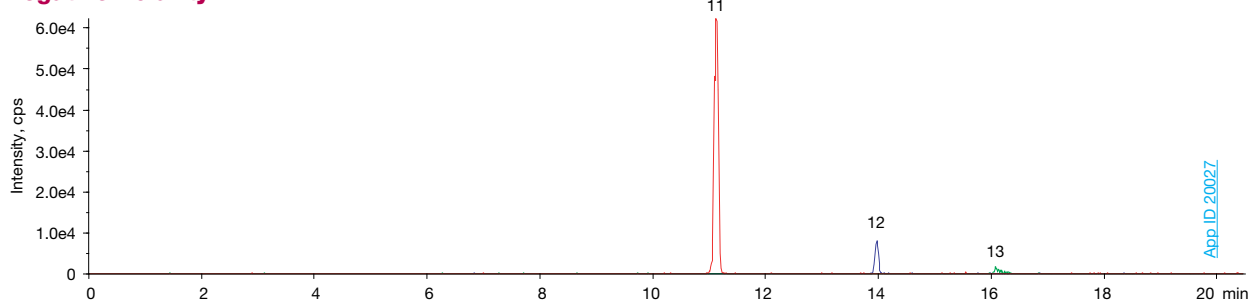
Flow Rate: 1 mL/min
Temperature: 25 °C
Detector: Tandem Mass Spectrometer (MS/MS) (25 °C)
Instrument: SCIEX API 4000™
Sample:

1. Lincomycin
2. Ergometrine
3. Aflatoxin G2
4. Aflatoxin G1
5. Aflatoxin B2
6. Ergocryptine
7. Aflatoxin B1
8. Ergocryptinine
9. Ochratoxin A
10. Nigirin
11. Chloramphenicol
12. β-Zearalenol
13. Rapamycin

Positive Polarity



Negative Polarity



Standard Mix of 13 Analytes

* For entire mycotoxins list please visit: www.phenomenex.com/Search

20027



Mycotoxin DON-3-Glucoside in Cereal Based Foods

by LC/MS/MS

Column: Kinetex® 2.6 µm C18
Dimensions: 150 x 2.1 mm
Part No.: [00F-4462-AN](#)
Mobile Phase: A: Water with 0.5 % Acetic acid
B: Methanol with 0.5 % Acetic acid
Gradient:

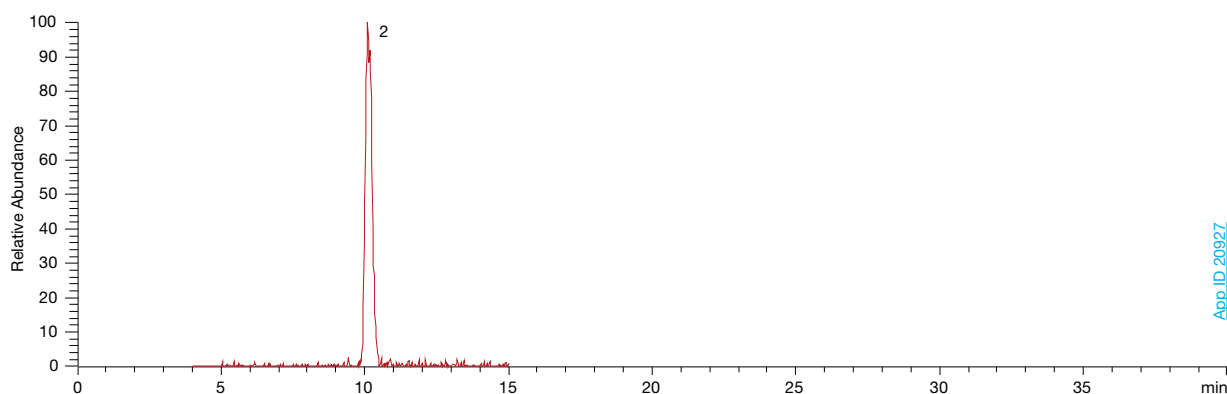
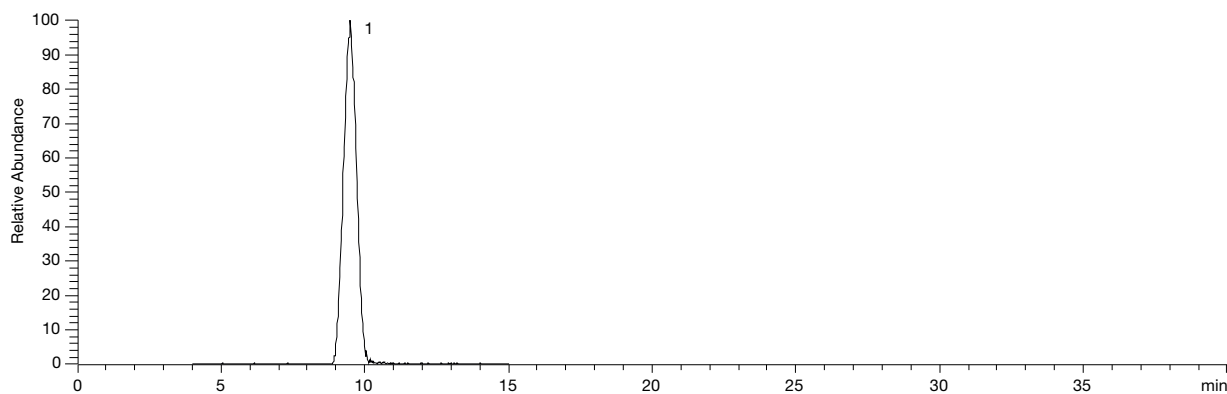
Time (min)	% B
0	10
3	10
21	40
27	60
30	10
35	10

Flow Rate: 200 µL/min
Temperature: 30 °C
Detector: Tandem Mass Spectrometer (MS/MS) (300 °C)
Sample: 1. Deoxynivalenol (DON)
2. Deoxynivalenol-3-glucoside (DON-3G)



Barilla
The Italian Food Company. Since 1877.

Author reference:
Michele Suman - michele.suman@barilla.com
Barilla Food Research Labs, via Mantova 166, 43100 Parma, Italy



[App ID 20927](#)

Chromatograms (SRM) of deoxynivalenol – DON (9.50 min) and deoxynivalenol-3-glucoside - DON-3G (10.1 min) from a naturally contaminated bread extract.

Aflatoxins, Ochratoxin A, Trichothecenes, Zearalenone

in Cereal Based Foods

by SPE and LC/MS/MS

Solid Phase Extraction (SPE)

Strata[®]-X 60 mg/3 mL

Part No.: 8B-S100-UBJ

Condition: 2 mL Methanol

Equilibrate: 2 mL Methanol/Water (10:90)

Load: Pretreated sample

Wash: 1 mL Methanol/Water (20/80, v/v)

Elute: 1 mL of Methanol

LC Conditions

Column: Kinetex[®] 2.6 µm C18

Dimensions: 100 x 2.1 mm

Part No.: 00D-4462-AN

Mobile Phase: A: Water with 0.5 % Acetic acid and 1 mM Ammonium acetate

B: Methanol with 0.5 % Acetic acid and 1 mM Ammonium acetate

Gradient	Time (min)	% B
	0	10
	4	40
	31	60
	36	60

Flow Rate: 200 µL/min

Temperature: 40 °C

Detector: Tandem Mass Spectrometer (MS/MS) (350 °C)

Sample	Analyte Name	RT (min)
	Deoxynivalenol	4.8
	Aflatoxin G2	12.8
	Aflatoxin G1	13.6
	Aflatoxin B2	14.6
	Aflatoxin B1	15.8
	HT-2 Toxin	20.1
	T-2 Toxin	25.3
	Zearalenone	29.0
	Ochratoxin A	31.4

Author reference:

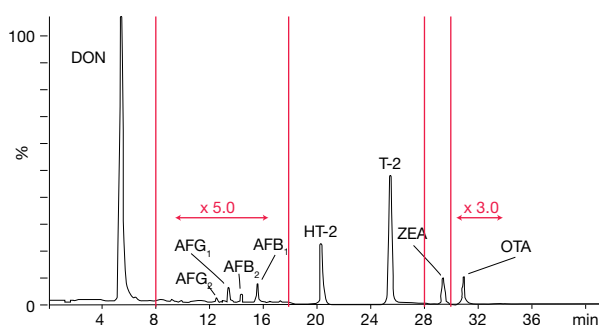
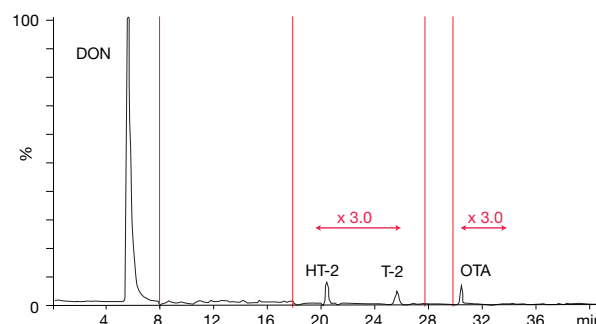
Michele Suman
michele.suman@barilla.com

Barilla Food Research Labs,
via Mantova 166, 43100 Parma, Italy

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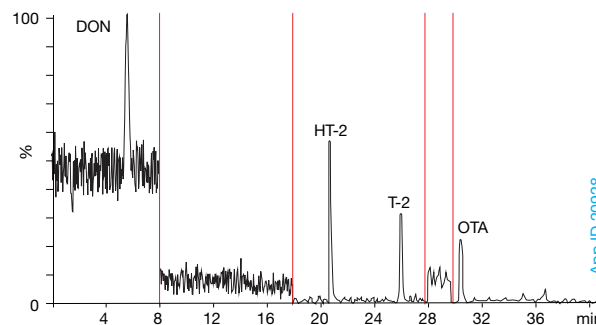
Veronica M. T. Lattanzio
veronica.lattanzio@ispa.cnr.it

Institute of Sciences of Food Production (ISPA), National Research
Council of Italy (CNR),
via Amendola 122/o, 70126 Bari, Italy.



Total ion chromatogram (sum of MRM transitions) of a wheat based crisp bread sample extract spiked with:

750 µg/kg DON; 1 µg/kg AFG2, AFB2; 3 µg/kg AFG1; 5 µg/kg AFB1; 50 µg/kg HT-2, T-2; 75 µg/kg ZEA; 3 µg/kg OTA



Chromatograms (MRM transitions) of flour naturally contaminated with:

Top: 898 µg/kg DON; 9 µg/kg HT2; 2 µg/kg T2; 6 µg/kg OTA (soft wheat)

Bottom: 5.3 µg/kg DON; 5.4 µg/kg HT2; 1.5 µg/kg T2; 0.8 µg/kg OTA (durum wheat)

Multi-Toxin Screening in Cereal Based Foods

by LC/MS/MS

Column: Kinetex® 2.6 µm XB-C18
Dimensions: 50 x 2.1 mm
Part No.: 00B-4496-AN
Mobile Phase: A: Water with 5 mM Ammonium acetate and 0.5% Acetic acid
 B: Methanol with 5 mM Ammonium acetate and 0.5% Acetic acid

Gradient	Time (min)	% B
	0	2
	2	2
	5	80
	5.2	98
	8	98

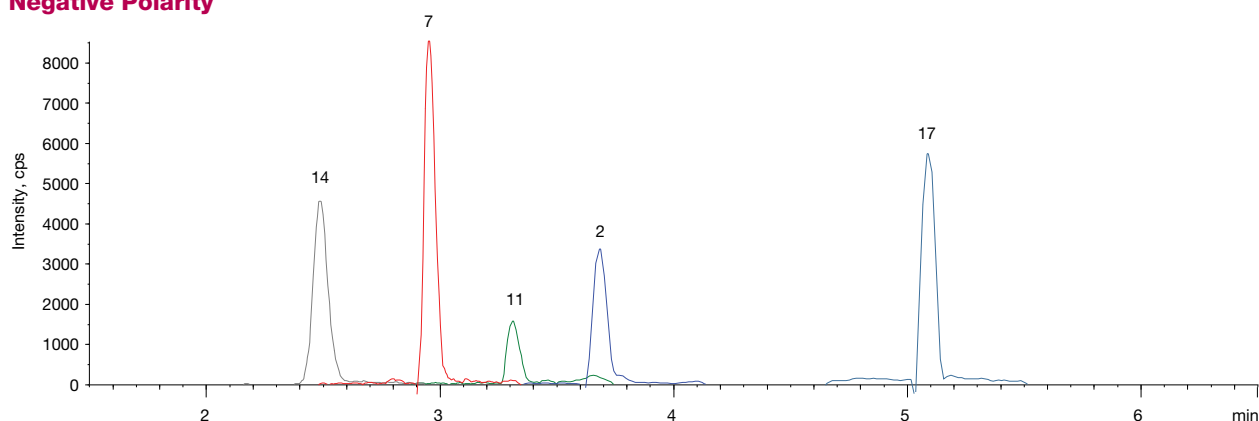
Flow Rate: 450 µL/min
Temperature: Ambient
Detector: Tandem Mass Spectrometer (MS/MS) 550 °C
Instrument: SCIEX API 5500™

Sample:

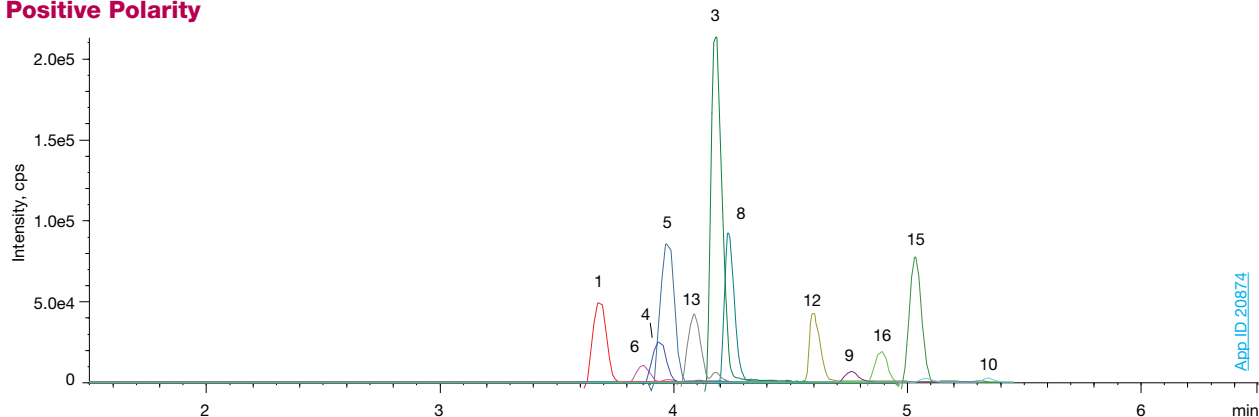
1. 15-Acetyldeoxynivalenol (15-AcDON)
2. 3-Acetyldeoxynivalenol (3-AcDON)
3. Aflatoxin B1 (AFB1)
4. Aflatoxin B2 (AFB2)
5. Aflatoxin G1 (AFG1)
6. Aflatoxin G2 (AFG2)
7. Deoxynivalenol (DON)
8. Diacetoxyscirpenol (DAS)
9. Fumonisin B1 (FB1)
10. Fumonisin B2 (FB2)
11. Fusarenon X (FUS X)
12. HT-2 toxin (HT2)
13. Monoacetoxyscirpenol (MAS)
14. Nivalenol (NIV)
15. Ochratoxin A (OTA)
16. T-2 toxin (T2)
17. Zearalenone (ZON)



Negative Polarity



Positive Polarity



TIC of all analytes with negative and positive fast polarity switching.

Mycotoxins From Corn Meal Products

by QuEChERS and LC/MS/MS

The use of roQ™ QuEChERS and Kinetex® XB-C18 Core-Shell Technology LC columns deliver a rapid and simple approach for Mycotoxin screening from corn products.

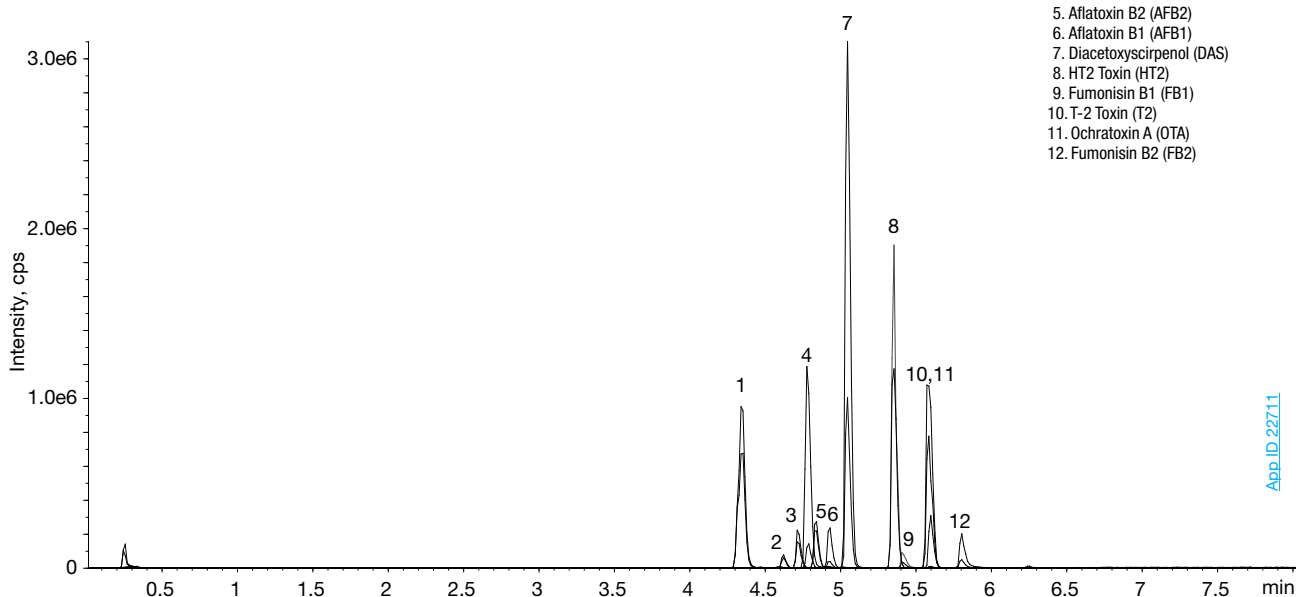
Extraction from Ground Corn

1. Homogenize sample using a blender or similar apparatus
2. Weigh and transfer 5 g of ground corn meal to a 50 mL roQ QuEChERS extraction tube
3. Add 10 mL of water and 10 mL of acetonitrile with 1.0 % formic acid
4. Dispense contents of the included roQ QuEChERS extraction packet ([KS0-8909](#)) into the 50 mL tube containing homogenized sample
5. Shake vigorously by hand for 1 minute
6. Centrifuge for 5 minutes @ 4000 rpm, making sure that the solid material is at the bottom of the tube and a liquid layer forms on top of the solid material

Clean up using dispersive Solid Phase Extraction (dSPE)

1. Transfer the supernatant from Step 6 of the extraction process into a roQ QuEChERS 15 mL centrifuge tube containing 900 mg MgSO_4 and 150 mg PSA ([KS0-8924](#))
2. Shake vigorously by hand for 30 seconds
3. Centrifuge for 5 minutes at 4000 rpm to separate solid material from the liquid layer
4. Transfer the supernatant to a vessel for evaporation

Positive Mode





LC Conditions

Column: Kinetex® 2.6 µm XB-C18
Dimensions: 50 x 2.1 mm
Part No.: [00B-4496-AN](#)
SecurityGuard Cartridge: [AJ0-8782](#)
Mobile Phase: A: 5 mM Ammonium acetate with 0.5 % Acetic acid
 B: 5 mM Ammonium acetate in Methanol with 0.5 % Acetic acid
Gradient:

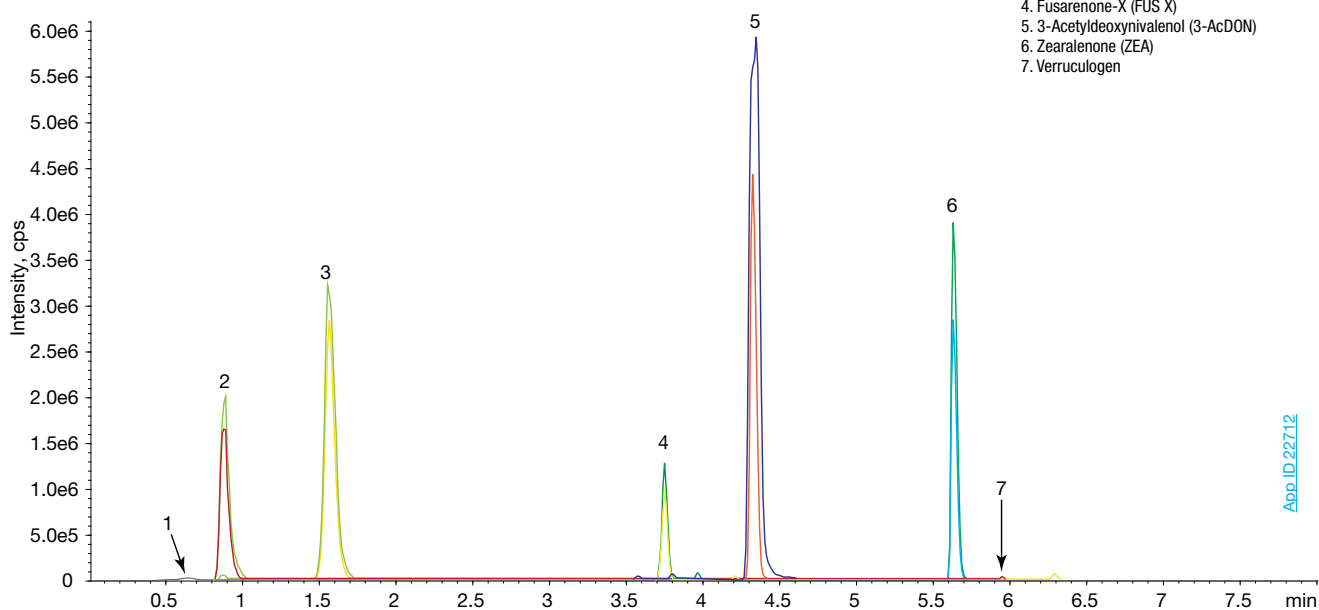
Time (min)	% B
0	5
2	5
5	80
5.2	98
8	98

Flow Rate: 0.45 mL/min
Temperature: Ambient
Injection Volume: 25 µL
Detection: Tandem Mass Spec (MS/MS)
Instrument: SCIEX API 5000™

For complete technical note visit:
www.phenomenex.com/Search

Search:

Negative Mode



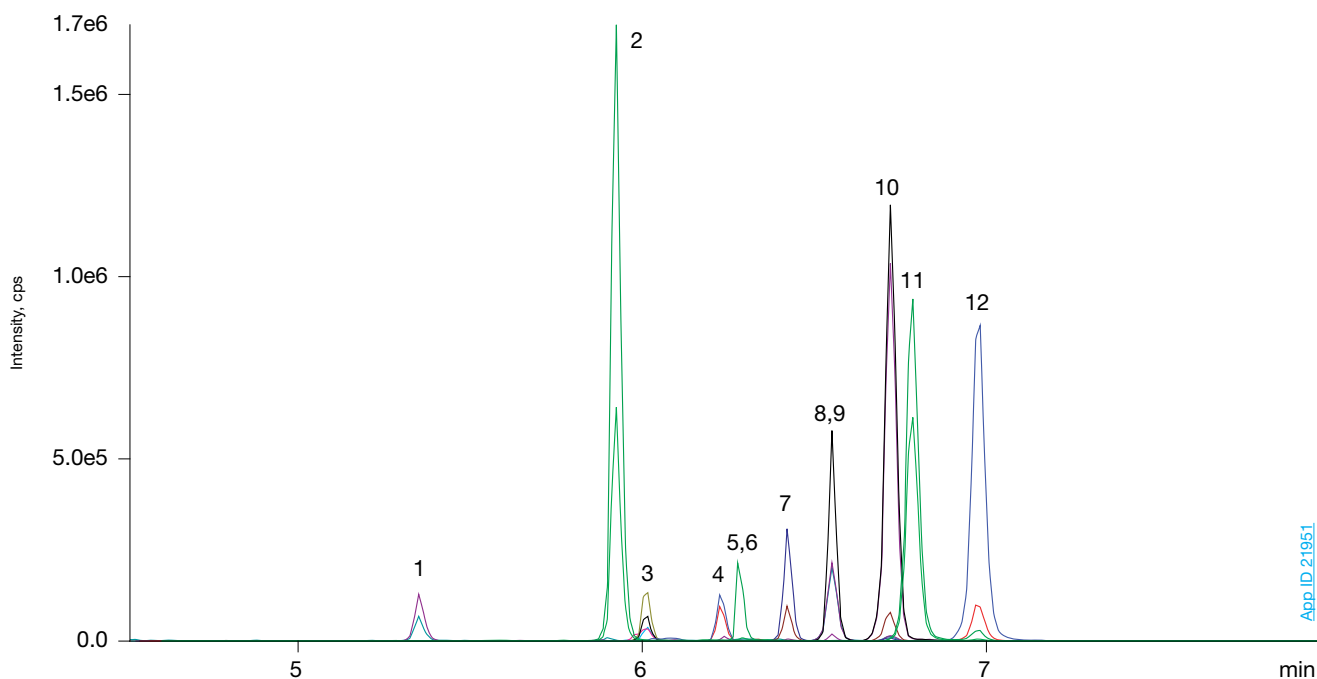
Mycotoxins Screening

by LC/MS/MS

Column: Kinetex® 2.6 µm Biphenyl
Dimensions: 50 x 2.1 mm
Part No.: [00B-4622-AN](#)
Mobile Phase: A: 5 mM Ammonium acetate with 0.1 % Acetic acid
B: Methanol with 5 mM Ammonium acetate with 0.1 % Acetic acid

Gradient	Time (min)	% B
	0	2
	2	2
	5	80
	5.2	98
	8	98
	8.01	2
	11	2

Flow Rate: 0.45 mL/min
Temperature: Ambient
Detection: Tandem Mass Spectrometer (MS/MS)
Instrument: SCIEX API 4000™
Sample: 1. 15-Acetyldeoxynivalenol
2. DAS
3. FB1
4. HT2 Toxin
5. FB2
6. T2 Toxin
7. Aflatoxin M1
8. Aflatoxin G2
9. Ochratoxin A
10. Aflatoxin G1
11. Aflatoxin B2
12. Aflatoxin B1



App ID 21951

Mycotoxins

by UHPLC/MS/MS

Column: Luna® Omega 1.6µm Polar C18
Dimensions: 50 x 2.1 mm
Part No.: [00B-4748-AN](#)
Mobile Phase: A: Water with 0.1 % Formic acid
 B: Acetonitrile with 0.1 % Formic acid
Gradient:

Time (min)	% B
0	20
4	90
4.1	20
6	20

Flow Rate: 400 mL/min
Temperature: 40 °C
Detection: Tandem Mass Spectrometer (MS/MS)
Instrument: SCIEX API 4000™
Sample:

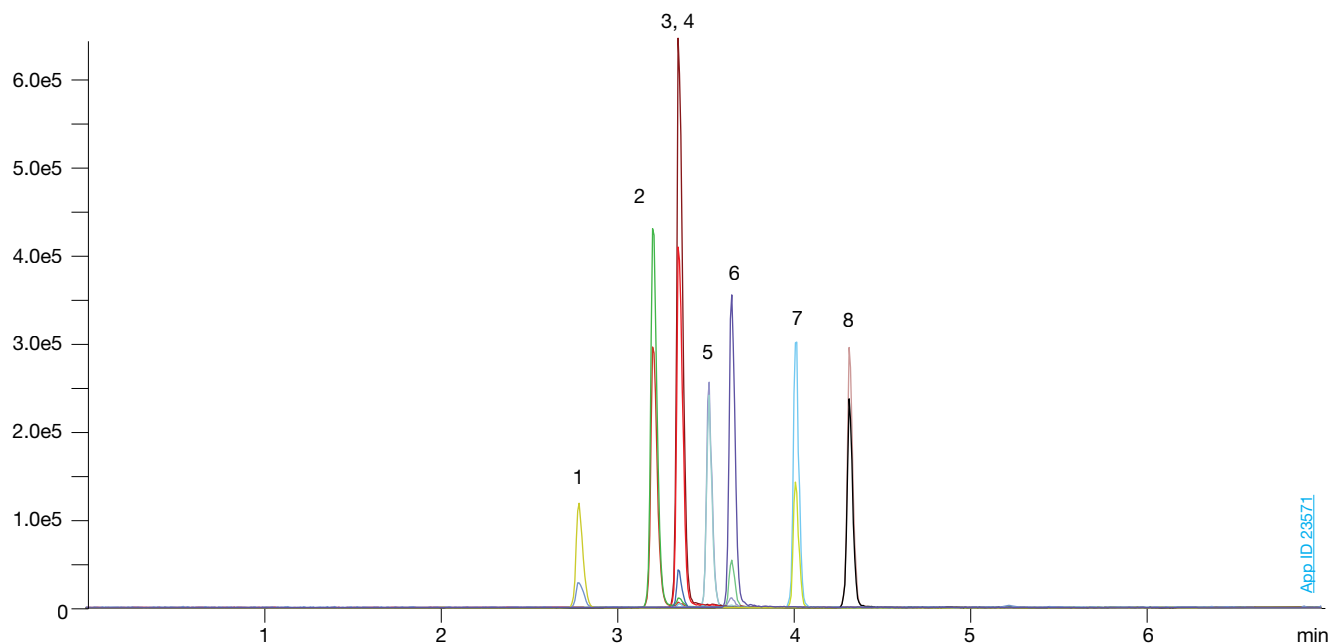
1. 15 DNV
2. Aflatoxin G2
3. Aflatoxin G1
4. Aflatoxin B2
5. Aflatoxin B1
6. Aflatoxin M1
7. HT2 Toxin
8. T2 Toxin

For more Luna Omega 1.6µm options, visit:

www.phenomenex.com/Luna



Positive Mode



Contaminants: Mycotoxins

Triazine Pesticides in Water

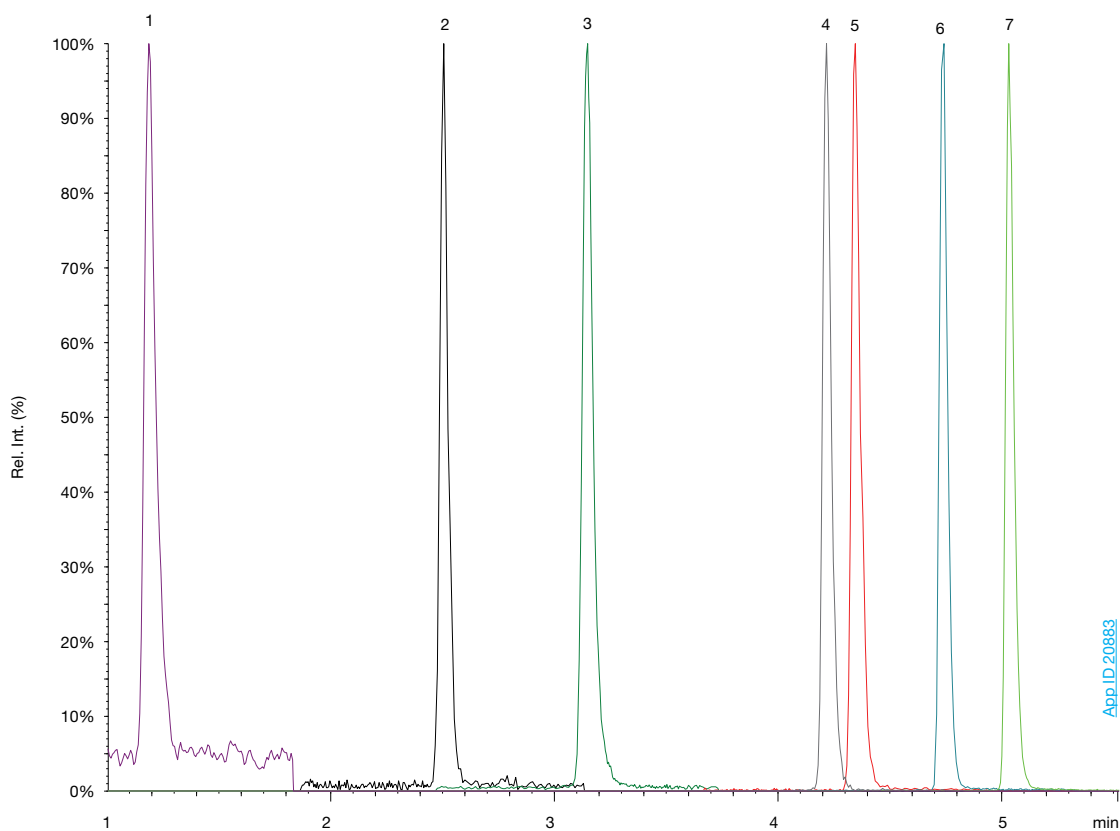
by LC/MS/MS

Column: Kinetex® 2.6 µm C18
Dimensions: 50 x 2.1 mm
Part No.: 00B-4462-AN
SecurityGuard™: AJ0-8784
Mobile Phase: A: Water with 0.1 % Formic acid
B: 100 % Methanol
Gradient:

Time (min)	% B
0	5
0.25	40
2	40
3	75
4	75
4.1	5

Flow Rate: 0.3 mL/min
Temperature: 35 °C
Detection: Mass Spectrometer (MS) 600 °C
Instrument: SCIEX API 4000™
Sample: 1. Atrazine-desethyl-desisopropyl (DACT)
2. Atrazine-desisopropyl (DIA)
3. Atrazine-desethyl (DEA)
4. Cyanazine
5. Simazine
6. Atrazine
7. Propazine

Resolve 7 Triazine Pesticides
in Under 7 Minutes



Organochlorine Pesticides in Water

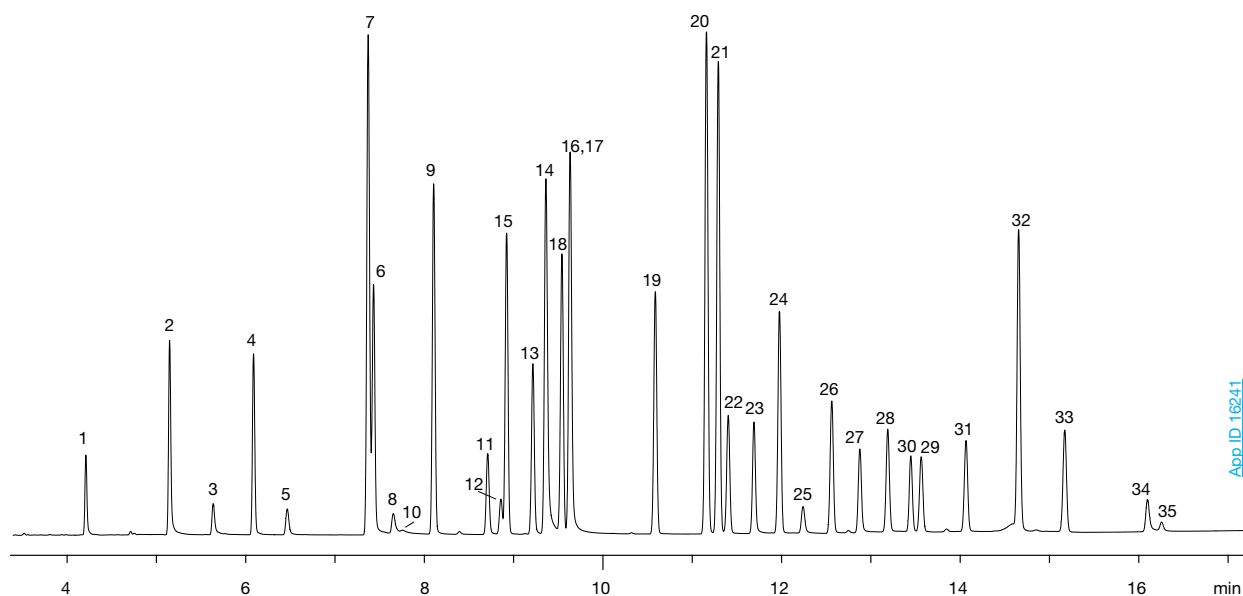
by GC/ECD

Column: Zebron™ ZB-MultiResidue™-2
Dimensions: 30 meter x 0.32 mm x 0.25 µm
Part No.: 7HM-G017-11
Injection: On-Column @ 103 °C, 0.5 µL
Recommended Liner: Zebron PLUS Single Taper Z-Liner™
Liner Part No.: AG2-0A13-05
Carrier Gas: Helium @ 1.8 mL/min (constant flow)
Oven Program: 100 °C for 0.5 min to 180 °C @ 35°/min to 340 °C @ 10 °C/min for 4 min
Detector: ECD @ 340 °C
Sample:

1. Hexachlorocyclopentadiene	18. Aldrin
2. Etridiazole	19. Heptachlor epoxide
3. Chloroneb	20. trans-Chlordane (gamma)
4. Trifluralin	21. cis-Chlordane (alpha)
5. Propachlor	22. Endosulfan I
6. α-BHC	23. 4,4'-DDE
7. Hexachlorobenzene	24. Dieldrin
8. Atrazine	25. Chlorobenzilate
9. γ-BHC	26. Endrin
10. Simazine	27. 4,4'-DDD
11. β-BHC	28. Endosulfan II
12. Alachlor	29. Endrin aldehyde
13. δ-BHC	30. 4,4'-DDT
14. Chlorothalonil	31. Endosulfan sulfate
15. Heptachlor	32. Methoxychlor
16. Chlorpyrifos	33. Endrin ketone
17. DCPA	34. Permethrin
	35. Permethrin isomer



Note: Analytes of varying concentration at or near 50 ppb



Polycyclic Aromatic Hydrocarbons (PAHs) in Water

by GC/MS

Solid Phase Extraction (SPE)

Strata® PAH 1.5g/6mL

Part No.: 8B-S130-7CH

Condition: 1. 10 mL of Dichloromethane
2. 10 mL of Methanol
3. 20 mL of Milli-Q® Water

Load: Water sample

Wash: 3 mL of Methanol/Water (50:50)

Dry: 30 seconds under vacuum

Elute: 6 mL of Dichloromethane

GC Conditions

Column: Zebron™ ZB-SemiVolatiles

Dimensions: 30 meter x 0.25 mm x 0.25 µm

Part No.: ZHG-G027-11

Injection: Split 10:1 µL @ 280 °C, 1 µL

Recommended Liner: Zebron PLUS Single Taper Z-Liner™

Liner Part No.: AG2-0A13-05

Carrier Gas: Helium @ 1.4 mL/min (constant flow)

Oven Program: 100 °C for 0.5 min to 260 °C @ 30 °C/min to 295 °C @ 6 °C/min to 325 °C @ 25 °C/min for 2 min

Detector: MSD @ 340 °C; 45-450 amu

Sample:

1. Naphthalene
2. 2-Methylnaphthalene
3. 1-Methylnaphthalene
4. Acenaphthylene
5. Acenaphthene
6. Fluorene
7. Phenanthrene
8. Anthracene
9. Fluoranthene
10. Pyrene

11. Benz[a]anthracene

12. Chrysene

13. Benzo[b]fluoranthene

14. Benzo[k]fluoranthene

15. Benzo[a]pyrene

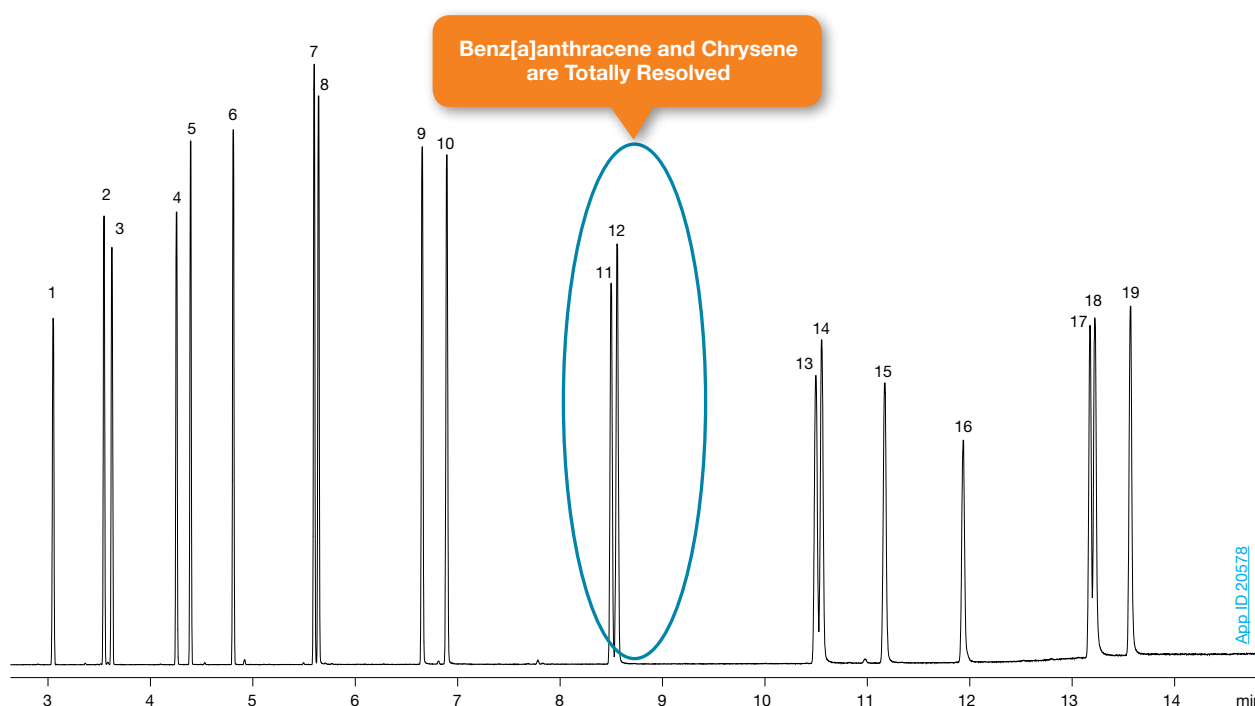
16. 3-Methylcholanthrene

17. Indeno[1,2,3-cd]pyrene

18. Dibenzo[a,h]anthracene

19. Benzo[g,h,i]perylene

Note: Analytes are 25 ppm in Dichloromethane

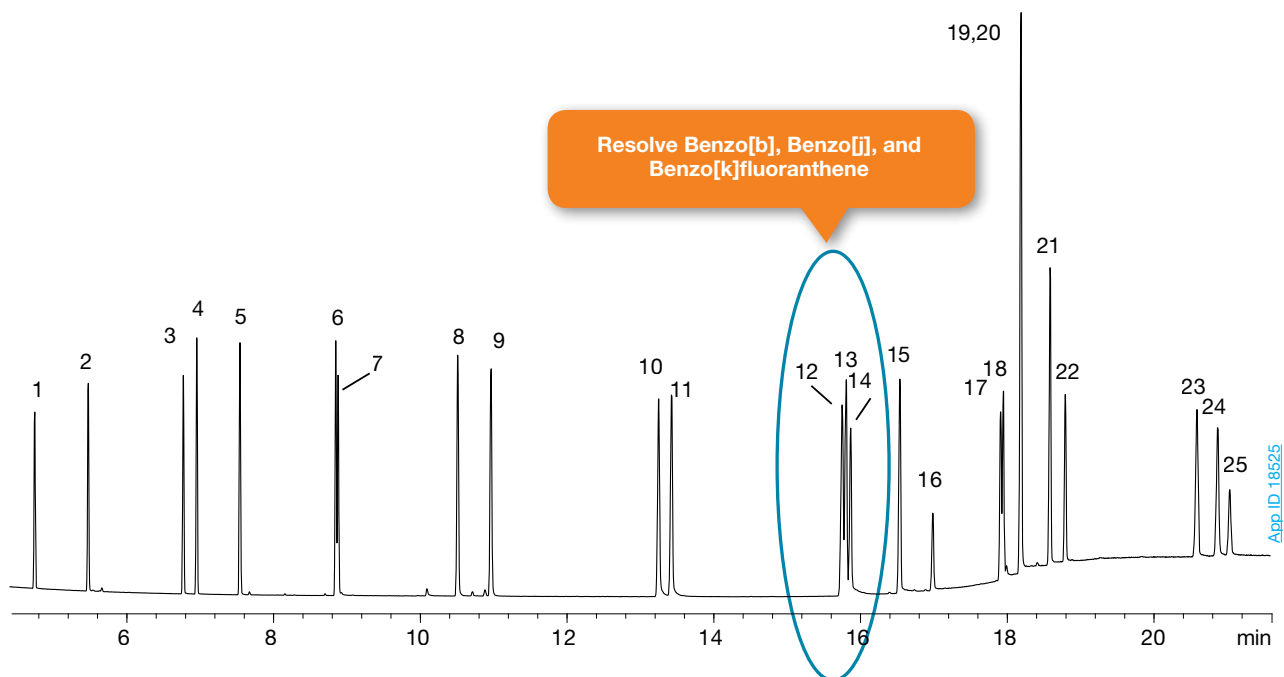


GC Conditions

Column: Zebron™ ZB-35
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: ZHG-G003-11
Injection: On-Column @ 83 °C, 1 µL
Recommended Liner: Zebron PLUS Single Taper Z-Liner™
Liner Part No.: AG2-0A13-05
Carrier Gas: Helium @ 1.2 mL/min (constant flow)
Oven Program: 80 °C for 0.66 min to 250 °C @ 20 °C/min to 360 °C @ 8 °C/min for 6 min
Detector: MSD @ 360 °C; 45-450 amu
Sample:

1. Naphthalene	14. Benzo[j]fluoranthene
2. 2-Methylnaphthalene	15. Benzo[a]pyrene
3. Acenaphthylene	16. 3-Methylcholanthrene
4. Acenaphthene	17. Dibenz[a,h]acridine
5. Fluorene	18. Dibenz[a,j]acridine
6. Phenanthrene	19. Indeno[1,2,3-cd]pyrene
7. Anthracene	20. Dibenz[a,h]anthracene
8. Fluoranthene	21. Benzo[g,h,i]perylene
9. Pyrene	22. 7H-Dibenzo[c,g]carbazole
10. Benz[a]anthracene	23. Dibenzo[a,e]pyrene
11. Chrysene	24. Dibenzo[a,i]pyrene
12. Benzo[b]fluoranthene	25. Dibenzo[a,h]pyrene
13. Benzo[k]fluoranthene	

Note: Analytes are 10 ppm in Dichloromethane



Polycyclic Aromatic Hydrocarbons (PAHs) in Water

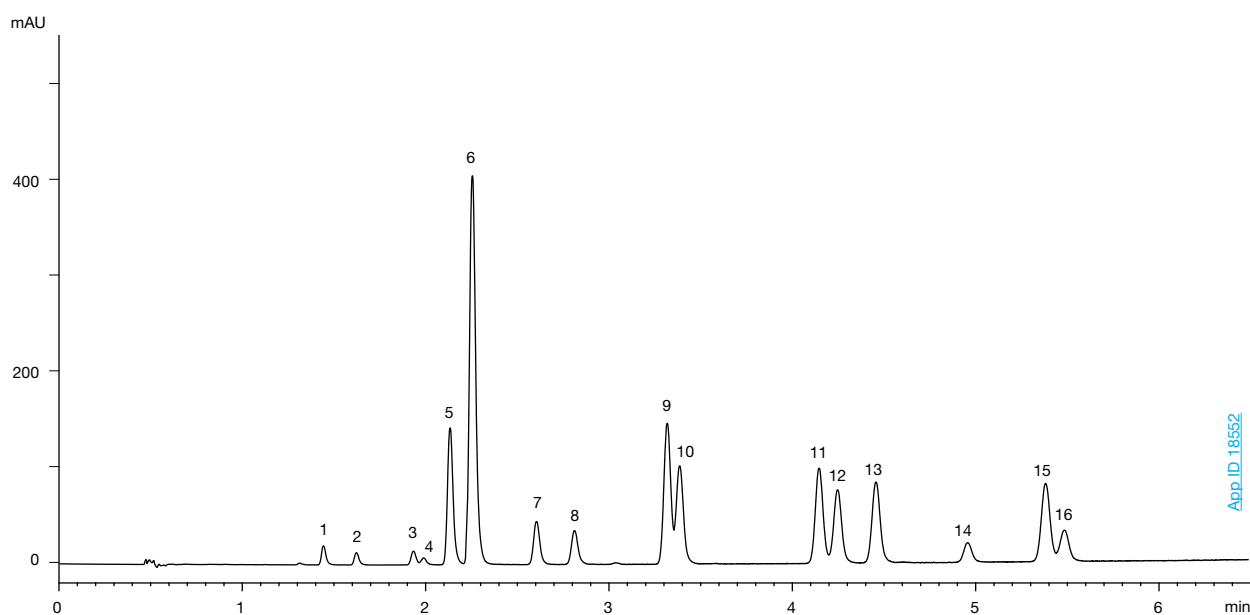
by LC/UV

Column: Kinetex® 2.6 µm C18
Dimensions: 100 x 4.6 mm
Part No.: 00D-4462-E0
SecurityGuard™: AJ0-8768
Mobile Phase: A: Water
 B: Acetonitrile
Gradient:

Time (min)	% B
0	70
10	100

Flow Rate: 1.5 mL/min
Temperature: 30 °C
Detection: UV @ 254 nm (ambient)
Sample:

1. Naphthalene
2. Acenaphthylene
3. Fluorene
4. Acenaphthene
5. Phenanthrene
6. Anthracene
7. Floranthene
8. Pyrene
9. Chrysene
10. Benz[a] anthracene
11. Benzo[b] fluoranthene
12. Benzo[k] fluoranthene
13. Benzo[a] pyrene
14. Dibenzo[a,h] anthracene
15. Indeno[1,2,3-cd] pyrene
16. Benzo [g,h,i] Perylene

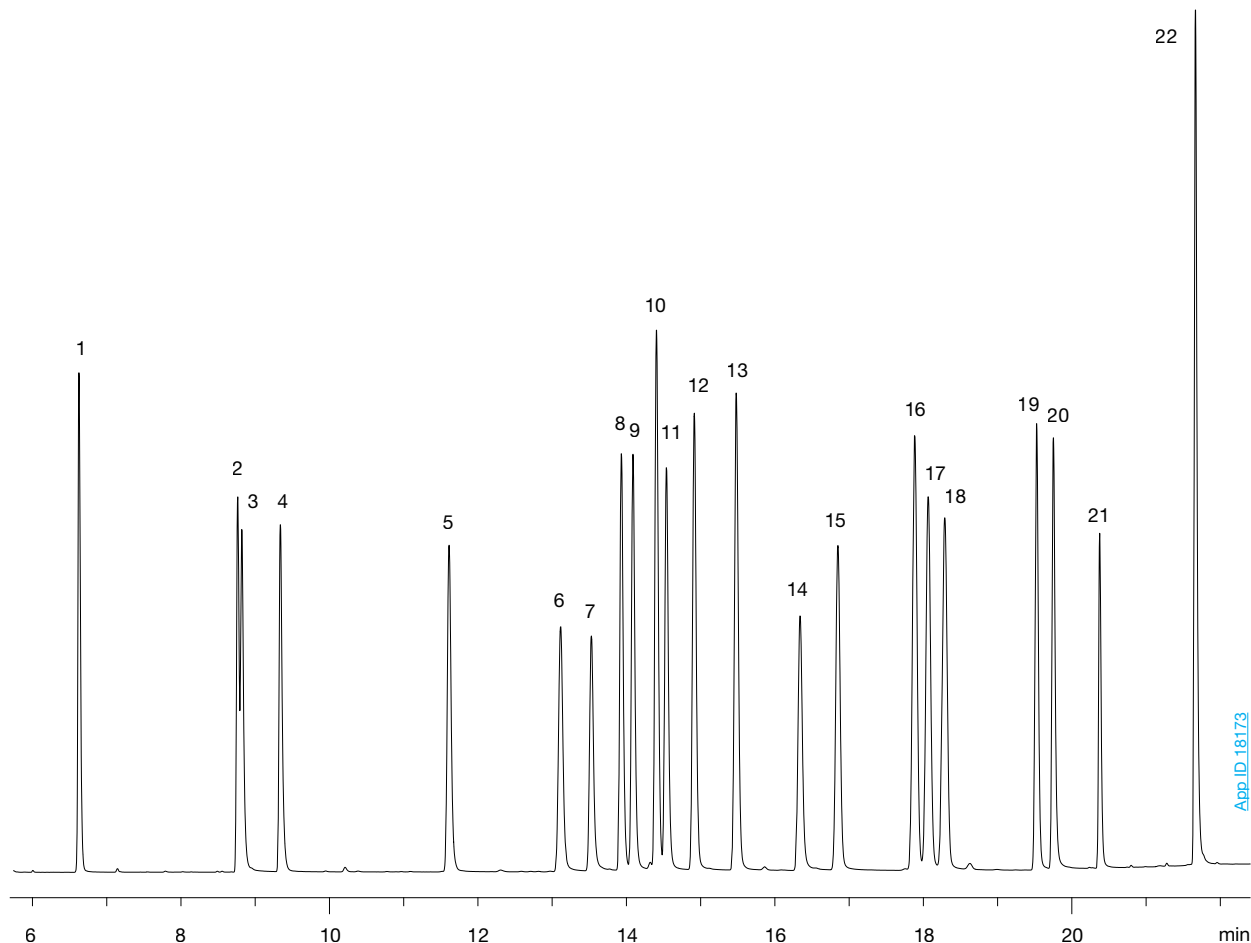


Polychlorinated Biphenyls (PCBs)

by GC/ECD

Column: Zebron™ ZB-XLB-HT Inferno™
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: 7HG-G024-11
Injection: Pressure Pulse @ 40 psi for 0.25 min, Split 2:1 @ 250 °C, 1 µL
Recommended Liner: Zebron PLUS Single Taper Z-Liner™
Liner Part No.: AG2-0A13-05
Carrier Gas: Helium @ 1.5 mL/min (constant flow)
Oven Program: 50 °C for 0.5 min to 210 °C @ 40 °C/min for 3 min to 230 °C @ 30 °C/min for 5 min to 250 °C @ 30 °C/min for 5 min to 320 °C @ 40 °C/min for 2 min
Detector: ECD @ 350 °C
Sample: Analytes are 25 ppb in isooctane

1. TCMX	12. BZ# 105
2. BZ# 31	13. BZ# 138
3. BZ# 28	14. BZ# 126
4. BZ# 52	15. BZ# 167
5. BZ# 101	16. BZ# 156
6. BZ# 81	17. BZ# 157
7. BZ# 77	18. BZ# 180
8. BZ# 123	19. BZ# 170
9. BZ# 118	20. BZ# 169
10. BZ# 114	21. BZ# 189
11. BZ# 153	22. DCB

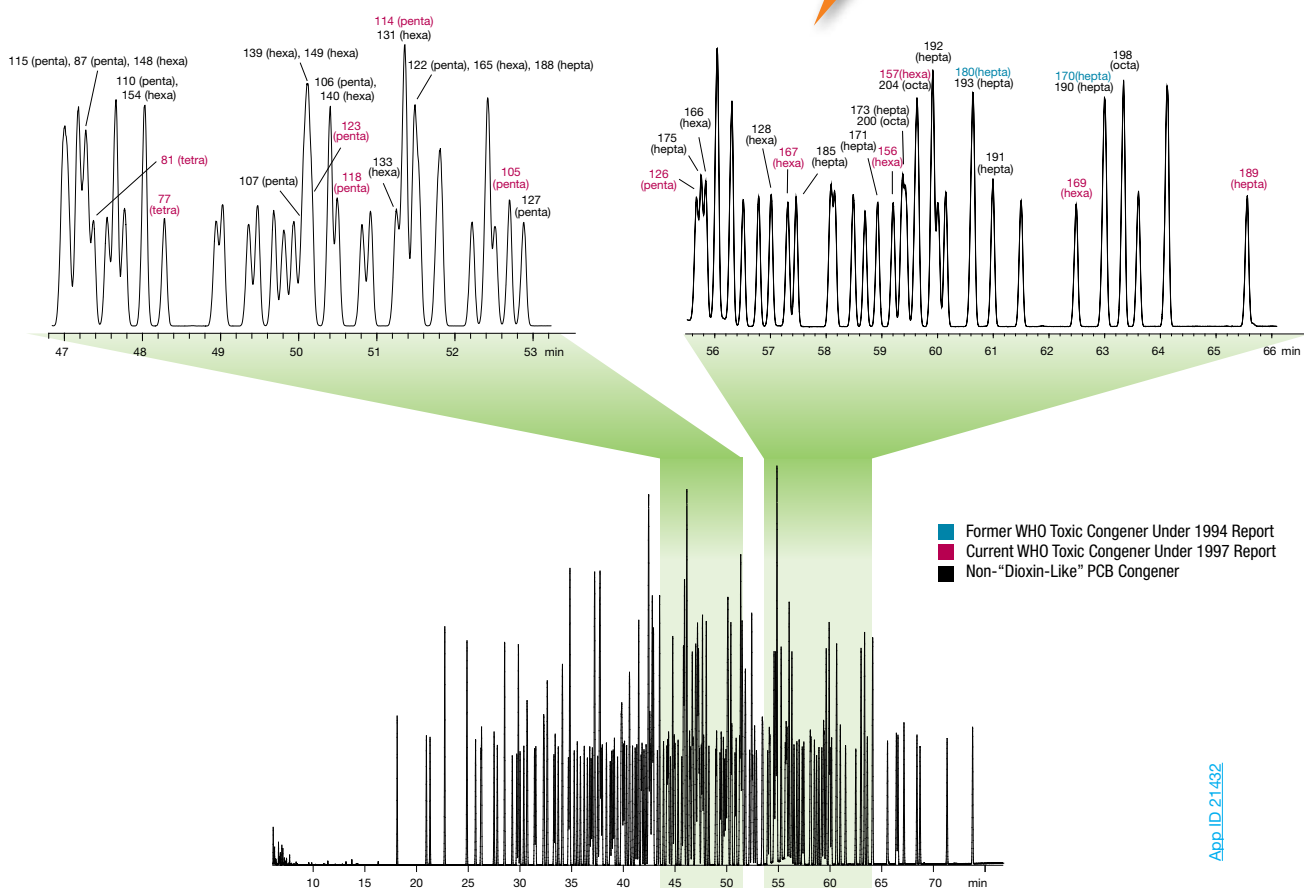


Polychlorinated Biphenyls (PCBs)

by GC/MS

Column: Zebron™ ZB-5ms
Dimensions: 60 meter x 0.25 mm x 0.25 µm
Part No.: 7KG-G010-11
Injection: Splitless @ 280 °C for 0.5 min (1 µL)
Recommended Liner: Zebron PLUS Single Taper Z-Liner™
Liner Part No.: AG2-0A13-05
Carrier Gas: Helium @ 1.1 mL/min (constant flow)
Oven Program: 60 °C for 1 min to 140 °C @ 25 °C/min to 290 °C @ 2 °C/min
Detector: MSD @ 320 °C; 35-510 amu
Sample: PCB Congeners

209 PCB Congeners



App ID 21452

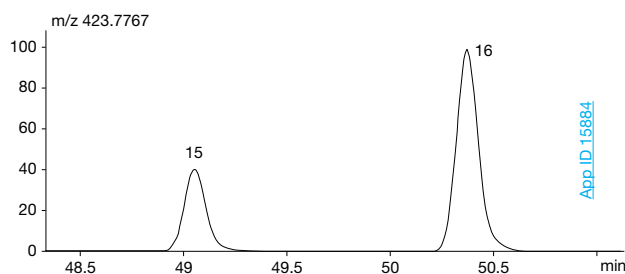
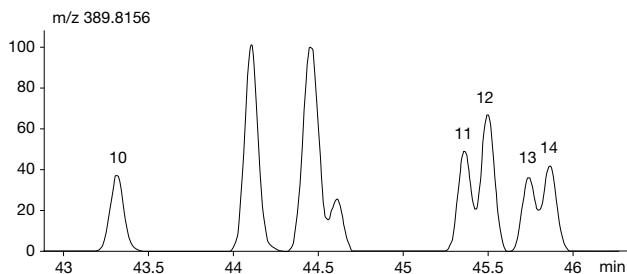
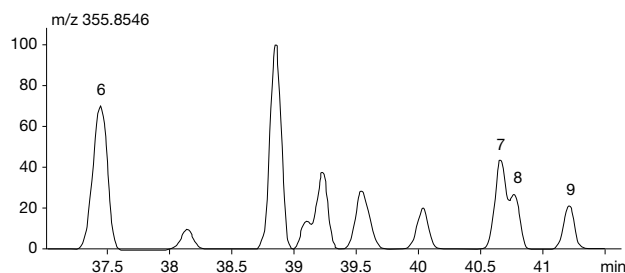
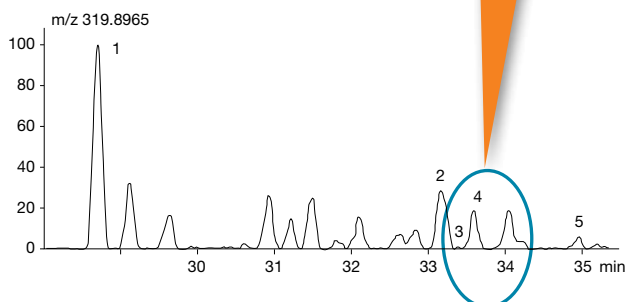
Polychlorinated Dibenzo-P-dioxins (PCDDs)

by GC/HRMS

Column: Zebron™ ZB-5ms
Dimensions: 60 meter x 0.25 mm x 0.25 µm
Part No.: [7KG-G010-11](#)
Injection: Splitless @ 250 °C, 2 µL
Recommended Liner: Zebron PLUS Single Taper Z-Liner™
Liner Part No.: [AG2-0A13-05](#)
Carrier Gas: Helium @ 26 cm/sec (constant flow)
Oven Program: 120 °C for 1 min to 220 °C @ 20 °C/min for 16 min to 235 °C @ 5 °C/min for 7 min to 300 °C @ 5 °C/min for 15 min
Detector: HRMSD @ 290 °C
Sample:

1. 1,3,6,8-TCDD	9. 1,2,3,8,9-PnCDD
2. 1,2,3,7/1,2,3,8-TCDD	10. 1,2,4,6,7, 9/1,2,4,6,8,9-HxCDD
3. 1,2,3,9-TCDD	11. 1,2,3,4,7,8-HxCDD
4. 2,3,7,8-TCDD	12. 1,2,3,6,7,8-HxCDD
5. 1,2,8,9-TCDD	13. 1,2,3,4,6,7-HxCDD
6. 1,2,4,6,8/1,2,4,7,9-PnCDD	14. 1,2,3,7,8,9-HxCDD
7. 1,2,3,7,8-PnCDD	15. 1,2,3,4,6,7,9-HpCDD
8. 1,2,3,6,7-PnCDD	16. 1,2,3,4,6,7,8-HpCDD

Analyze 16 PCDDs including
2,3,7,8 TCDD



[App ID 15884](#)

Polychlorinated Dibenzofurans (PCDFs)

by GC/HRMS

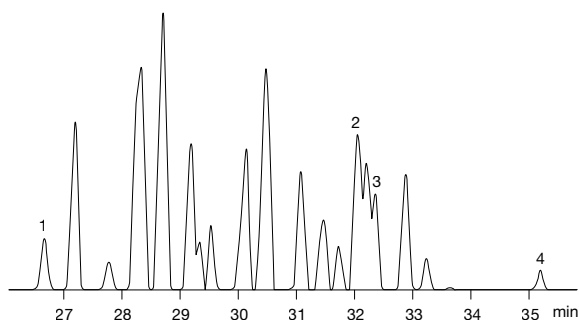
Column: Zebron™ ZB-5ms
Dimensions: 60 meter x 0.25 mm x 0.25 µm
Part No.: [7KG-G010-11](#)
Injection: Splitless @ 250 °C, 2 µL
Recommended Liner: Zebron PLUS Single Taper Z-Liner™
Liner Part No.: [AG2-0A13-05](#)
Carrier Gas: Helium @ 26 cm/sec (constant flow)
Oven Program: 120 °C for 1 min to 220 °C @ 20 °C/min for 16 min to 235 °C @ 5 °C/min for 7 min to 300 °C @ 5 °C/min for 15 min
Detector: HRMSD @ 290 °C

Sample:

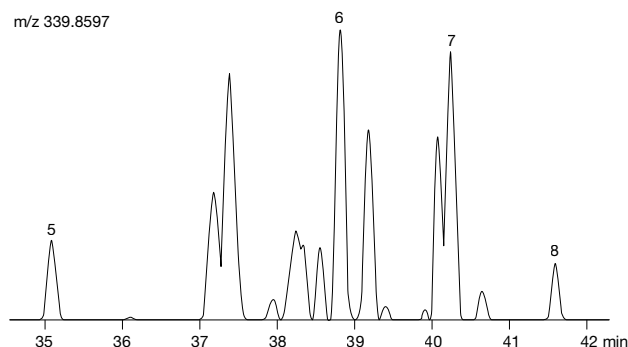
1. 1,3,6,8-TCDF	10. 1,2,3,4,6,7-HxCDF
2. 2,3,4,7-TCDF	11. 1,2,3,4,7,8-HxCDF
3. 1,2,7,8-TCDF	12. 1,2,3,6,7,8-HxCDF
4. 1,2,8,9-TCDF	13. 1,2,3,6,8,9-HxCDF
5. 1,3,4,6,8/1,2,4,6,8-PnCdf	14. 2,3,4,6,7,8-HxCDF
6. 1,2,3,7,8-PnCdf	15. 1,2,3,7,8,9-HxCDF
7. 1,2,3,7,8-PnCdf	16. 1,2,3,4,8,9-HxCDF
8. 1,2,3,8,9-PnCdf	17. 1,2,3,4,6,7,8-HpCDF
9. 1,2,3,4,6,8-HxCDF	18. 1,2,3,4,7,8,9-HpCDF



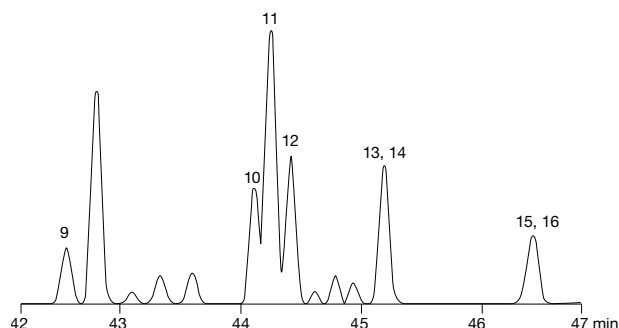
m/z 303.9016



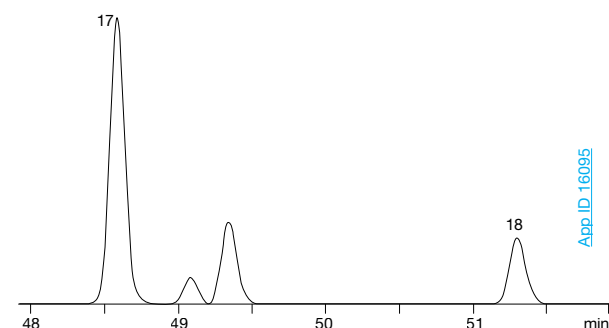
m/z 339.8597



m/z 373.8207



m/z 407.7818



App ID 16095

Perfluorinated Alkyl Substances (PFAS)

by LC/MS/MS

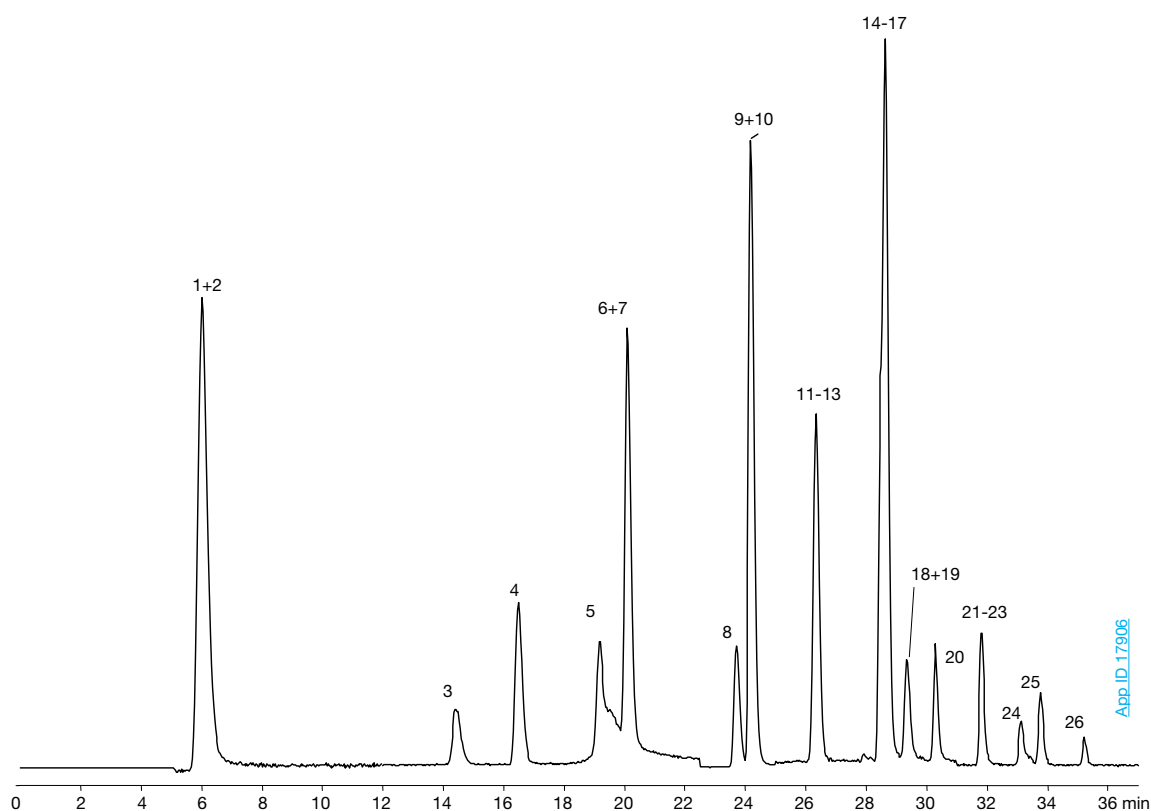


Column: Luna® 3 µm PFP(2)
Dimensions: 150 x 2.0 mm
Part No.: 00F-4447-BQ
Mobile Phase: A: Water and 10 mM Ammonium acetate
 B: Methanol and 10 mM Ammonium acetate
Gradient:

Time (min)	% B
0	30
29	90
30	100
34	100
37	30

Flow Rate: 200 µL/min
Temperature: 40 °C
Detection: Mass Spectrometer (MS)
Instrument: SCIEX API 2000™

- Sample:**
1. PFBA (Perfluorobutanoic acid)
 2. MPFBA (Perfluoro-[1,2,3,4-13C4] butanoic acid)
 3. PFPA (Perfluoropentanoic acid)
 4. PFBS (Perfluorobutanesulfonic acid)
 5. HPFHpA (7H-Dodecafluoroheptanoic acid)
 6. PFHxA (Perfluorohexanoic acid)
 7. MPFHxA (Perfluoro-[1,2-13C2] hexanoic acid)
 8. PFHpA (Perfluoroheptanoic acid)
 9. PFHxS (Perfluorohexanesulfonic acid)
 10. MPFHxS (Perfluoro-[18O2] hexanesulfonic acid)
 11. PFOA (Perfluorooctanoic acid)
 12. MPFOA (Perfluoro-[1,2,3,4-13C4] octanoic acid)
 13. H2PFOS (1H,1H,2H,2H-Perfluorooctanesulfonic acid)
 14. PFOS (Perfluorooctanesulfonic acid)
 15. MPFOS (Perfluoro-[1,2,3,4-13C4] octanesulfonic acid)
 16. PFNA (Perfluorononanoic acid)
 17. MPFNA (Perfluoro-[1,2,3,4,5-13C5] nonanoic acid)
 18. H₂PFDA (2H,2H-Perfluorodecanoic acid)
 19. PF-3,7-DMOA (Perfluoro-3,7-dimethyloctanoic acid)
 20. PFDA (Perfluorodecanoic acid)
 21. PFUnA (Perfluoroundecanoic acid)
 22. H₂PFUnA (2H,2H,3H,3H-Perfluoroundecanoic acid)
 23. PFDS (Perfluorodecanesulfonic acid)
 24. PFDoA (Perfluorododecanoic acid)
 25. PFOSA (Perfluorooctanesulfonamid)
 26. PFTA (Perfluorotetradecanoic acid)



23 Per-Polyfluoronated Alkyl Substances (PFAS)

by UHPLC/MS/MS

Column: Luna® Omega 1.6 µm PS C18
Dimensions: 50 x 2.1 mm
Part No.: 00B-4752-AN
Mobile Phase: A: 5 mM Ammonium Acetate in Water
 B: Acetonitrile
Gradient:

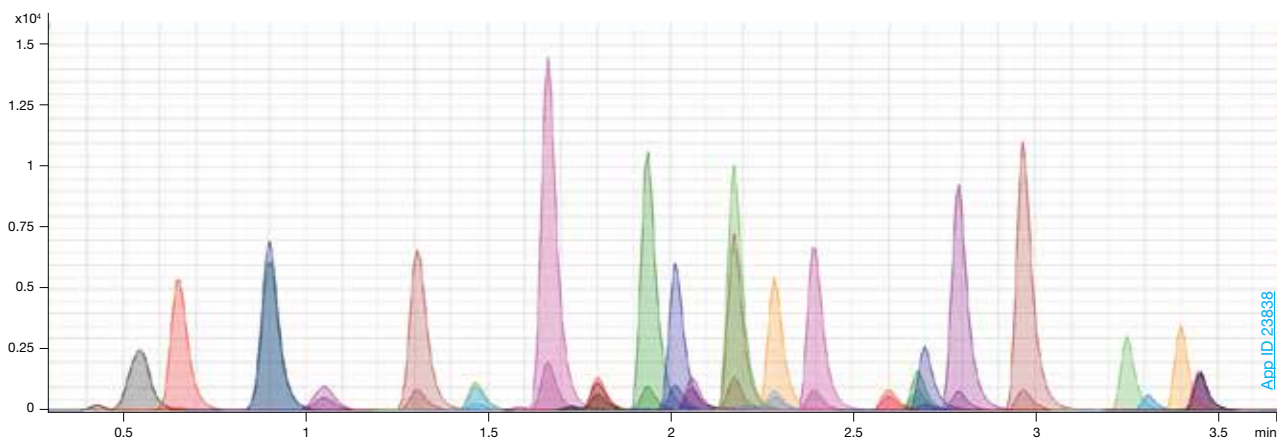
Time (min)	% B
0	40
0.5	40
3	90
3.1	100
4	100

Injection: 5 µL
Flow Rate: 0.55 mL/min
Temperature: 40 °C
Detection: Tandem Mass Spec (MS/MS)
Instrument: Agilent® 6460 QQQ
Samples:

1. 6:2 FTS	13. PFHpA
2. 8:2 FTS	14. PFHpS
3. EtFOSA	15. PFHxA
4. EtFOSE	16. PFHxS
5. FOA	17. PFNA
6. MeFOA	18. PFOA
7. MeFOSE	19. PFOS
8. PFBA	20. PFPeA
9. PFBS	21. PFTeDA
10. PFDA	22. PFTrDA
11. PFDoA	23. PFUdA
12. PFDS	



We would like to provide special thanks to Weck Laboratories for contributing this application.



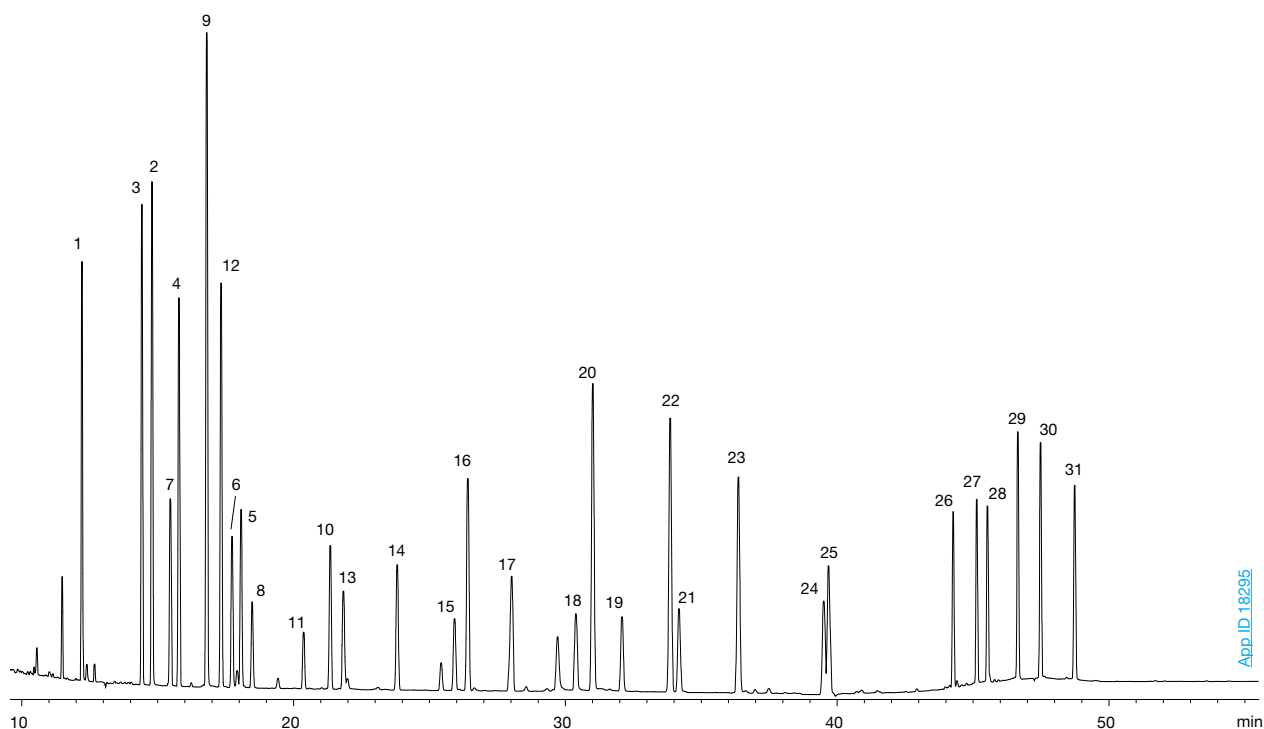
Polybrominated Diphenyl Ethers (PBDEs)

by GC/ECD



Column: Zebtron™ ZB-5
Dimensions: 60 meter x 0.25 mm x 0.25 µm
Part No.: [7KG-G002-11](#)
Injection: Pulsed Splitless @ 280 °C, 4 bar for 1 min, splitless for 2 min
Recommended Liner: Zebtron PLUS Single Taper Z-Liner™
Liner Part No.: [AG2-0A13-05](#)
Carrier Gas: Helium @ 2.6 mL/min (constant flow)
Oven Program: 50 °C for 1 min to 180 °C @ 20 °C/min for 1 min to 240 °C @ 2 °C/min for 1 min to 300 °C @ 10 °C/min for 10 min
Detector: ECD @ 330 °C
Sample: Analytes are 12 ppb

1. 2-Bromobiphenyl (IS)	12. e-HCH (ISG)	23. PCB 167 (IS)
2. HCB	13. 4,4-Dichlorobenzophenone	24. PCB 180
3. α-HCH (α-BHC)	14. cis-Heptachlorepoxide	25. PBDE 47
4. γ-HCH (γ-BHC)	15. PCB 101	26. PBDE 100
5. Moschus-Xylol (Musk Xylene)	16. cis-Chlordane (cis-Chlordane)	27. PBDE 99
6. PCB 29 (ISG)	17. Dieldrin	28. PBDE 116 (ISG)
7. β-HCH (β-BHC)	18. PCB 118	29. PBDE 85
8. PCB 28	19. PCB 153	30. PBDE 154
9. δ-HCH (δ-BHC)	20. p,p'-DDD	31. PBDE 153
10. Aldrin	21. PCB 138	
11. PCB 52	22. p,p'-DDT	

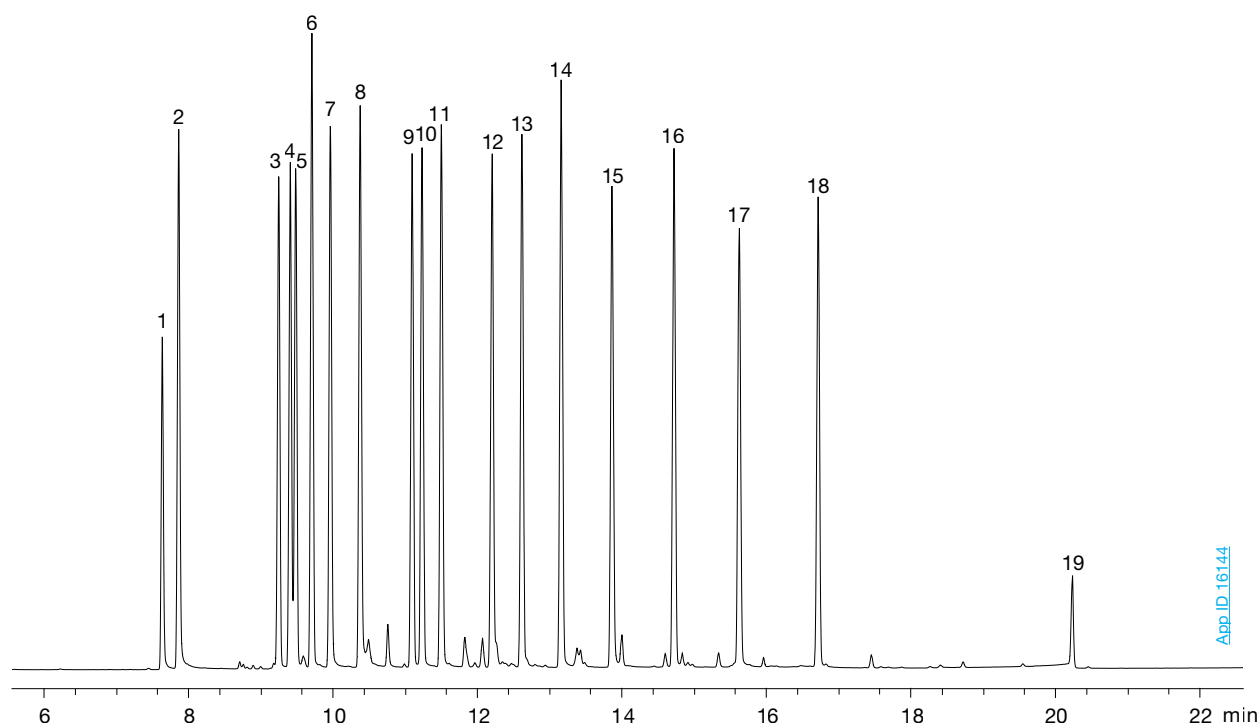


Polybrominated Diphenyl Ethers (PBDEs)

by GC/ECD

Column: Zebron™ ZB-5HT Inferno™
Dimensions: 15 meter x 0.25 mm x 0.10 µm
Part No.: [7EG-G015-02](#)
Injection: On-Column @ 73 °C, 0.5 µL
Recommended Liner: Zebron PLUS Single Taper Z-Liner™
Liner Part No.: [AG2-0A13-05](#)
Carrier Gas: Helium @ 1.5 mL/min (constant flow)
Oven Program: 70 °C to 160 °C @ 25 °C/min to 350 °C @ 10 °C/min for 5 min
Detector: ECD @ 400 °C
Sample: Analytes are 2.5 ppm in isooctane

1. BDE-25	11. BDE-99
2. BDE-28	12. BDE-85
3. BDE-75	13. BDE-154
4. BDE-49	14. BDE-153
5. BDE-71	15. BDE-138
6. BDE-47	16. BDE-183
7. BDE-66	17. BDE-190
8. BDE-77	18. BDE-203
9. BDE-100	19. BDE-209
10. BDE-119	



[App ID 16144](#)

Bisphenol A (BPA) in Water

by LC/FL

Solid Phase Extraction (SPE)

Strata[®]-X 200 mg/6 mL

Part No.: 8B-S100-FCH

Condition: 4 mL of Methanol

Equilibrate: 4 mL of Water

Load: 100 mL water sample

Dry: 10 min under full vacuum (10 mm Hg)

Elute: 4 mL Methanol

Dry down: Evaporate under a slow stream of nitrogen gas

Reconstitute: 1 mL of Water

LC Conditions

Column: Kinetex[®] 2.6 µm C18

Dimensions: 50 x 4.6 mm

Part No.: 00B-4462-EQ

Mobile Phase: Acetonitrile / Water (65:35)

Flow Rate: 1.5 mL/min

Detection: Fluorescence @ 230 nm, Emission @ 302 nm

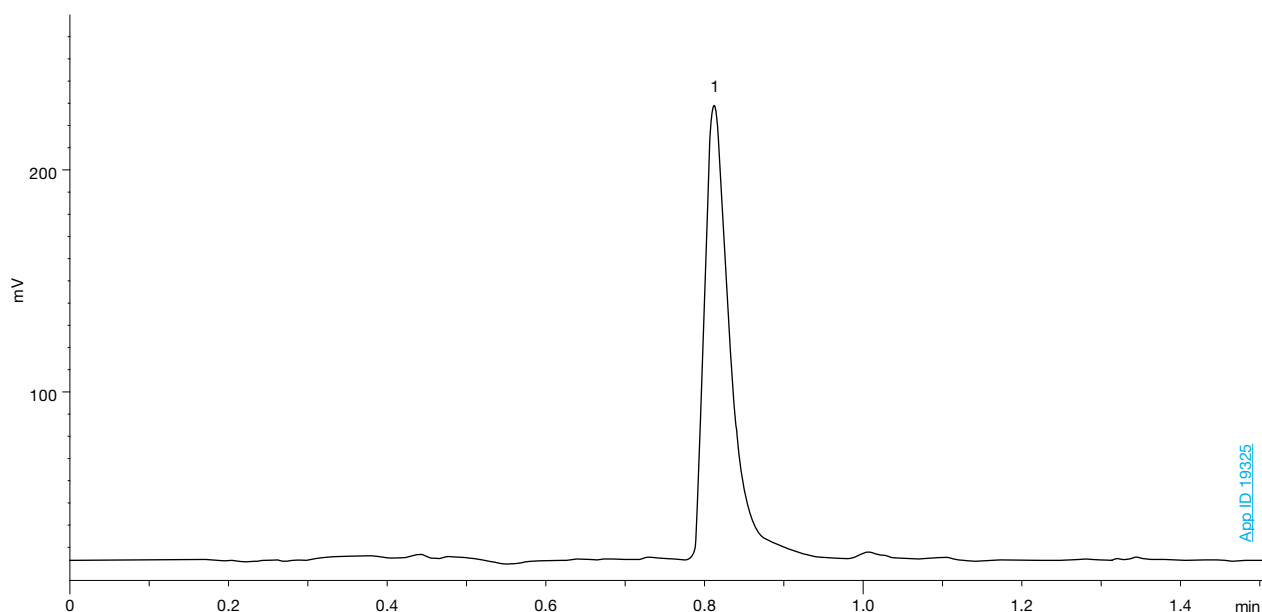
Sample: 1. Bisphenol A



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Melamine and Cyanuric Acid in Milk and Baby Formula Products

by SPE, LC/MS and GC/MS

Solid Phase Extraction (SPE)

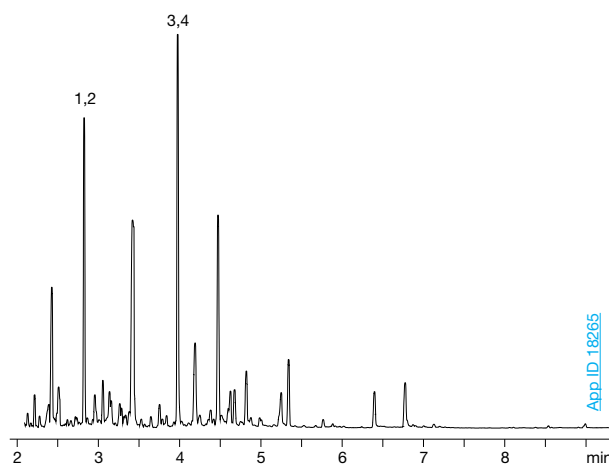
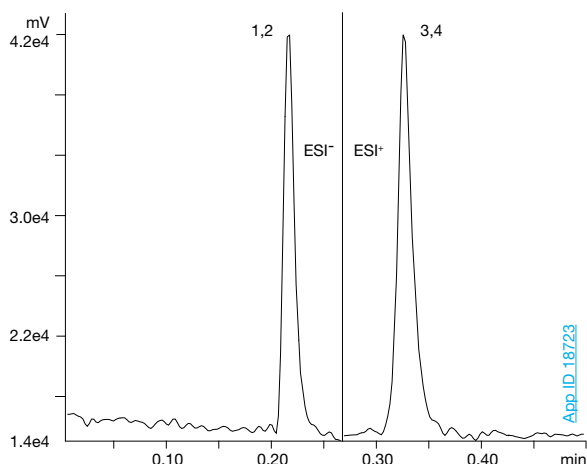
Strata® Melamine 200 mg/3 mL

Part No.: 8B-S049-FBJ
Condition: 3 mL of Methanol
Equilibrate: 3 mL of Acetonitrile/Water (50:50)
Load: Pretreated sample
Wash: 1. 500 µL of Acetonitrile/Water (50:50)
 2. 500 µL of Acetonitrile/Water (50:50)
 3. 500 µL of Methanol/Water (50:50)
Dry Down: 2 mins under vacuum
Elute: 500 µL Methanol followed by 2x 500 µL of 5% Ammonium hydroxide in Methanol



For complete technical note visit:
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Search:



LC Conditions

Column: Kinetex® 2.6 µm HILIC
Dimension: 50 x 2.1 mm
Part No.: 00B-4461-AN
Mobile Phase: Acetonitrile/100 mM Ammonium acetate, pH 5.8 (90:10)
Flow Rate: 1.0 mL/min
Temperature: 25 °C
Detection: Mass Spectrometer (MS) @110 °C
 Switch from Negative Ion Mode (Cyanuric acid) to Positive Ion (for Melamine) at 0.26 minutes until 1 minute; MRM
Sample: 1. Cyanuric acid 128-85.0 (quant ion), 128.0-42.0 (qualifier ion)
 2. Cyanuric acid 13C3 (ISTD) 131.1-87.0
 3. Melamine 127.1-85 (quant ion), 127.1-68 (qualifier ion)
 4. Melamine-13C3.15N3 (ISTD) 133.2-89.1

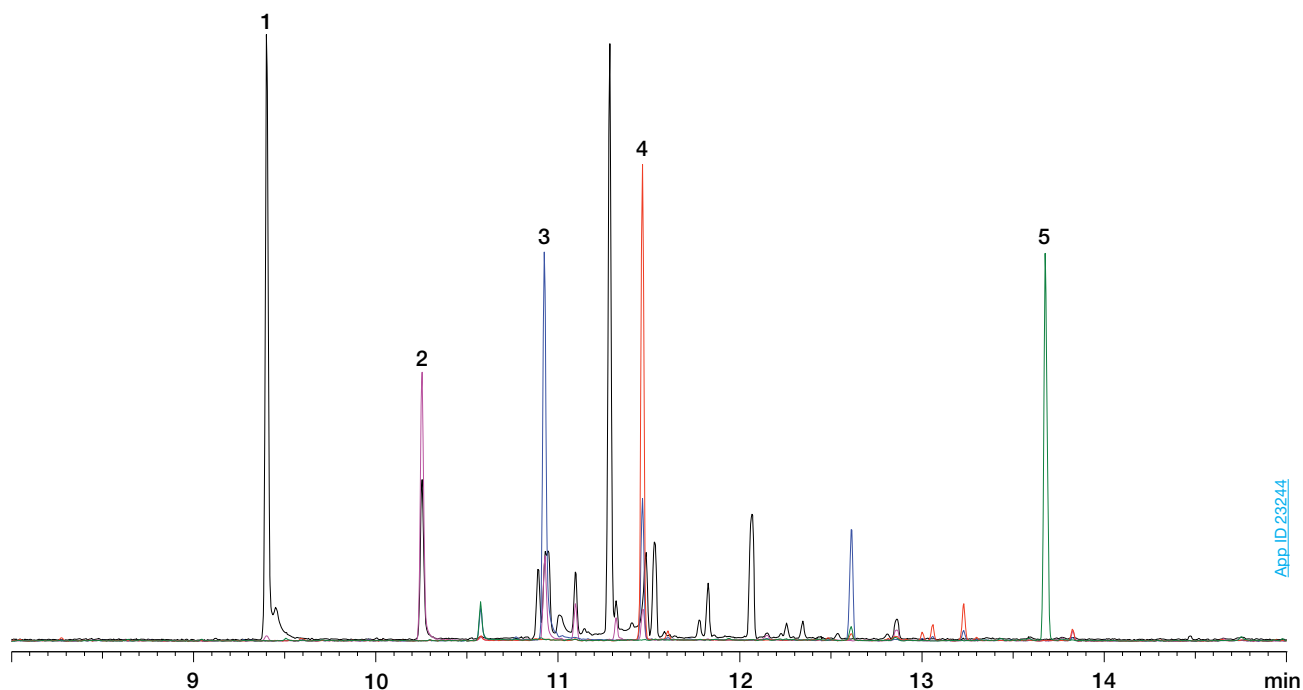
GC Conditions

Column: Zebron™ ZB-XLB-HT Inferno™
Dimensions: 15 meter x 0.25 mm x 0.25 µm
Part No.: ZEG-G024-11
Injection: On-Column @ 103 °C, 1 µL
Recommended Liner: Zebron PLUS Single Taper Z-Liner™
Liner Part No.: AG2-0A13-05
Carrier Gas: Helium @ 1.4 mL/min (constant flow)
Oven Program: 100 °C for 0.5 min to 320 °C @ 25 °C/min
Detector: MSD @ 325 °C
Sample: Analytes are 200 ng / 100 µL in BSTFA / Pyridine (1:1)
 1. Cyanuric Acid 13C3 (IS)
 2. Cyanuric Acid
 3. Melamine 13C3 15N3 (IS)
 4. Melamine

Melamine in Dog Food

By GC/MS

Column: Zebron ZB-5MS^{PLUS}[™]
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: [7HG-G030-11](#)
Injection: Splitless @ 280 °C, 1 µL
Recommended Liner: Zebron PLUS Single Taper Z-Liner[™]
Liner Part No.: [AG2-0A13-05](#)
Carrier Gas: Helium @ 1 mL/min (constant flow)
Oven Program: 75 °C for 1 min to 320 °C @ 15 °C/min hold for 4 min
Detection: MSD @ 320 °C
Sample: 1. Cyanuric Acid
2. Ammelide
3. Ammeline
4. Melamine
5. Benzoguanamine



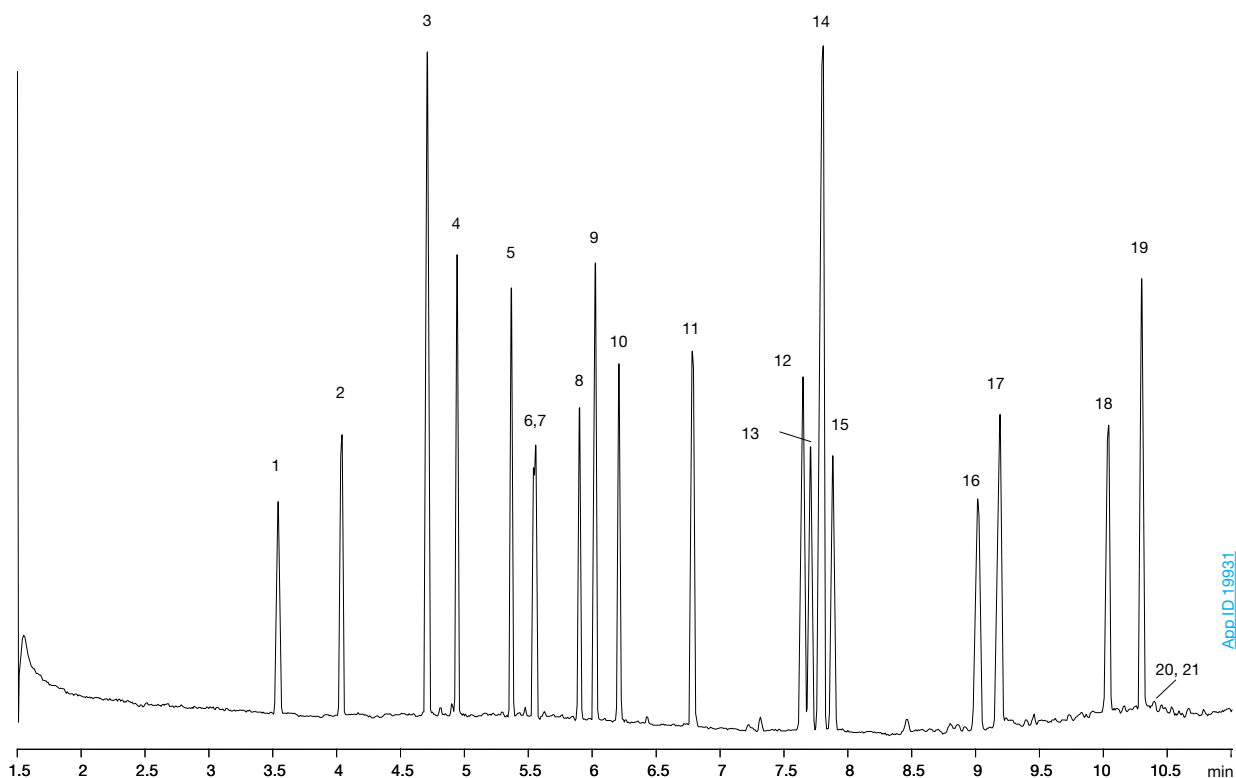
App ID 23244

Phthalates

by GC/MS

Column: Zebron™ ZB-50
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: 7HG-G004-11
Injection: Split 10:1 @ 260 °C, 1 µL
Recommended Liner: Zebron PLUS Single Taper Z-Liner™
Liner Part No.: AG2-0A13-05
Carrier Gas: Helium @ 1 mL/min (constant flow)
Oven Program: 135 °C to 275 °C @ 25 °C/min for 3.5 min to 340 °C @ 35 °C/min for 1 min
Detector: MSD @ 320 °C; 45-500 amu
Sample: Analytes are 100 µg/mL

1. Dimethyl phthalate	12. Bis(2-ethylhexyl) phthalate
2. Diethyl phthalate	13. Benzyl butyl phthalate
3. Diallyl phthalate	14. Di-n-heptyl phthalate
4. Di-n-propyl phthalate	15. Bis(2-n-butoxyethyl) phthalate
5. Di-n-butyl phthalate	16. Dicyclohexyl phthalate
6. Diisobutyl phthalate	17. Di-n-octyl phthalate
7. Di-n-hexyl phthalate	18. Diphenylhexyl phthalate
8. Bis(2-methoxyethyl) phthalate	19. Di-n-nonyl phthalate
9. Di-n-pentyl phthalate	20. Diisononyl phthalate
10. Bis(2-ethoxyethyl) phthalate	21. Diisodecyl phthalate
11. Di-(4-methyl-2-pentyl) phthalate	



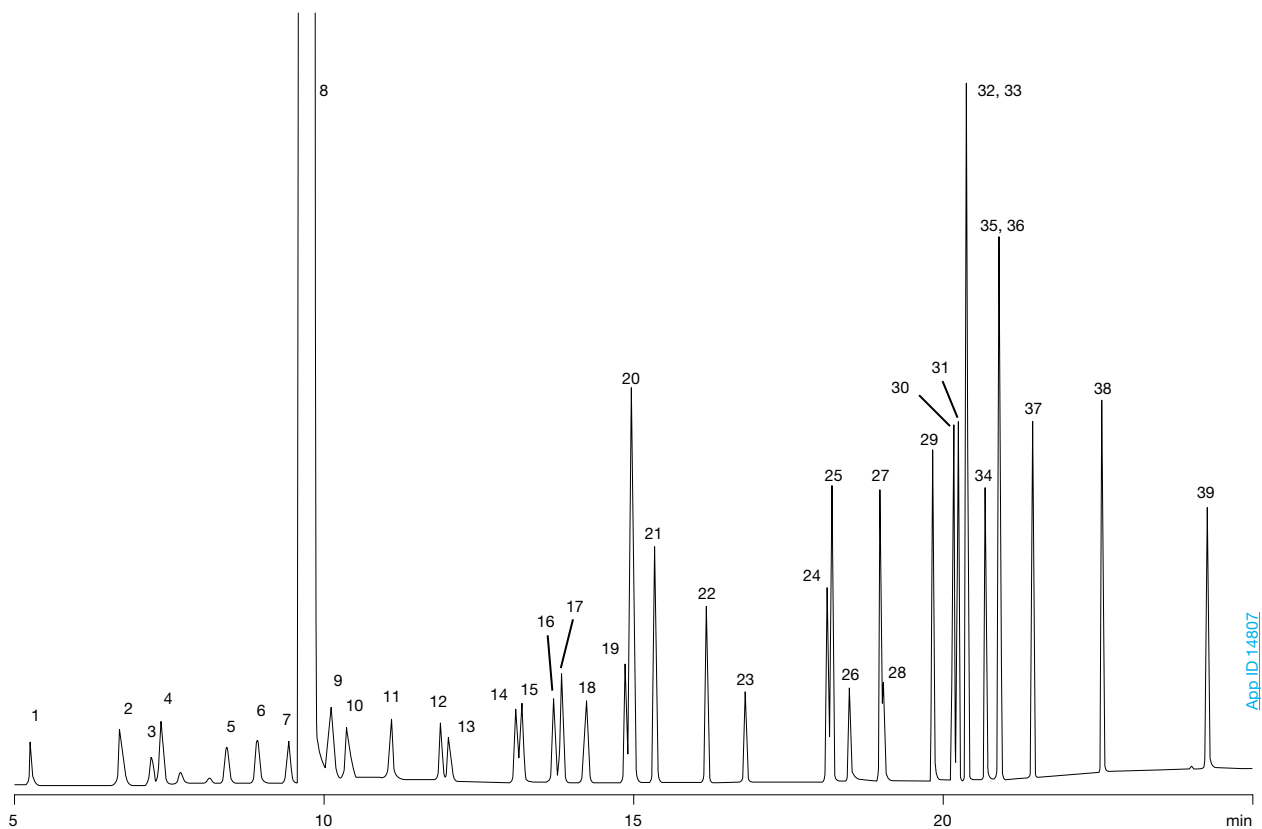
App ID 19931

Residual Solvents

by GC/MS

Column: Zebron™ ZB-624
Dimensions: 60 meter x 0.32 mm x 1.80 µm
Part No.: [7KM-G005-31](#)
Injection: Split 20:1 @ 220 °C, 0.6 µL
Recommended Liner: Zebron PLUS Single Taper
Liner Part No.: [AG2-0A10-05](#)
Carrier Gas: Helium @ 1 mL/min (constant flow)
Oven Program: 40 °C for 8 min to 90 °C @ 8 °C/min to 210 °C @ 15 °C/min for 8 min
Detector: MSD @ 180 °C
Sample: All analytes are 140 ng on-column except Methylene chloride as the solvent

1. Methanol	15. Ethyl acetate	29. N,N-Dimethylformamide
2. Pentane	16. Tetrahydrofuran	30. Chlorobenzene
3. Ethanol	17. Chloroform	31. Ethylbenzene
4. Ether	18. Cyclohexane	32. m-Xylene
5. Acetone	19. 1,2-Dimethoxyethane	33. p-Xylene
6. Isopropanol	20. Benzene	34. 3-Picoline
7. Acetonitrile	21. Heptane	35. o-Xylene
8. Methylene chloride	22. Trichloroethylene	36. Styrene
9. tert-Butanol	23. 1,4-Dioxane	37. Anisole
10. MTBE	24. Pyridine	38. Benzaldehyde
11. Hexane	25. Toluene	39. N-Methylpyrrolidone
12. Allyl alcohol	26. Ethylene glycol	
13. n-Propanol	27. Tetrachloroethylene	
14. Methyl ethyl ketone	28. Formamide	



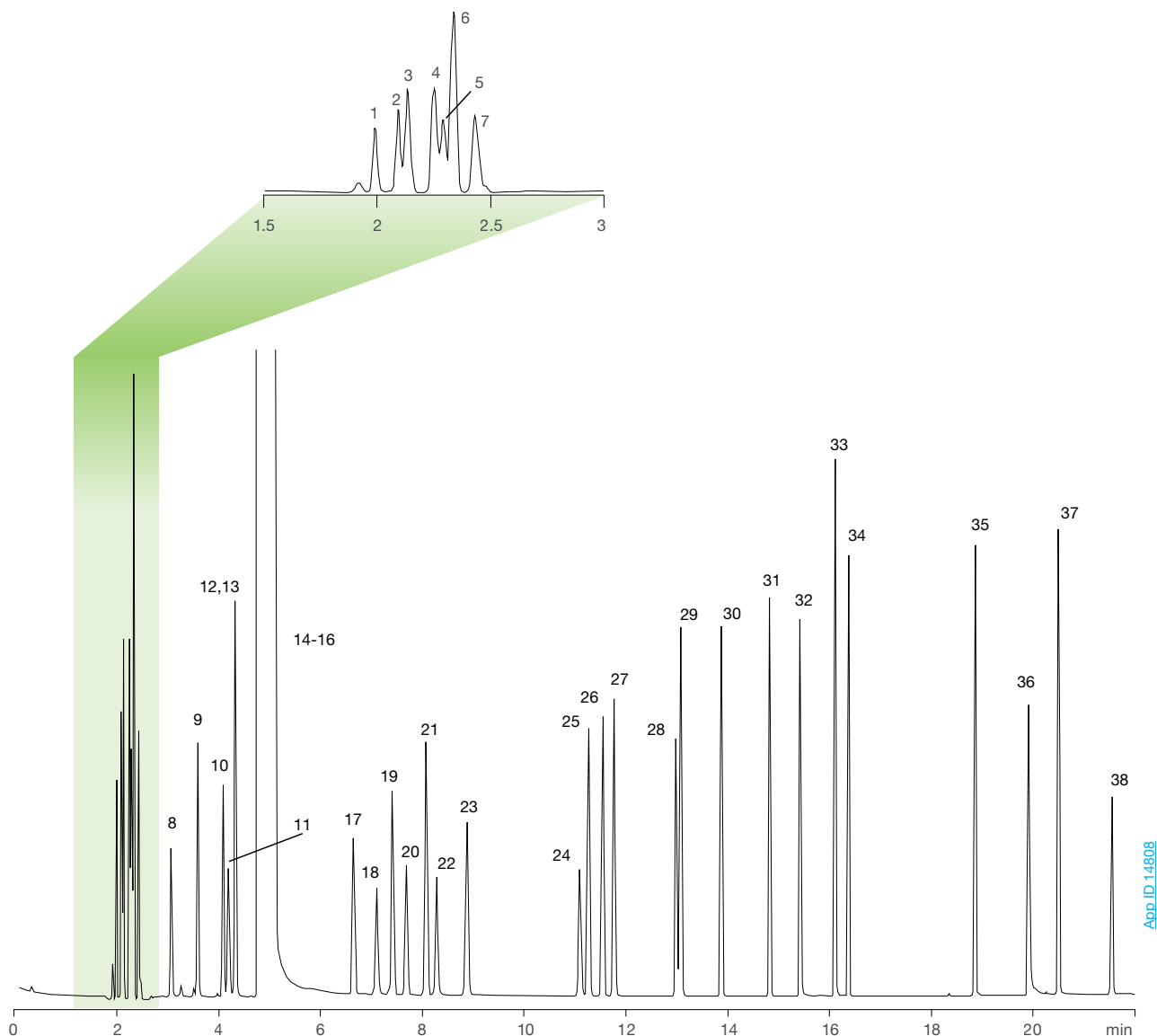
App ID 14807

Residual Solvents

by GC/MS

Column: Zebron™ ZB-WAX
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: 7HG-G007-11
Injection: Split 100:1 @ 250 °C, 1 µL
Recommended Liner: Zebron PLUS Single Taper
Liner Part No.: AG2-0A10-05
Carrier Gas: Helium @ 0.7 mL/min (constant flow)
Oven Program: 35 °C for 5 min to 60 °C @ 4 °C/min to 180 °C @ 12 °C/min for 4 min
Detector: MSD @ 180 °C
Sample:

- | | | |
|-------------------|-------------------------|------------------------------|
| 1. Pentane | 14. Methylene chloride | 27. m-Xylene |
| 2. Hexane | 15. Ethanol | 28. Pyridine |
| 3. Ethyl ether | 16. Benzene | 29. o-Xylene |
| 4. Isooctane | 17. Trichloroethylene | 30. Chlorobenzene |
| 5. MTBE | 18. Acetonitrile | 31. Styrene |
| 6. Heptane | 19. Tetrachloroethylene | 32. 3-Picoline |
| 7. Cyclohexane | 20. Chloroform | 33. N,N-Dimethylformamide |
| 8. Acetone | 21. Toluene | 34. Anisole |
| 9. THF | 22. 1-Propanol | 35. Benzaldehyde |
| 10. Ethyl acetate | 23. 1,4-Dioxane | 36. Ethylene glycol |
| 11. Methanol | 24. Allyl alcohol | 37. N-Methyl-2-pyrrolidinone |
| 12. t-Butanol | 25. Ethylbenzene | 38. Formamide |
| 13. MEK | 26. p-Xylene | |

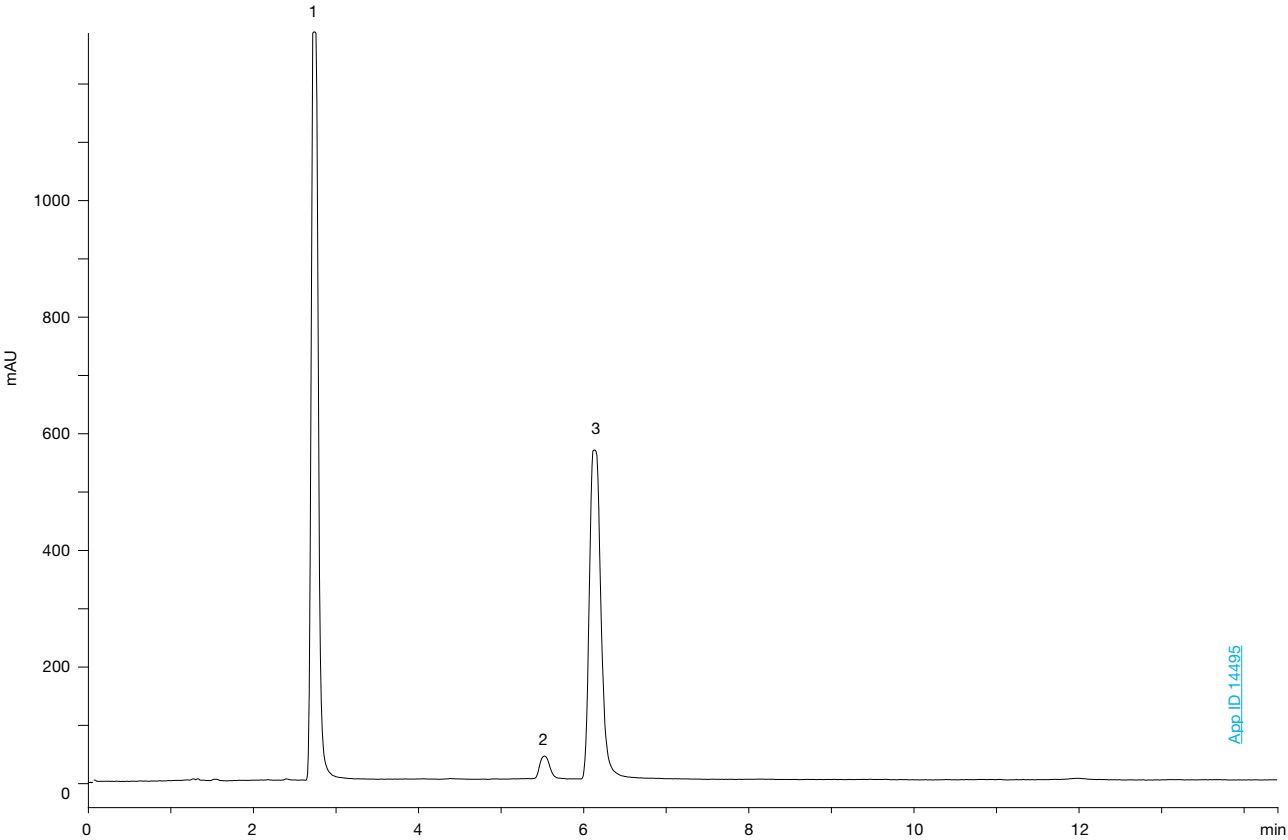


App ID 14808

Acrylamide, Acrylonitrile and Acrolein in Water

by LC/UV

Column: Synergi™ 4 µm Hydro-RP
Dimensions: 250 x 4.6 mm
Part No.: 00G-4375-E0
SecurityGuard™ Cartridge: AJ0-7511
Mobile Phase: Water/Acetonitrile (98:2)
Flow Rate: 2 mL/min
Detection: UV @ 195 nm
Sample: 1. Acrylamide
2. Acrylonitrile
3. Acrolein



Acrylamide From Coffee

by SLE and LC/MS/MS

Extraction Procedure

Sample Pretreatment

- **Ground Coffee Control (40 mg/mL)** 60 g of ground coffee was percolated with 1500 mL of boiling water
- **Instant Coffee Control (8 mg/mL)** 2 g of instant coffee was dissolved in 250 mL of boiling water

Acrylamide standard was spiked into control coffee to reach 100 ng/mL (ground coffee) and 200 ng/mL (instant coffee) by adding 20 μ L Acrylamide- $^{13}\text{C}_3$ (4 μ g/mL in water) to 800 μ L of the prepared coffee.

Simplified Liquid Extraction (SLE) Protocol

Left: Coffee with 2 % Ammonium hydroxide
Right: Control ground coffee



Left: Clean sample after extraction
Right: Novum SLE 6 cc tube after extraction



Sample Loading

- Add 150 μ L 2 % Ammonium hydroxide in water to the spiked samples (from Pretreatment step), vortex for 30 seconds.
- Load the sample onto the Novum™ SLE 6 cc tubes and apply a short and gentle pulse of vacuum (~5-10 seconds at 5" or less of Hg) until the sample has completely entered the media.
- Wait for 5-6 minutes.

Note: Inadequate or excessive wait periods can lead to variable recoveries and poor precision.

Elution

- Dispense 2x 2.5 mL of Ethyl acetate/Tetrahydrofuran (1:1) onto the Novum SLE sorbent and collect the solvent under gravity into a collection tube that contains 10 μ L Ethylene glycol.
- Apply vacuum at 5" of Hg (or lower) for 20-30 seconds to complete the extraction.

Note: To reduce analyte loss due to dry down, ethylene glycol was added to the collection tube to prevent the sample from drying completely during the dry down step.

Dry Down

- Evaporate extracted samples to complete dryness under a slow stream of N_2 at 45° C .
- Reconstitute sample in 300 μ L of water.

For complete technical note visit:
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Search: 

Recovery

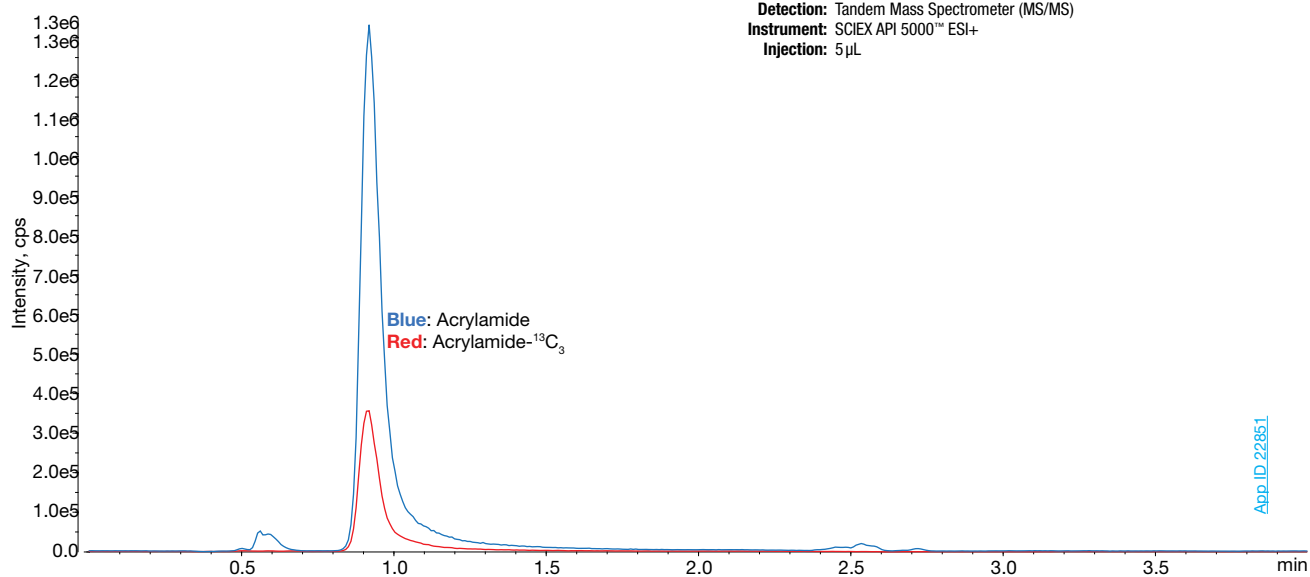
Sample ID	Ground coffee (100 ng/mL)	Instant coffee (200 ng/mL)
Mean of area ratio	1.89	3.75
STDV	0.01	0.06
CV (%)	0.78	1.61
Absolute Recovery (%)	94.9	92.8
n=	6	6

MRM Transitions

Analyte	Q1 Mass (Da)	Q3 Mass (Da)	Dwell (msec)	CE
Acrylamide_1	72	54.9	250	16
Acrylamide_2	72	43.9	250	18
Acrylamide- ¹³ C ₃	75	58.2	250	16



Acrylamide from coffee (100 ng/mL)

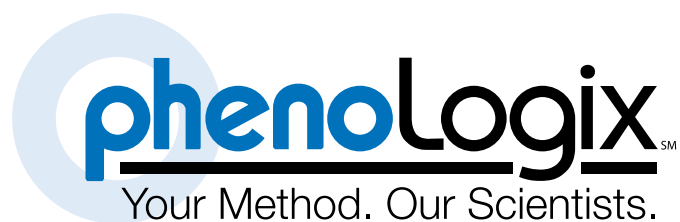


HPLC Conditions

Column: Synergi™ 4 μm Hydro-RP
Dimensions: 50 x 2.0 mm
Part No.: 00B-4375-B0
Mobile Phase: A: 0.1 % Formic acid in Water
 B: 0.1 % Formic acid in Methanol
Flow Rate: 300 μL/min
Gradient:

Time (min)	% B
0	0
0.6	0
0.85	100
3	100
3.01	0
5	0

Temperature: Ambient
Detection: Tandem Mass Spectrometer (MS/MS)
Instrument: SCIEX API 5000™ ESI+
Injection: 5 μL



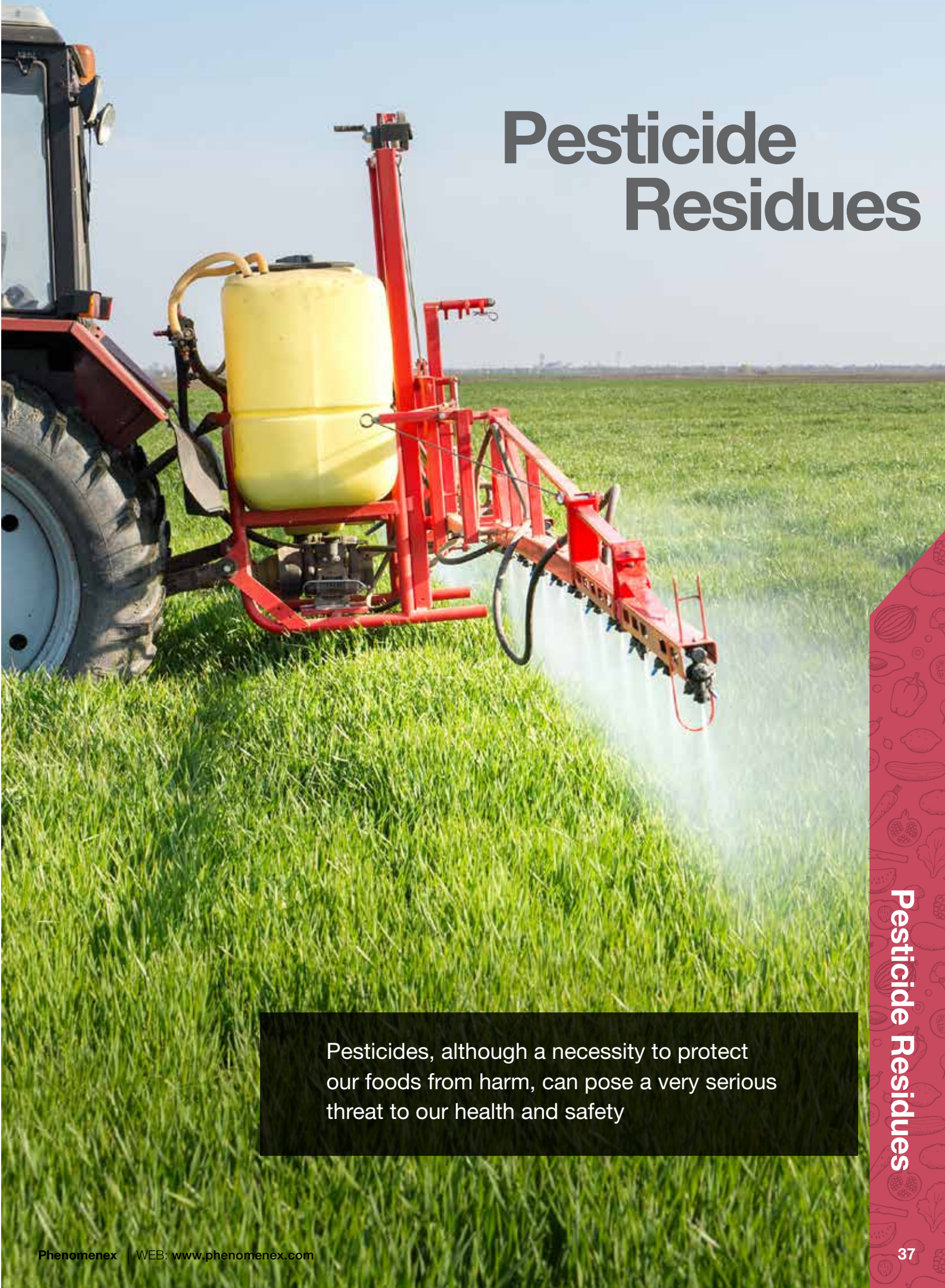
We Develop Methods with You



It's OK if you don't have time to develop or run a sample preparation method yourself. Our full-service analytical support laboratory will do it for you.

www.phenomenex.com/PhenoLogix

Pesticide Residues



Pesticides, although a necessity to protect our foods from harm, can pose a very serious threat to our health and safety

Multi-Residue Pesticide Screening

by LC/MS/MS

Sample Preparation

Easily prepare samples with roQ™ QuEChERS Kits. See page 130 to select the proper kit for your sample matrix.

LC Conditions—Fully Porous

Column: Synergi™ 2.5 µm Fusion-RP

Dimensions: 50 x 2.0 mm

Part No.: [008-4423-B0](#)

SecurityGuard™: [AJ0-4286](#)

Mobile Phase: A: Water/Methanol (90:10) + 5 mM Ammonium formate

B: Methanol/Water (90:10) + 5 mM Ammonium formate

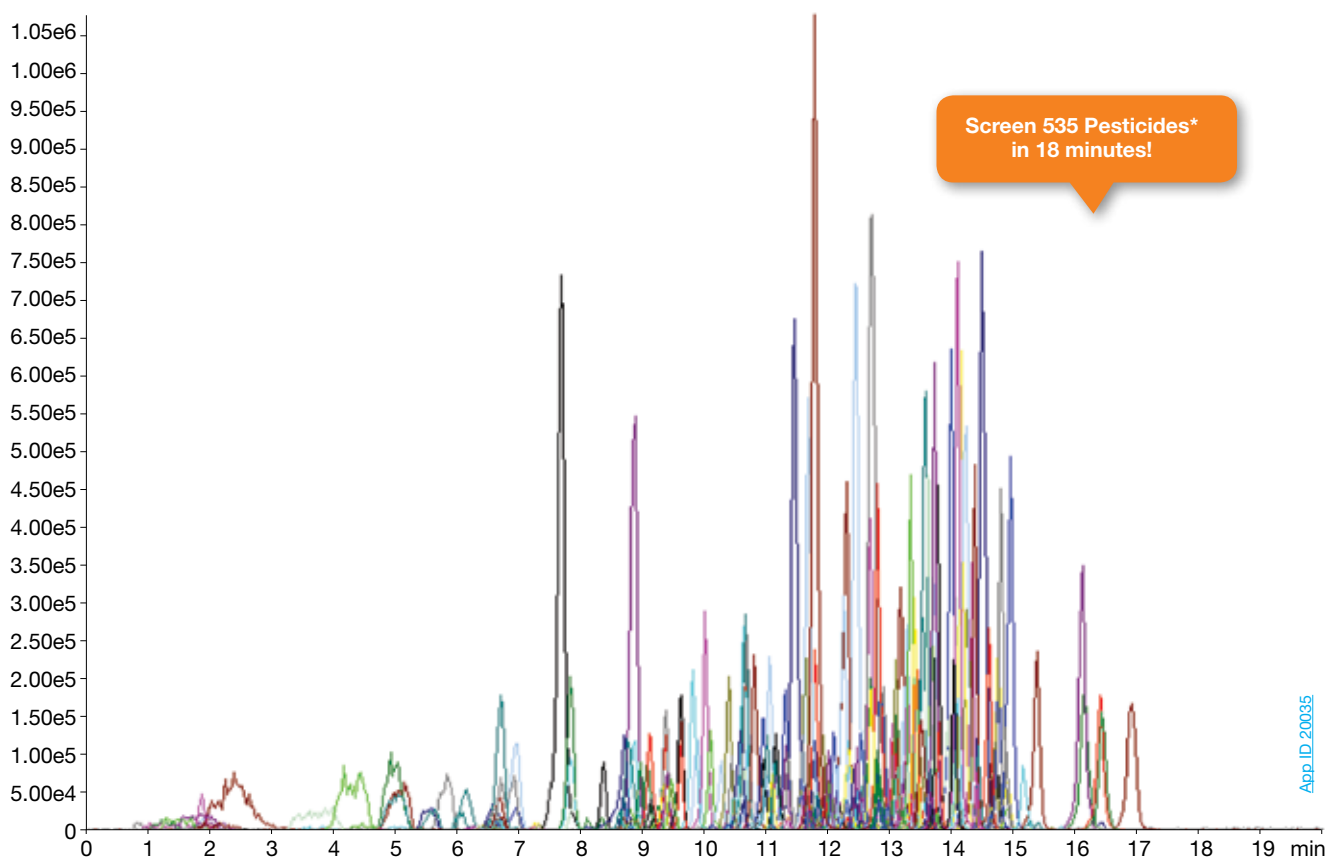
Gradient:	Time (min)	% B
	0	0
	1	0
	15	100
	18	100
	18.05	0
	20	0

Flow Rate: 400 µL/min

Temperature: 40 °C

Detection: Tandem Mass Spectrometer (MS/MS) (400 °C)

Instrument: SCIEX API 3200™



* For entire pesticides list please visit: www.phenomenex.com/Search

20035

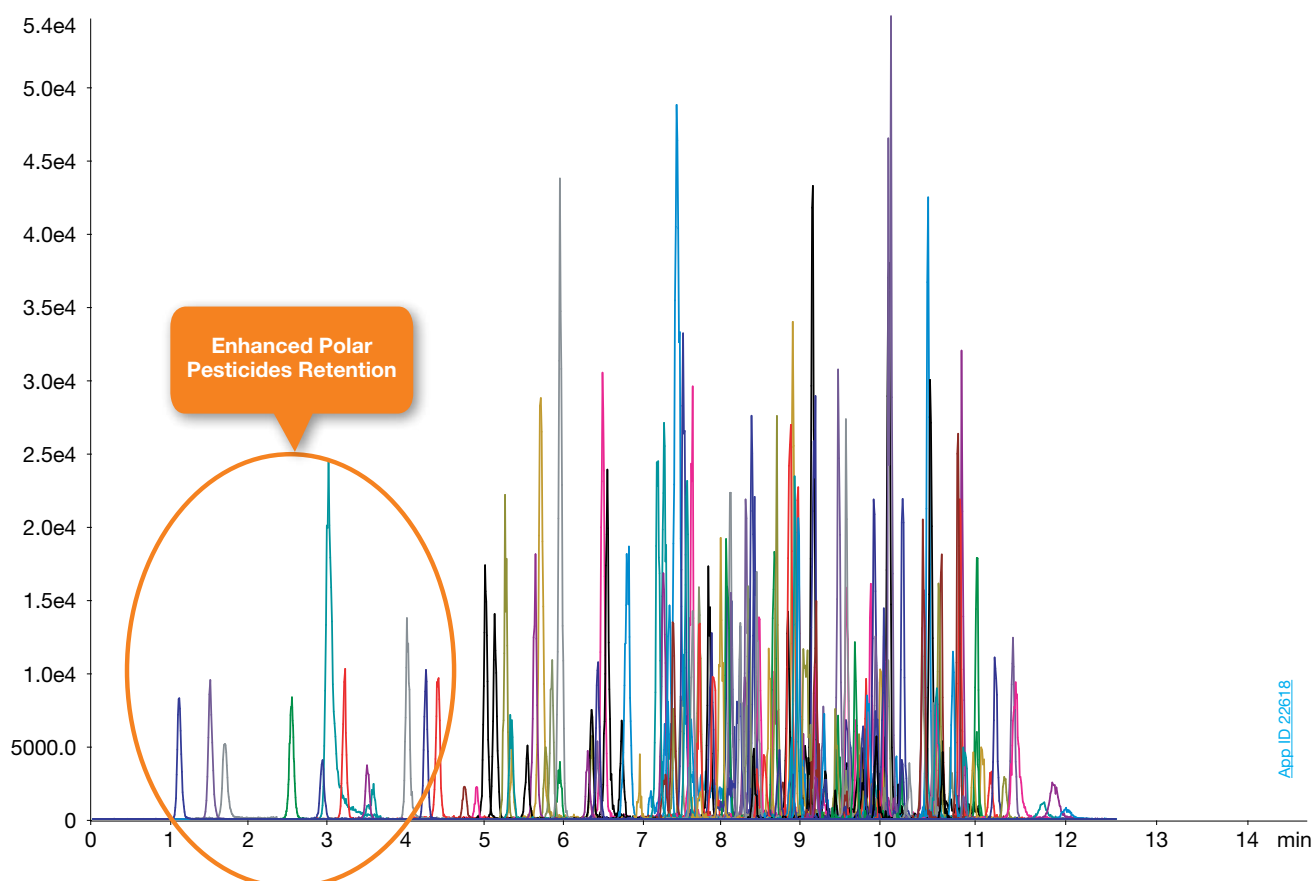


LC Conditions—Core-Shell Technology

Column: Kinetex® 5 µm Biphenyl
Dimensions: 100 x 2.1 mm
Part No.: 00D-4627-AN
Mobile Phase: A: 5 mM Ammonium formate in Water
 B: 5 mM Ammonium formate in Methanol
Gradient:

Time (min)	% B
0.01	10
1	10
10	90
15	90
15.1	10
20	10

Flow Rate: 0.5 mL/min
Temperature: 35 °C
Detection: Tandem Mass Spectrometer (MS/MS) (0 °C)
Detector: SCIEX 4500 QTRAP®
Sample: 175 Pesticide mix*



* For entire pesticides list please visit: www.phenomenex.com/Search

22618



App ID: 22618

Multi-Residue Pesticide Screening

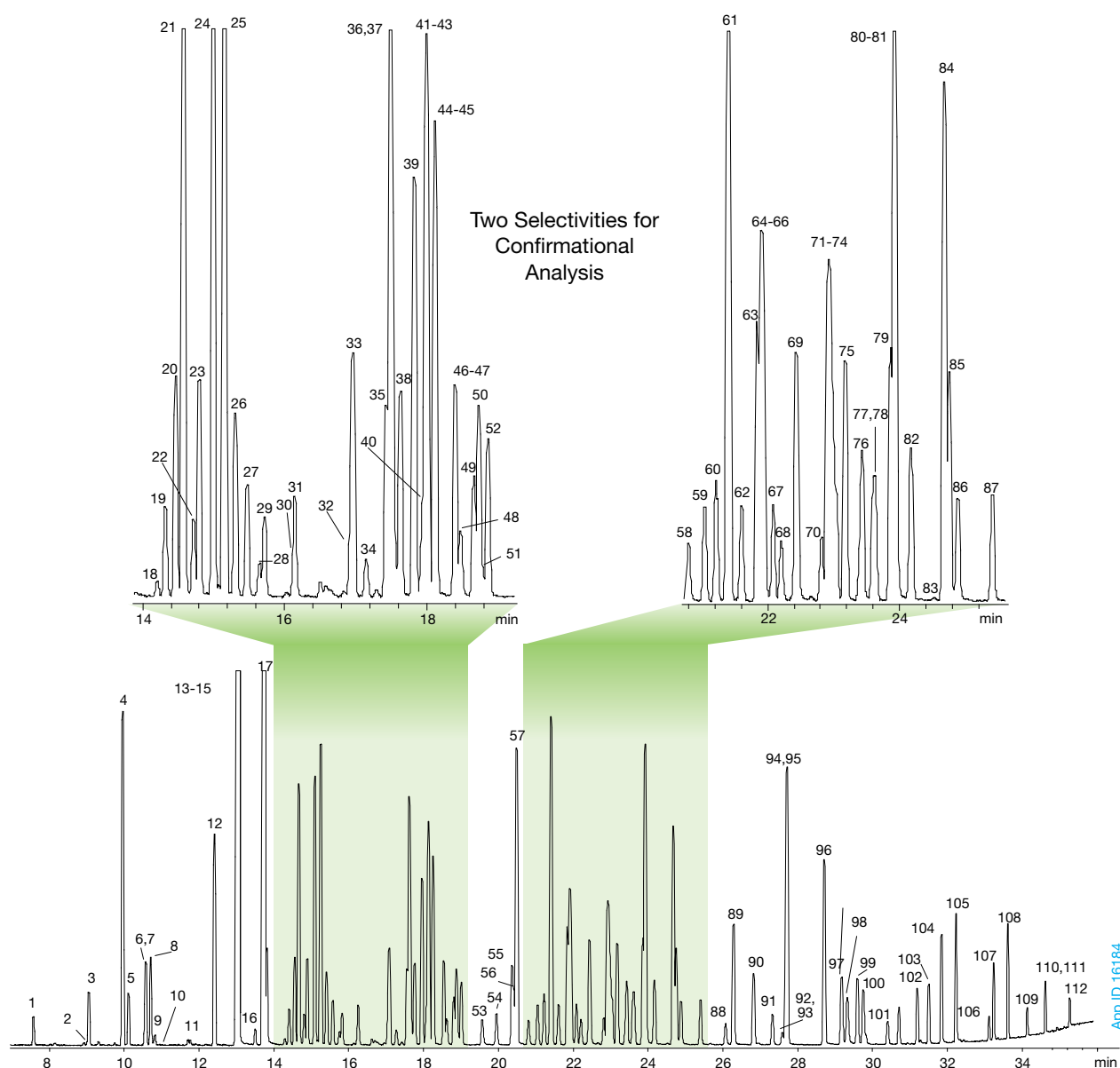
by GC/MS

Sample Preparation

Easily prepare samples with roQ™ QuEChERS Kits. See page 130 to select the proper kit for your sample matrix.

GC Conditions

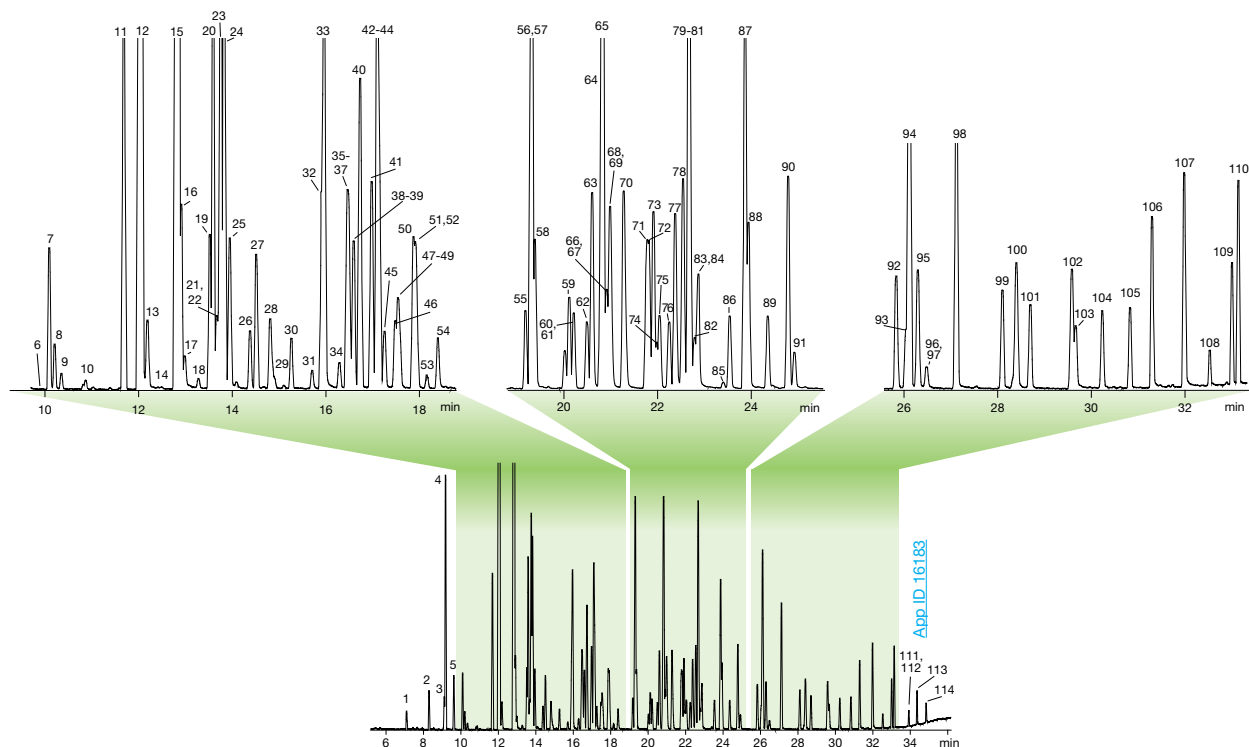
Column: Zebtron™ ZB-MultiResidue™-1
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: [7HG-G016-11](#)
Injection: Splitless @ 260 °C, 1 µL
Recommended Liner: Zebtron PLUS Single Taper
Liner Part No.: [AG2-0A10-05](#)
Carrier Gas: Helium @ 0.9 mL/min (constant flow)
Oven Program: 80 °C for 0.5 min to 150 °C @ 10 °C/min to 240 °C @ 4 °C/min to 320 °C @ 15 °C/min for 3 min
Detector: MSD @ 320 °C; 45-400 amu
Sample: Analytes are 1 ppm in Dichloromethane



For complete technical note visit:
www.phenomenex.com/Search
 Search: 

GC Conditions

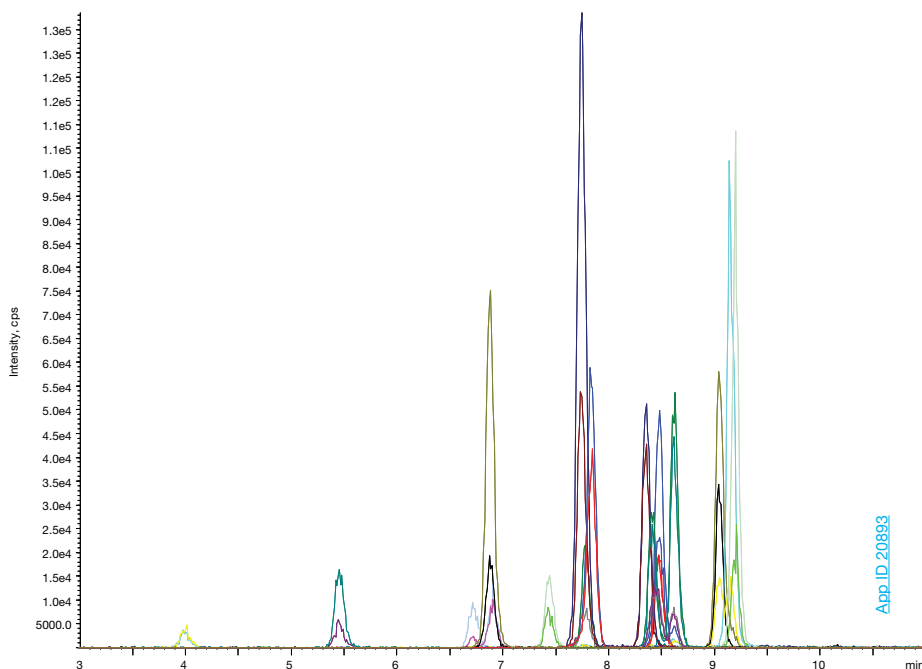
Column: Zebron™ MultiResidue™-2
Dimensions: 30 meter x 0.25 mm x 0.20 µm
Part No.: [7HG-G017-10](#)
Injection: Splitless @ 260 °C, 1 µL
Recommended Liner: Zebron PLUS Single Taper
Liner Part No.: [AG2-0A10-05](#)
Carrier Gas: Helium @ 0.9 mL/min (constant flow)
Oven Program: 80 °C for 0.5 min to 150 °C @ 10 °C/min to 240 °C @ 4 °C/min to 320 °C @ 15 °C/min for 3 min
Detector: MSD @ 320 °C; 45-400 amu
Sample: Analytes are 1 ppm in Dichloromethane



Pesticides

by LC/MS/MS

Triazine Pesticides



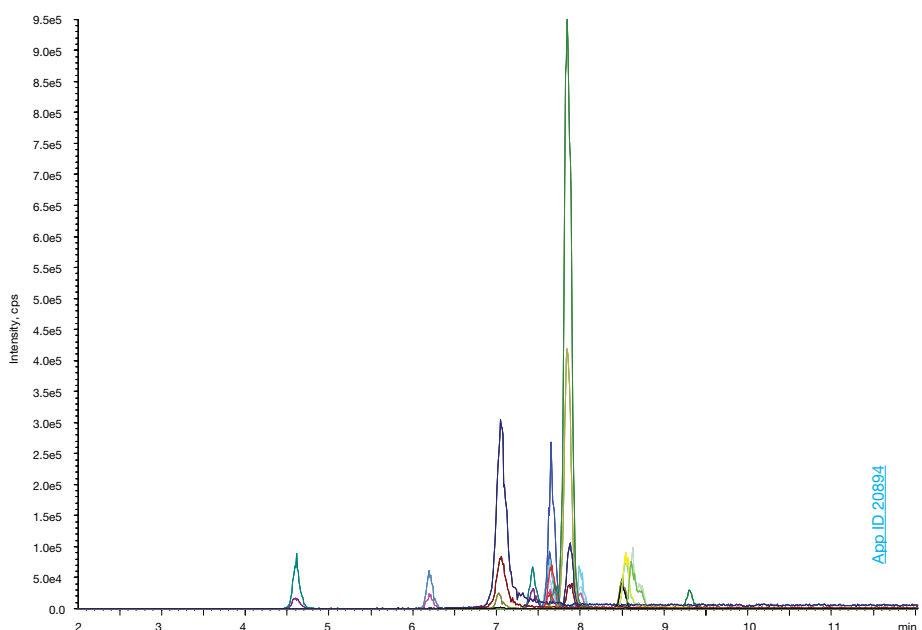
Column: Synergi™ 2.5 µm Fusion-RP
Dimensions: 50 x 2.0 mm
Part No.: 008-4423-B0
Mobile Phase: A: Water with 5 mM Ammonium formate
 B: Methanol with 5 mM Ammonium formate
Gradient:

Time (min)	% B
0	20
8	90
14	90
15	20
20	20

Flow Rate: 250 µL/min
Temperature: 25 °C
Detection: Tandem Mass Spectrometer (MS/MS) (500 °C)
Instrument: SCIEX 3200 QTRAP®

Analyte Name	RT (min)
Desethyl-atrazine	4.0
Desisopropyl-atrazine	5.4
Cyanazine	6.7
Hexazinon	6.9
Simazine	6.9
Metribuzin	7.4
D5-atrazine (internal std)	7.7
Ametryn	7.8
Metazachlor	7.8
Prometon	8.3
Sebutylazine	8.4
Atrazine	8.5
Propazine	8.6
Terbutylazine	8.6
Prometryn	9.0
Terbutryn	9.1
Metolachlor	9.2

Phenylurea Pesticides



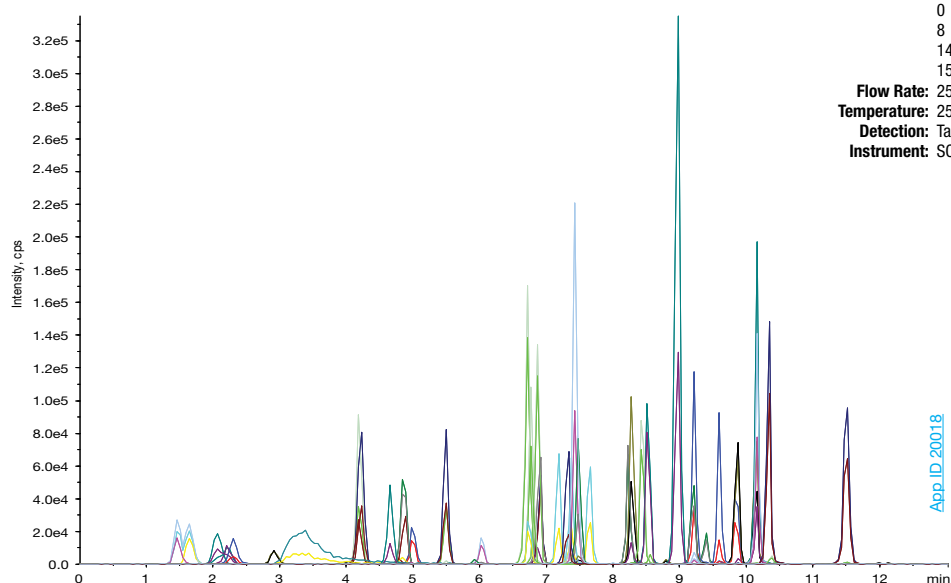
Column: Synergi 2.5 µm Fusion-RP
Dimensions: 50 x 2.0 mm
Part No.: 008-4423-B0
Mobile Phase: A: Water with 5 mM Ammonium formate
 B: Methanol with 5 mM Ammonium formate
Gradient:

Time (min)	% B
0	20
8	90
14	90
15	20
20	20

Flow Rate: 250 µL/min
Temperature: 25 °C
Detection: Tandem Mass Spectrometer (MS/MS) (500 °C)
Instrument: SCIEX 3200 QTRAP

Analyte Name	RT (min)
Fenuron	4.6
Metoxuron	6.2
Thidiazuron	7.0
Tebuthiuron	7.1
Monolinuron	7.4
Chlortoluron	7.6
Fluomethuron	7.6
Metabenzthiazuron	7.6
D6-Isoproturon (internal standard)	7.6
Metobromuron	7.7
Isoproturon	7.9
Diuron	8.0
Linuron	8.5
Propanil	8.5
Siduron	8.6
Diflufenbuzuron	9.3

Carbamate Pesticides

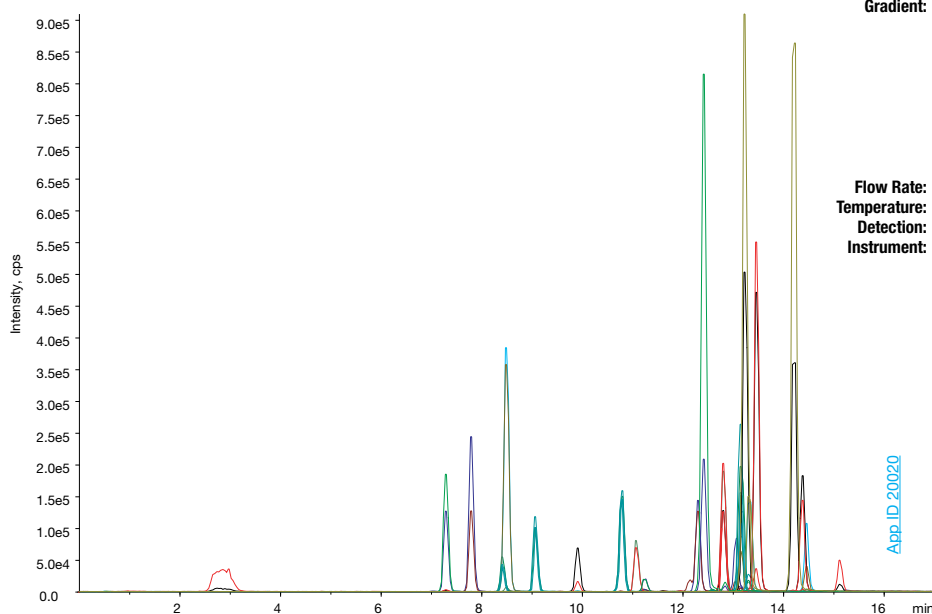


Column: Synergi™ 4 µm Fusion-RP
Dimensions: 50 x 2.0 mm
Part No.: [00B-4424-B0](#)
SecurityGuard™ Cartridge: [AJ0-7556](#)
Mobile Phase: A: Water with 5 mM Ammonium formate
 B: Methanol with 5 mM Ammonium formate
Gradient:

Time (min)	% B
-5	20
0	20
8	90
14	90
15	20

Flow Rate: 250 µL/min
Temperature: 25 °C
Detection: Tandem Mass Spectrometer (MS/MS) (25 °C)
Instrument: SCIEX 3200 QTRAP®

Organophosphorus Pesticides



Column: Synergi 4 µm Fusion-RP
Dimensions: 50 x 2.0 mm
Part No.: [00B-4424-B0](#)
SecurityGuard™ Cartridge: [AJ0-7556](#)
Mobile Phase: A: Add 5 mL of 1 M Ammonium formate to 1 L Water
 B: Add 5 mL of 1 M Ammonium formate to 1 L Methanol
Gradient:

Time (min)	% B
-5	5
0	5
2	5
6	50
12	90
14	90
16	5
17	5

Flow Rate: 250 µL/min
Temperature: 25 °C
Detection: Tandem Mass Spectrometer (MS/MS) (ambient)
Instrument: SCIEX 3200 QTRAP

* For entire pesticides list please visit: www.phenomenex.com/Search

20018 & 20020



Acidic Pesticides

by LC/MS/MS

Sample Preparation

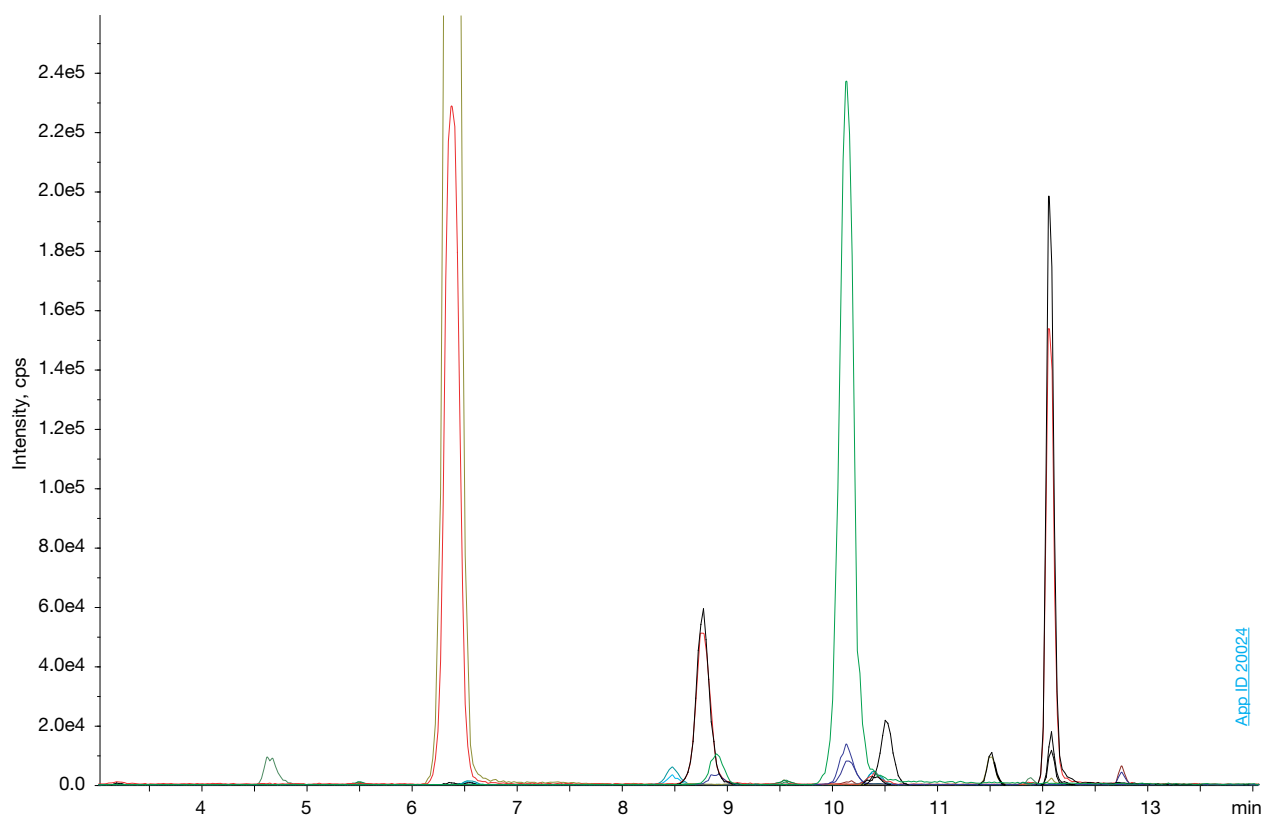
Easily prepare samples with roQ™ QuEChERS Kits. See page 130 to select the proper kit for your sample matrix.

Column: Synergi™ 4 µm Fusion-RP
Dimensions: 50 x 2.0 mm
Part No.: [Q0B-4424-B0](#)
SecurityGuard™: [A10-7556](#)
Mobile Phase: A: Water with 5 mM Ammonium formate
 B: Methanol with 5 mM Ammonium formate
Gradient:

Time (min)	% B
0	5
1.5	40
8	60
10	90
14	90
15	5

Flow Rate: 0.25 mL/min
Temperature: 25 °C
Detection: Tandem Mass Spectrometer (MS/MS) (ambient)
Detector: SCIEX 3200 QTRAP®

Analyte Name	RT (min)
2,4,5-T	10.5
2,4,5-TP	11.5
2,4-D	8.6
2,4-DB	11.8
2,4-DP (Dicloprop)	10.2
Bentazon	6.5
Bromoxynil	8.8
Clorpyralid	3.4
Dicamba	5.6
Dinoterb	12.1
Dinoseb	12.1
Fluoroxypyr	6.6
Imazapyr	4.7
Loxynil	10.2
MCPA	9
MCPB	11.9
MCPD	10.6
PCP	12.8
Triclopyr	9.6



App ID 20024

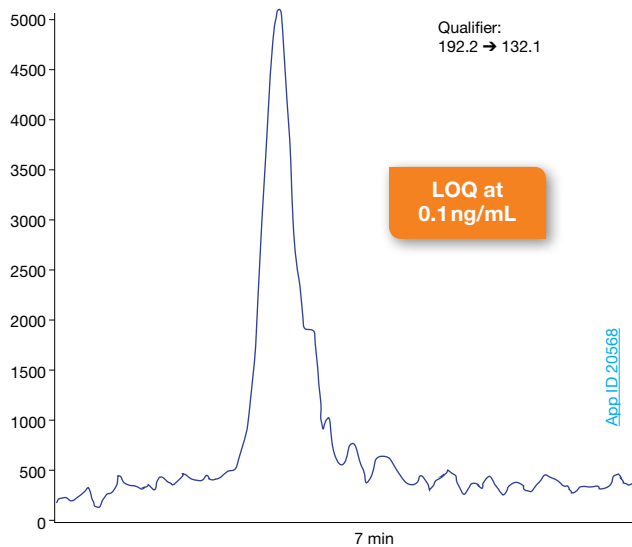
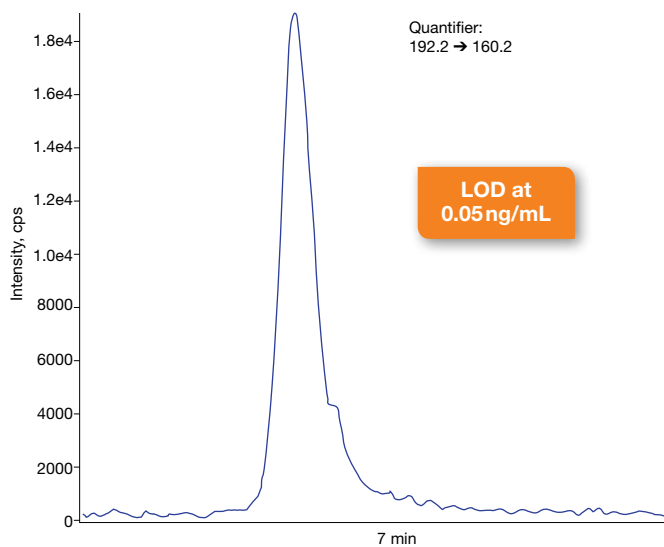
Carbendazim in Orange Juice

by LC/MS/MS

Column: Synergi™ 2.5 µm Fusion-RP
Dimensions: 50 x 2.0 mm
Part No.: [00B-4423-B0](#)
SecurityGuard™: [AJ0-8782](#)
Mobile Phase: A: 5 mM Ammonium formate in 10% Methanol
B: 5 mM Ammonium formate in 90% Methanol
Gradient:

Time (min)	% B
0	0
1	0
15	100
18	100
18.05	0
20	0

Flow Rate: 0.4 mL/min
Temperature: 40 °C
Detection: Tandem Mass Spectrometer (MS/MS) (ambient)
Detector: SCIEX QTRAP® 5500
Sample: Carbendazim



Quaternary Ammonium Compounds (QAC)

by LC/MS/MS

LC Conditions

Column: Synergi™ 4 µm Hydro-RP
Dimensions: 150 x 2.0 mm
Part No.: 00F-4375-B0
Mobile Phase: A: Water with 5 mM Ammonium formate
 B: Methanol with 5 mM Ammonium formate

Gradient:	Time (min)	% B
	0	0
	3	70
	6	85
	9	90
	20.5	90
	21	0
	32	0

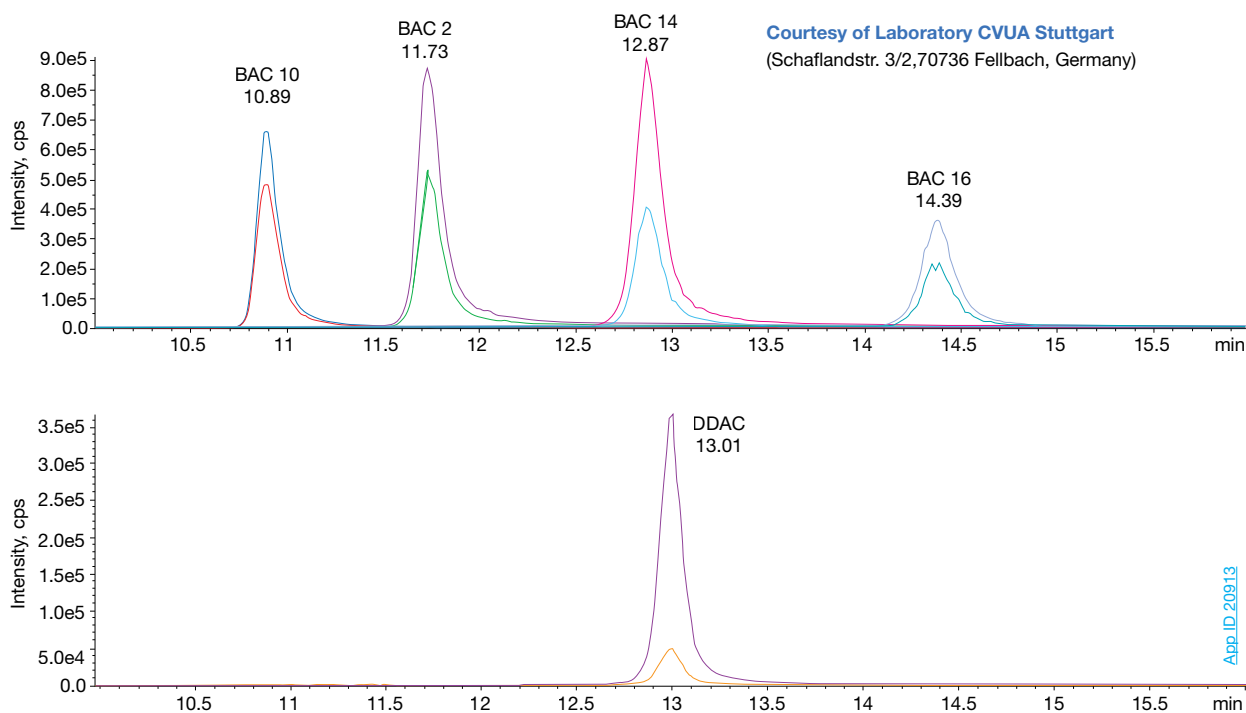
Flow Rate: 100 µL/min – 300 µL/min

Temperature: 40 °C

Detection: Tandem Mass Spectrometer (MS/MS) (425 °C)

Instrument: SCIEX API 4000™

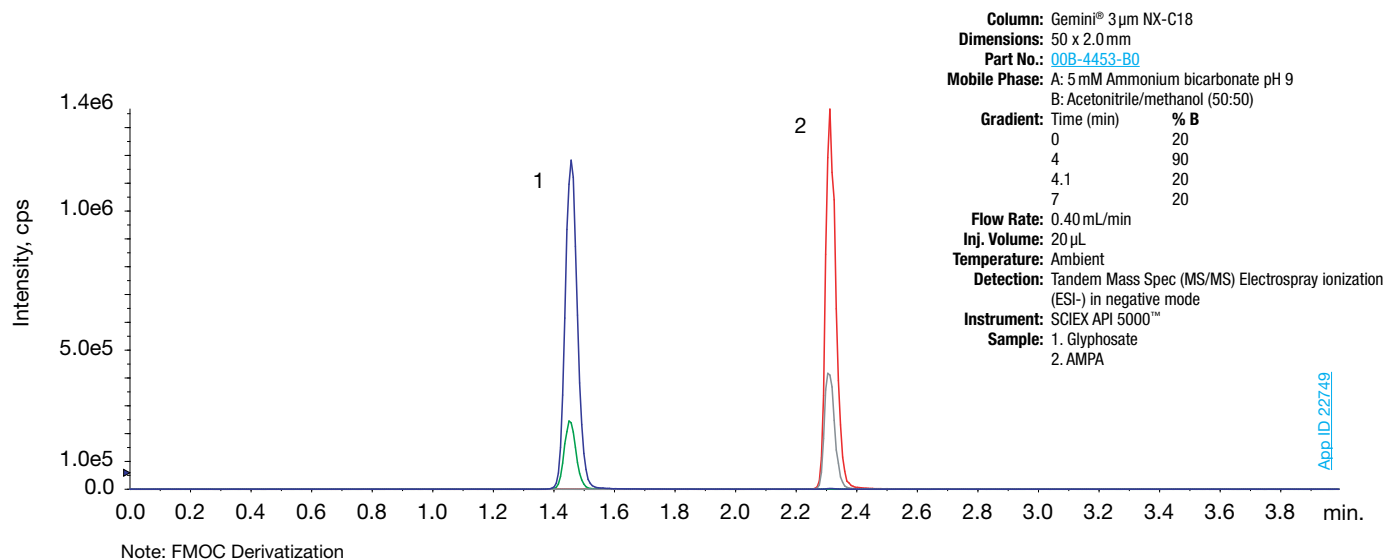
Sample: 1. BAC 10 276/184 (Quantifier) / 276/91 (Qualifier)
 2. BAC 12 304/212 (Quantifier) / 304/91 (Qualifier)
 3. BAC 14 332/240 (Quantifier) / 332/91 (Qualifier)
 4. BAC 16 360/268 (Quantifier) / 360/91 (Qualifier)
 5. DDAC 326/186 (Quantifier) / 326/41 (Qualifier)



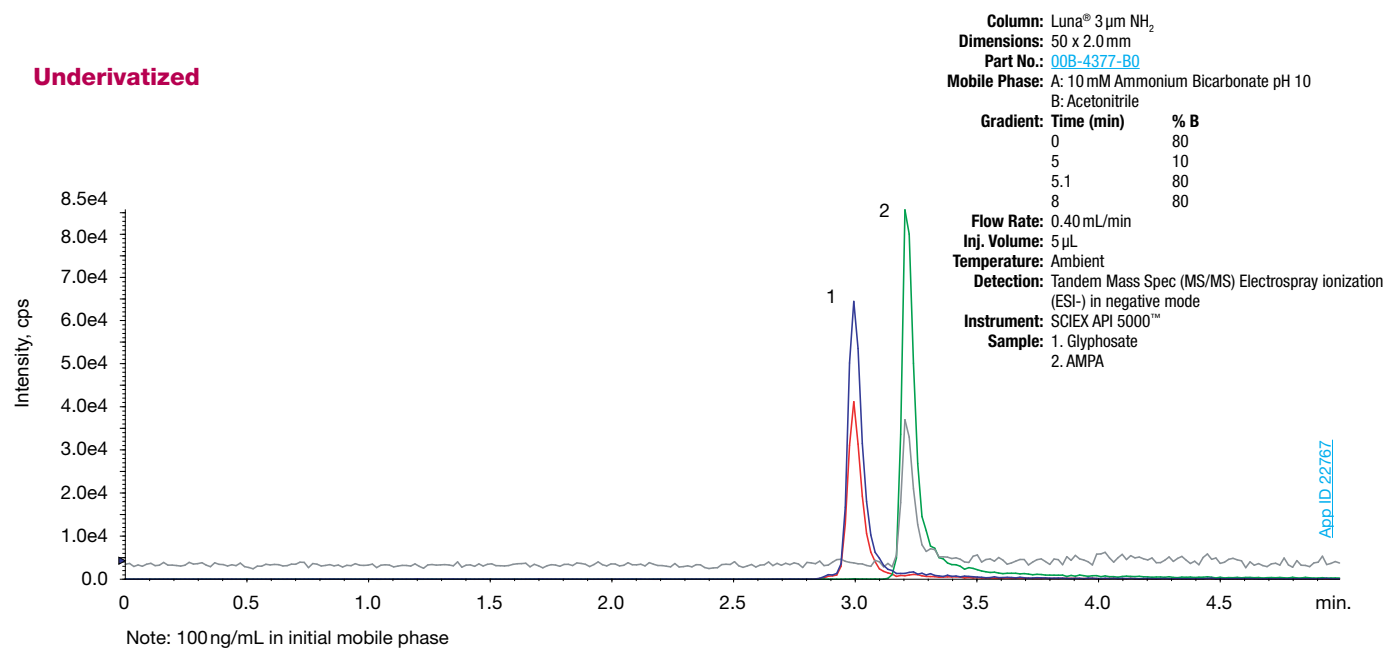
Glyphosate Analysis

by LC/MS/MS

Derivatized



Underivatized



Chlorinated Pesticides in Poultry Tissue

by SPE & GC/ECD

Sample Preparation

Pre-treatment:

1. Render poultry fat pads using a microwave in 1 minute intervals ensuring the sample does not exceed 100°C.
2. Weigh 1 gram of rendered fat into a 10 mL volumetric flask and bring to volume with hexane containing internal standards 1 and 2 for SPE.
3. Vortex or shake volumetric flasks to ensure proper mixing. Sample is now ready for SPE.

Solid Phase Extraction (SPE) Protocol

1. Before extracting samples, condition Strata® Alumina-N SPE cartridges (Phenomenex part no. [8B-S313-KDG](#)) by placing on vacuum chamber with pump and filling each cartridge to volume with methanol/water (86:14).
2. Slowly rinse the solution through the cartridge at a rate of approximately 10 mL/minute until bedding is dry.
3. Fill cartridges to volume with petroleum ether to remove traces of methanol/water solution and drip at a rate of approximately 10 mL/minute.
4. Place glass culture tubes inside vacuum chamber to catch sample eluent and replace manifold to ensure a tight vacuum seal.
5. Pipet 1 mL sample into cartridge.
6. As sample drains through alumina bed, fill cartridge to volume with Ethyl Ether/Petroleum Ether (1.5:98.5) to ensure analyte elution.
7. Once samples have been collected, transfer glass culture tubes into nitrogen evaporator and evaporate to dryness.
8. Reconstitute samples with 2 mL Hexane, vortex for 30 seconds, and transfer to autosampler vial for injection.



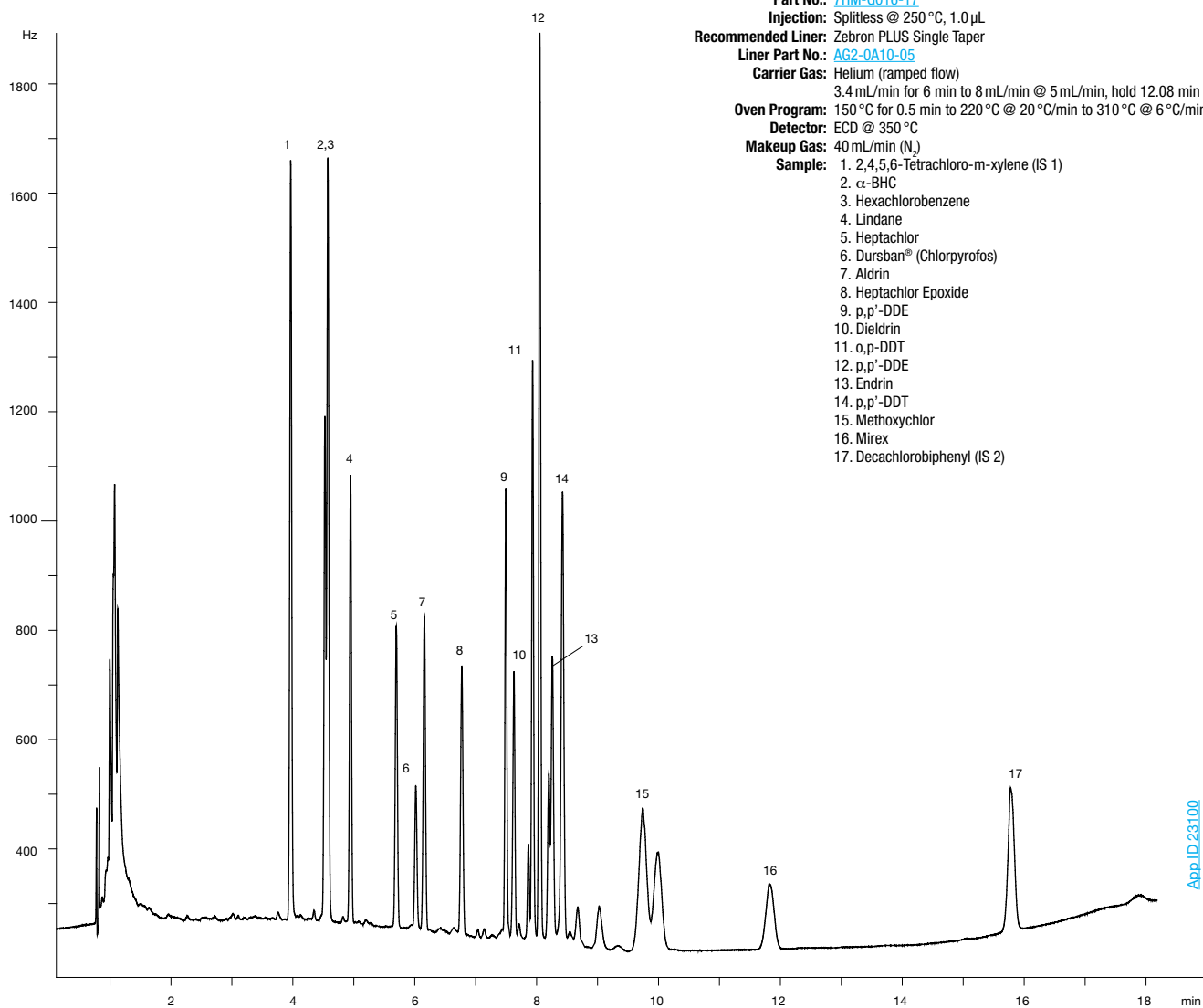
We would like to provide special thanks to Tyson Foods, Inc. and WBA Analytical Laboratories for their contributions.

For complete technical note visit:
www.phenomenex.com/Search
 Search: 

GC/ECD Conditions

Columns: Zebtron™ ZB-MultiResidue™ -1
Dimensions: 30 m x 0.32 mm x 0.50 µm
Part No.: [7HM-G016-17](#)
Injection: Splitless @ 250 °C, 1.0 µL
Recommended Liner: Zebtron PLUS Single Taper
Liner Part No.: [AG2-0A10-05](#)
Carrier Gas: Helium (ramped flow)
 3.4 mL/min for 6 min to 8 mL/min @ 5 mL/min, hold 12.08 min
Oven Program: 150 °C for 0.5 min to 220 °C @ 20 °C/min to 310 °C @ 6 °C/min
Detector: ECD @ 350 °C
Makeup Gas: 40 mL/min (N₂)
Sample:

1. 2,4,5,6-Tetrachloro-m-xylene (IS 1)
2. α-BHC
3. Hexachlorobenzene
4. Lindane
5. Heptachlor
6. Dursban® (Chlorpyrifos)
7. Aldrin
8. Heptachlor Epoxide
9. p,p'-DDE
10. Dieldrin
11. o,p-DDT
12. p,p'-DDE
13. Endrin
14. p,p'-DDT
15. Methoxychlor
16. Mirex
17. Decachlorobiphenyl (IS 2)



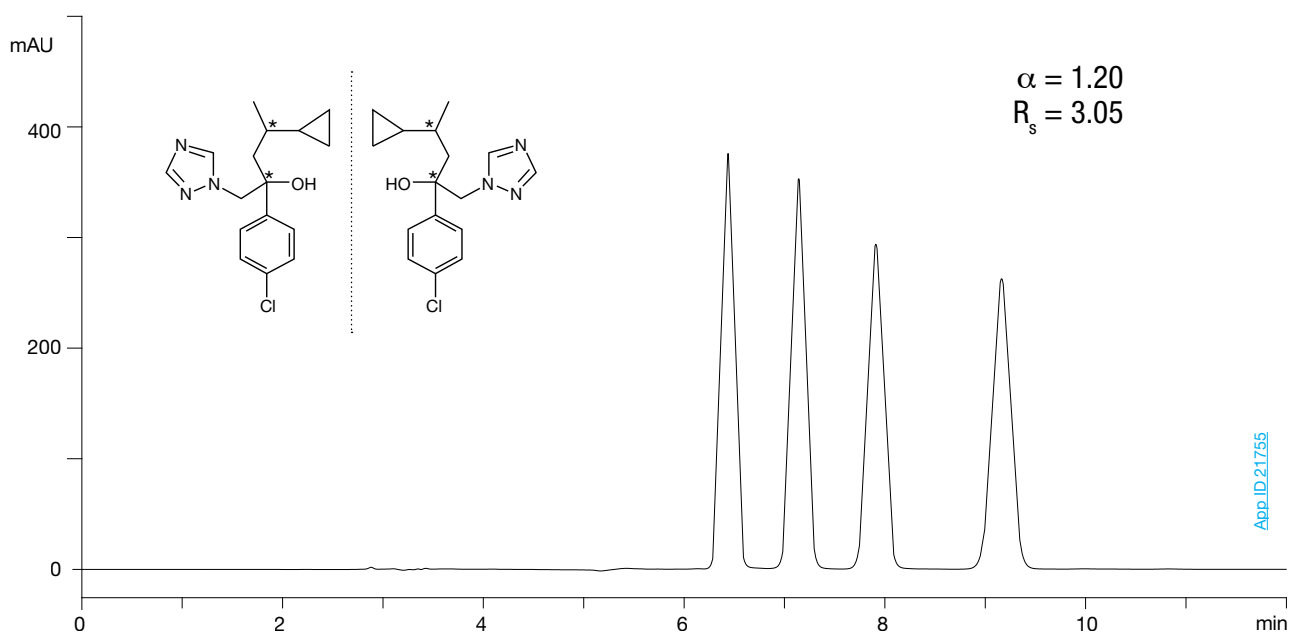
App ID: 23100

Enantiomeric and Diastereoisomeric Resolutions for Pesticides

by Chiral Chromatography

Column: Lux® 5 µm Cellulose-4
Dimensions: 250 x 4.6 mm
Part No.: 00G-4491-E0
Mobile Phase: 0.1 % Diethylamine in Acetonitrile /
 0.1 % Diethylamine in 20 mM
 Ammonium bicarbonate (60:40)
Flow Rate: 1 mL/min
Detection: UV @ 220 nm
Analyte: Cyproconazole

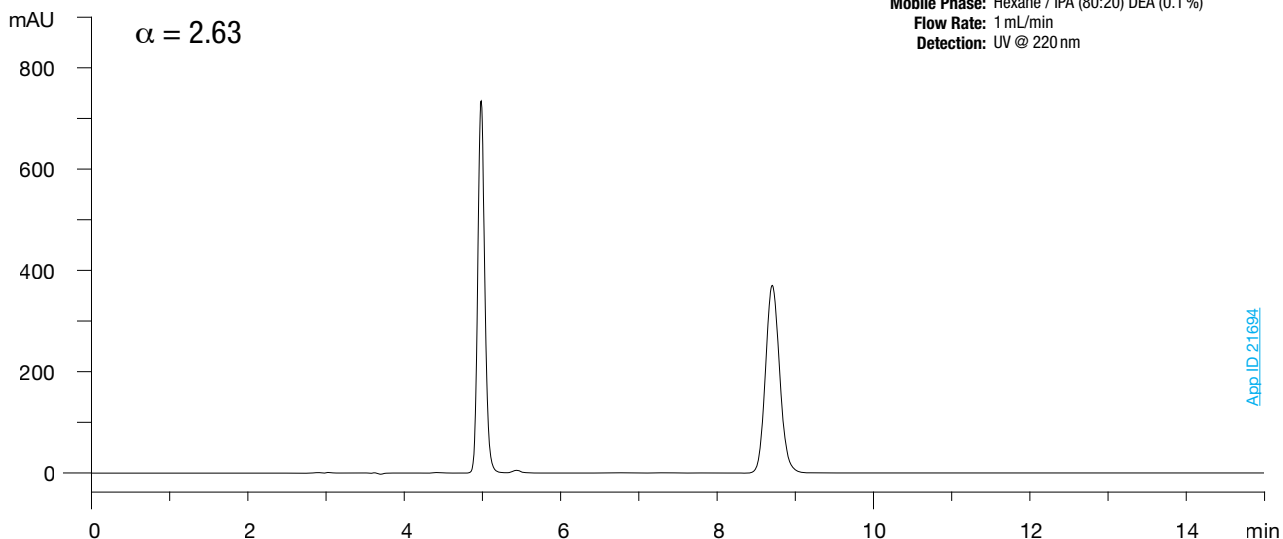
Stereoisomers Mix of Cyproconazole



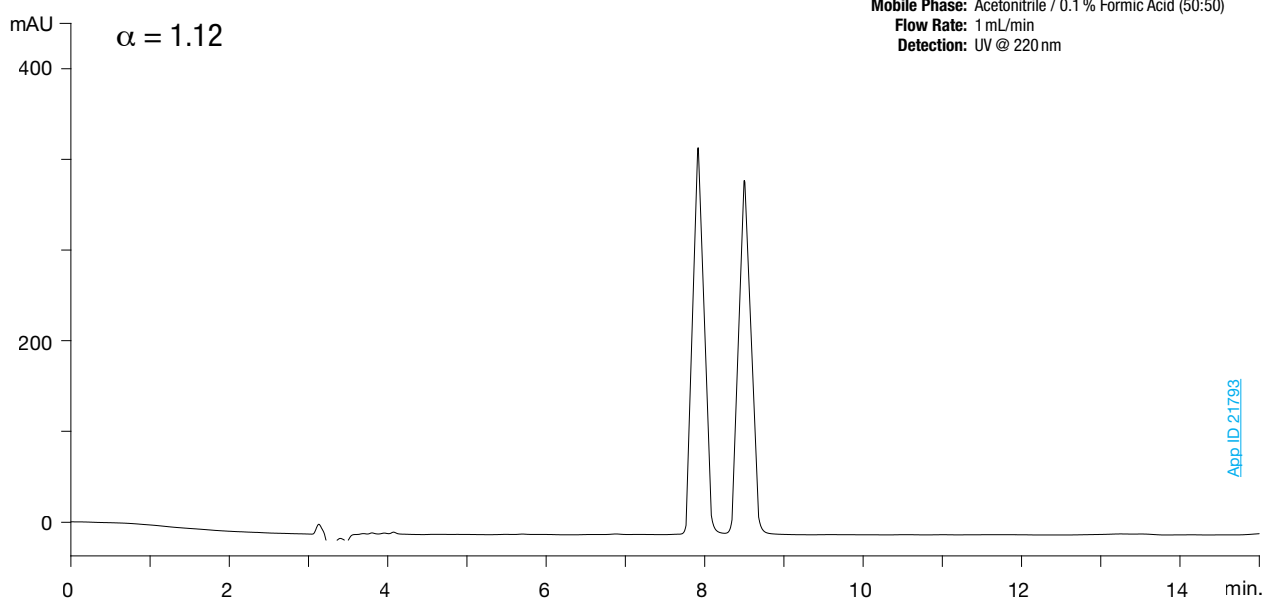
Enantioseparation of Racemic Herbicide Agents

by Chiral Chromatography

Fenoxaprop-ethyl



Haloxypop



Pesticide Residues in Spinach

by QuEChERS, LC/MS/MS, and GC/MS

Sample Preparation

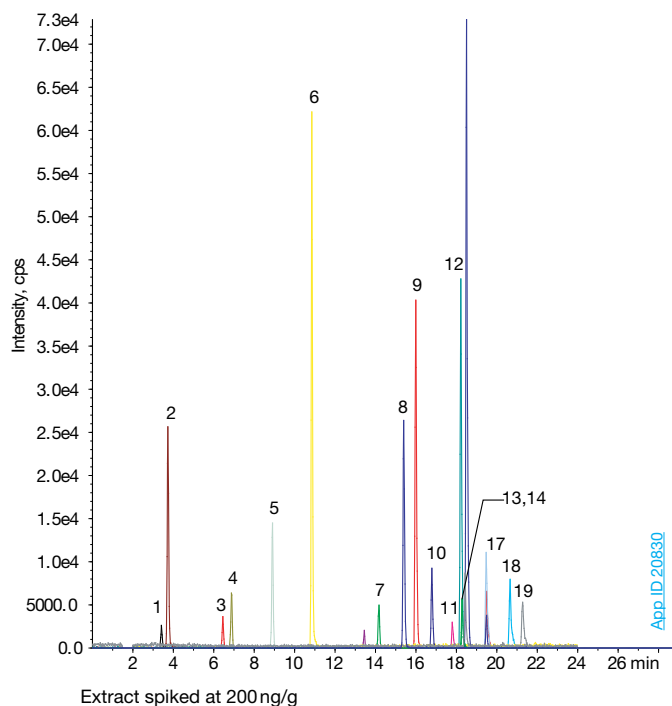
roQ™ QuEChERS AOAC Extraction and dSPE kits were used for extraction and clean up.

For full extraction procedure please see technical note at:

www.phenomenex.com/Search

Search:

LC/MS/MS



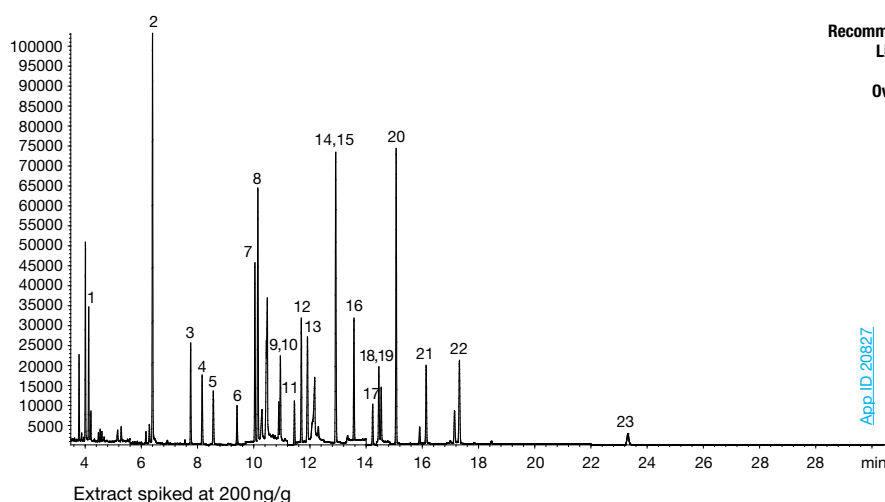
Column: Luna® 3 µm C18(2)
Dimensions: 150 x 3.0 mm
Part No.: 00F-4251-Y0
Mobile Phase: A: 5 mM Formic acid in Water
 B: 5 mM Formic acid Methanol
Gradient:

Time (min)	% B
0	25
15	90
30	90
30.01	25
40	25

Flow Rate: 0.3 mL/min
Temperature: 25 °C
Detection: MS (ambient)
Sample:

1. Pymetrozine
2. Methamidophos
3. Thiabendazole
4. Methomyl
5. Imidacloprid
6. Imazalil
7. Carbaryl
8. Atrazine
9. Azoxystrobin
10. Linuron
11. Cyprodinil
12. d10-Parathion
13. Kresoxim- methyl
14. Tolyfluanid
15. Triphenylphosphate
16. Tebuconazole
17. Chlorpyrifos- Methyl
18. Ethion
19. Chlorpyrifos

GC/MS



Column: Zebron™ ZB-5MSi with 5 mGuardian™
Dimensions: 30 m x 0.25 mm x 0.25 µm
Part No.: 7HG-G018-11-GGA
Injection: Splitless @ 250 °C, 2 µL
Recommended Liner: Zebron PLUS Single Taper
Liner Part No.: AG2-0A10-05
Carrier Gas: Helium @ 1 mL/min (constant flow)
Oven Program: 100 °C to 150 °C @ 25 °C/min to 280 °C @ 10 °C/min for 10 min then to 340 °C @ 25 °C/min for 5 min
Detector: MSD @ 350 °C
Sample:

1. Dichlorvos	13. Procymidone
2. O-phenylphenol	14. o,p-DDD
3. Trifluarlin	15. Kresoxim-methyl
4. α-HCH-d6	16. Ethion
5. Atrazine	17. Endosulfan Sulfate
6. Chlorothalonil	18. Tebuconazole
7. Chlorpyrifos-methyl	19. TPP
8. Carbaryl	20. Bifenthrin
9. d10-Parathion	21. L-Cyhalothrin
10. Chlorpyrifos	22. Permethrins
11. Cyprodinil	23. Azoxystrobin
12. Tolyfluanid	

Pesticide Residues in Lettuce

by LC/MS/MS and GC/MS

Sample Preparation

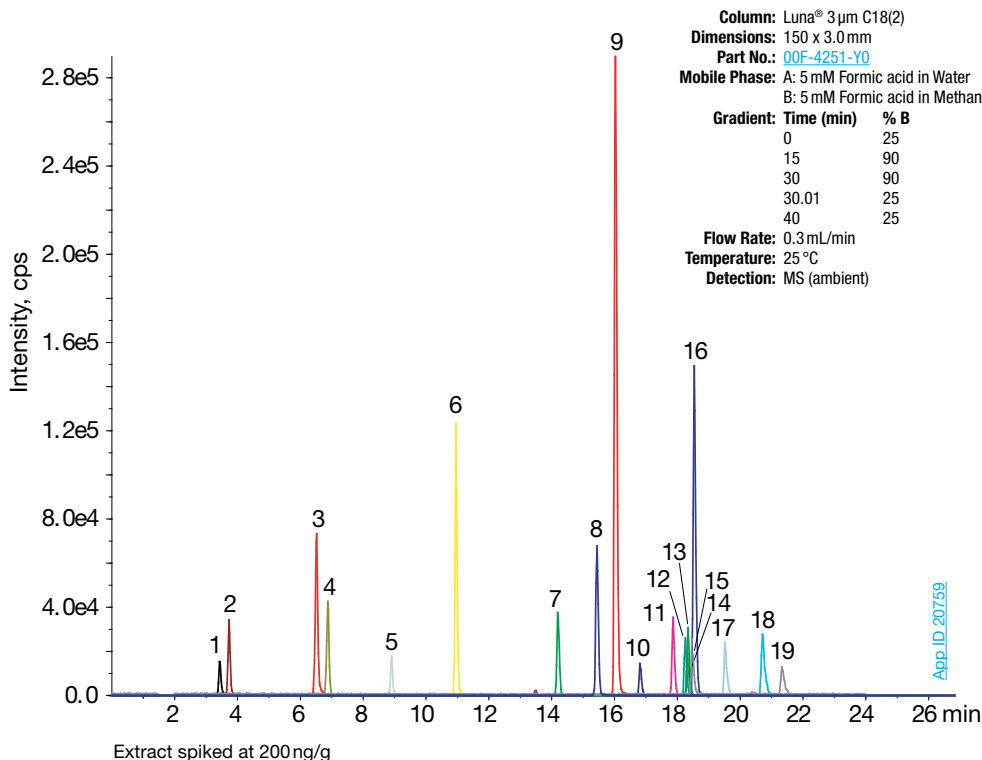
roQ™ QuEChERS EN Extraction and dSPE kits were used for extraction and clean up.

For full extraction procedure please see technical note at:

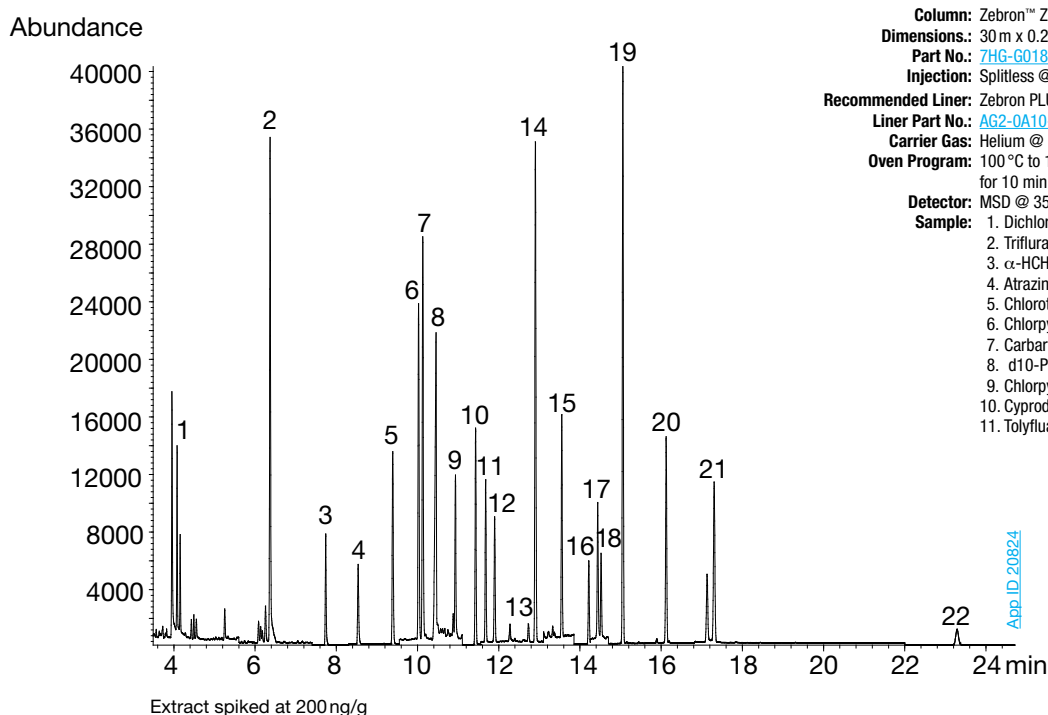
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Search:

LC/MS/MS



GC/MS



Neonicotinoid Pesticide Residues in Honey

by QuEChERS and LC/MS/MS

Sample Preparation

roQ™ QuEChERS AOAC kits were used for extraction and clean up.

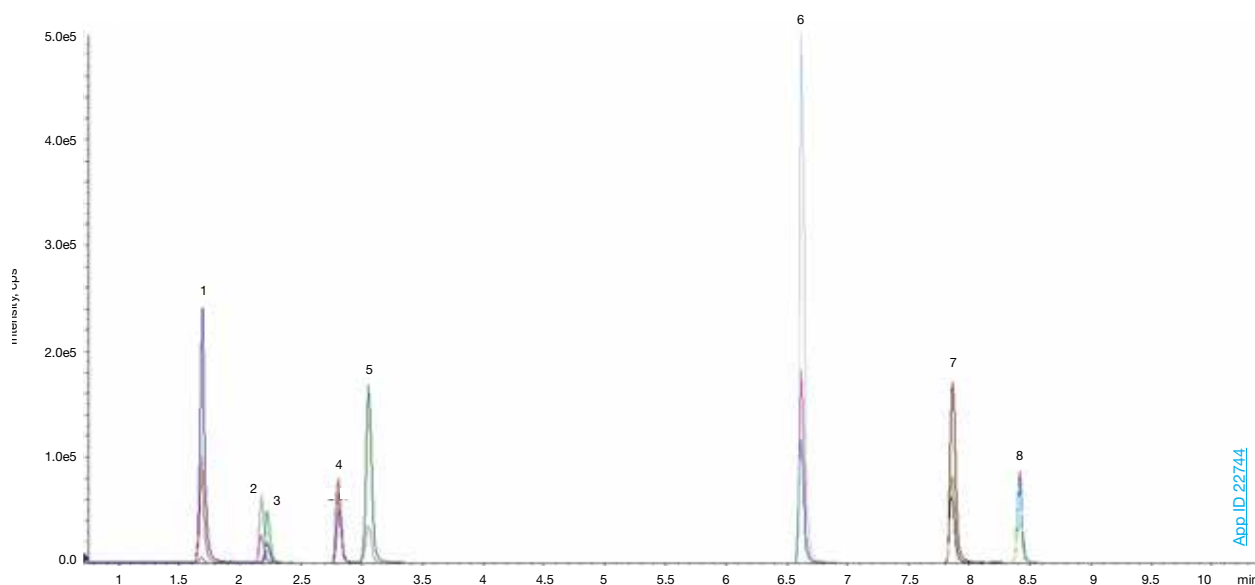
LC/MS/MS

Column: Kinetex® 2.6 µm Biphenyl
Dimensions: 50 x 2.1 mm
Part No.: [00B-4622-AN](#)
SecurityGuard™ ULTRA Cartridges: [AJ0-8782](#)
SecurityGuard™ ULTRA Cartridge Holder: [AJ0-9000](#)
Mobile Phase: A: 0.1 % Formic acid in Water
 B: 0.1 % Formic acid in Acetonitrile
Gradient:

Time (min)	% B
0.1	5
10	70
12	70
12.1	5
14.1	5

Flow Rate: 0.5 mL/min
Injection Volume: 25 µL
Temperature: 40 °C
Detection: Tandem Mass Spec (MS/MS)
Instrument: SCIEX API 4500 QTRAP®
Sample:

1. Nitenpyram
2. Thiamethoxam
3. Clothianidin
4. Imidacloprid
5. Acetamiprid
6. Azoxystrobin
7. Coumaphos
8. Chlorpyrifos



Note: 400 ng/g extracted neonicotinoids spiked in honey.

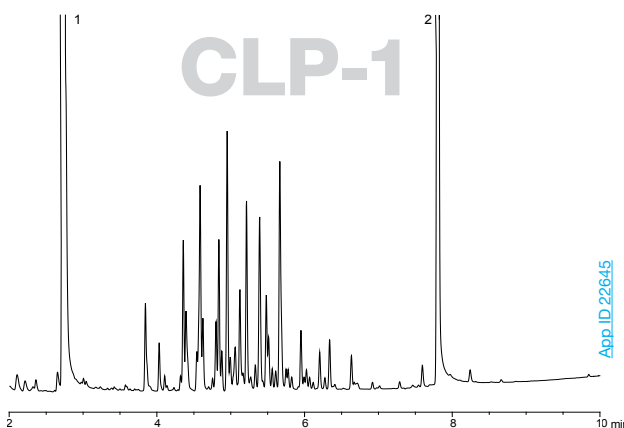
Polychlorinated Biphenyls (PCBs)

by Dual-Column GC/ECD

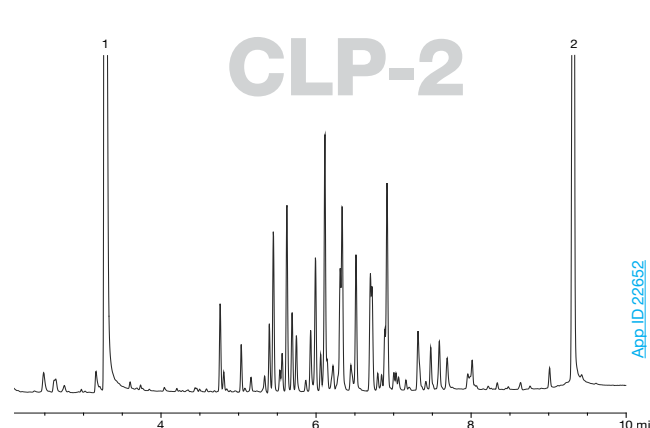
Conditions for all columns:

Columns: As listed
Dimensions: 30 meter x 0.25 mm x 0.25 μ m (Zebtron™ ZB-CLPesticides-1)
30 meter x 0.32 mm x 0.32 μ m (Zebtron ZB-CLPesticides-2)
Part Nos.: [7HM-G028-51](#) (ZB-CLPesticides-1)
[7HM-G029-11](#) (ZB-CLPesticides-2)
Injection: Pulsed Splitless @ 30 psi (hold 20 sec) @ 250 °C, 1 μ L
Carrier Gas: Helium @ 60 cm/sec (constant flow)
Oven Program: 120 °C to 200 °C @ 45 °C/min to 330 °C @ 15 °C/min for 2 min
Detector: ECD @ 330 °C
Y-Connector: [AG0-4717](#) (Borosilicate Glass)
Guard Column: [ZAM-G000-00-GZ0](#) (5 m Z-Guard™)
Recommended Liner: Zebtron PLUS Single Taper with Wool
Liner Part No.: [AG2-0A11-01](#)
Septum: [AG0-4696](#) (PhenoRed™-400)
Inlet Seal: [AG0-8620](#) (Gold-Plated Easy Seals™)
Sample: Aroclor is 1000 ng/mL and SS and IS are 100 ng/mL in hexane
1. Tetrachloro-meta-xylene (TCMX) (surrogate standard)
2. Decachlorobiphenyl (internal standard)

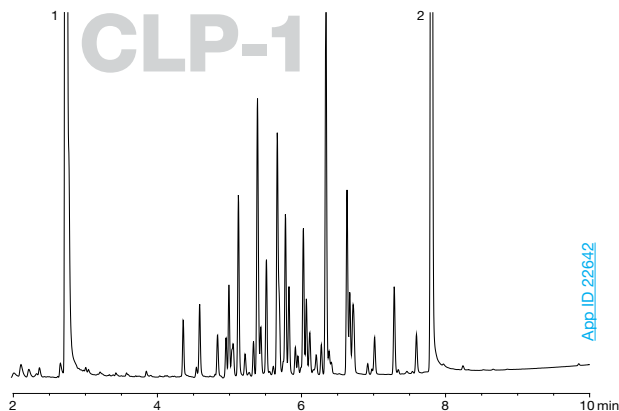
Aroclor 1254



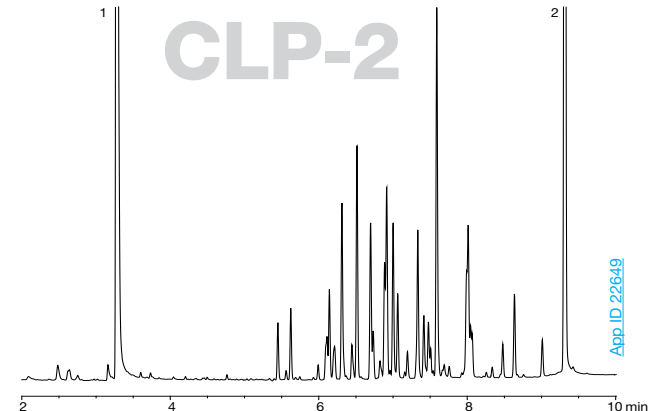
Aroclor 1254



Aroclor 1260



Aroclor 1260



Ethephon From Ketchup

by SPE and LC/MS/MS

Sample Preparation

Solvent Extraction:

1. Weigh and transfer 2 g of ketchup into a 15 mL centrifuge tube
2. Add 2 mL of 100 mM Sodium phosphate buffer
3. Add 10 mL of Acetone and vortex until ketchup is dispersed
4. Shake using mechanical shaker for 4 min
5. Centrifuge at 6000 rpm or greater for 4 min
6. Supernatant is ready for loading onto SPE cartridge

Solid Phase Extraction (SPE)

Strata®-X-AW 100 mg/6 mL

Part No.: [8B-S038-ECH](#)
Condition/Equilibrate: 3 mL of Acetone
Load: Supernatant from solvent extraction
Wash: 3 mL of Methanol
Dry: 3 min at high vacuum (>10 in. Hg)
Elute: 3 mL of Methanol with 1 % TFA
Blow down: Dry sample under nitrogen at 50 °C

Note: Reconstitute sample with 0.5 mL of Acetonitrile/Water (9:1) and transfer to an autosampler vial for LC/MS/MS analysis

LC/MS/MS Conditions

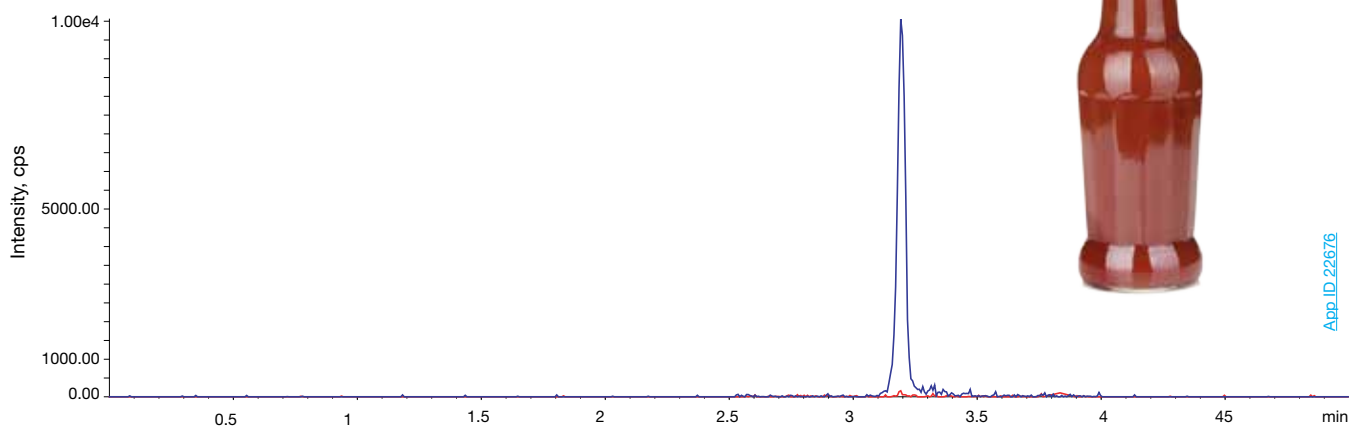
Column: Luna® 3 µm NH₂
Dimensions: 50 x 2.0 mm
Part No.: [00B-4377-BQ](#)
Mobile Phase: A: 10 mM Ammonium bicarbonate pH 10
 B: Acetonitrile
Gradient:

Time (min)	% B
0	90
5	10

Flow Rate: 0.4 mL/min
Temperature: Ambient
Inj. Volume: 10 µL
Detection: Tandem Mass Spec (MS/MS)
Instrument: SCIEX API 4000™ QTRAP®
Sample: Ethephon extract from ketchup

TFA in the ion-source can significantly reduce MS intensity. It is recommended that a diverter valve is utilized to ensure that no residual TFA from the SPE step is transferred to the MS.

Ethephon Extract from Ketchup at 50 ng/g



App ID 22676

Dicamba Pesticides and Other Herbicides

by LC/UV

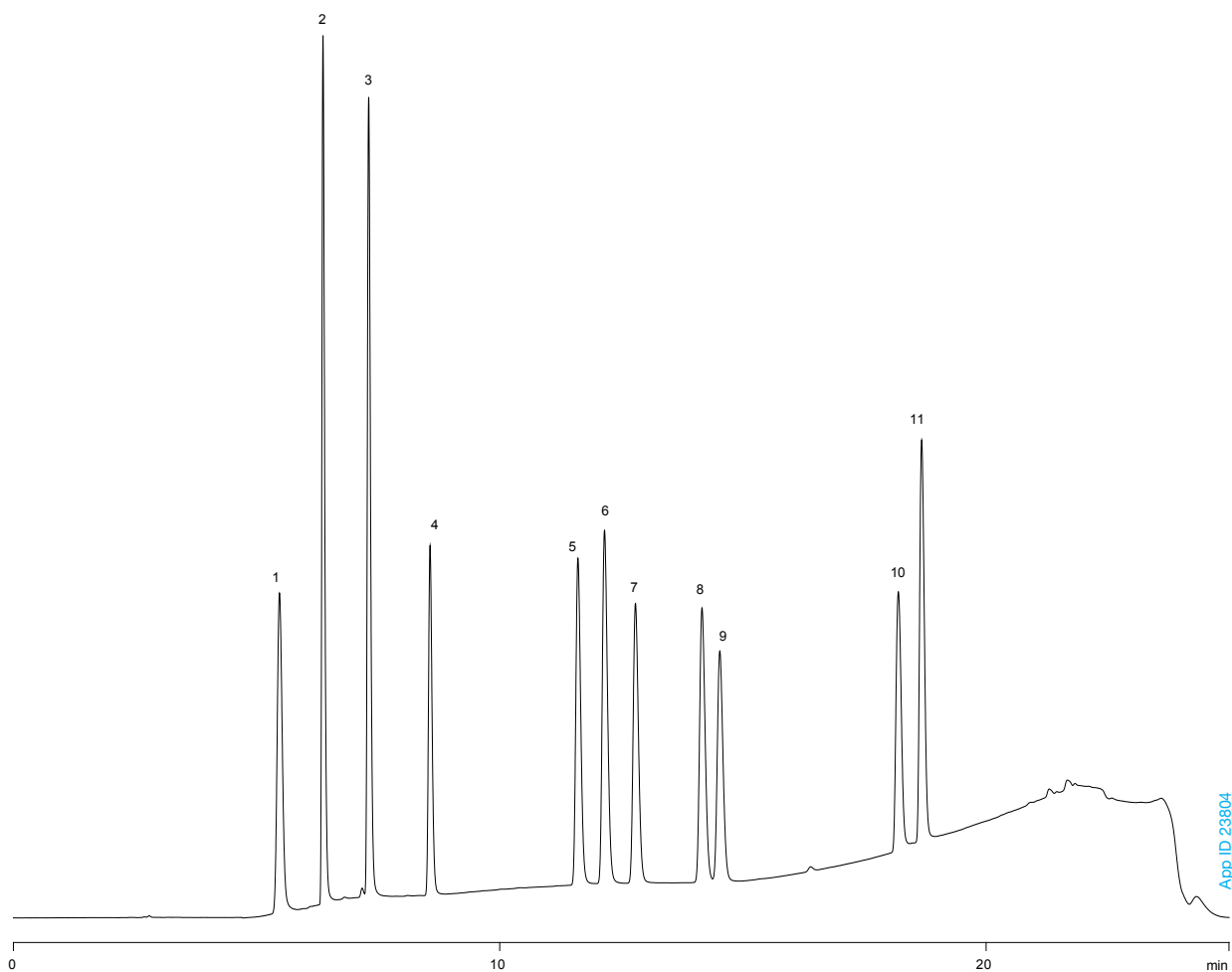
Column: Kinetex® 2.6 µm F5
Dimensions: 150 x 4.6 mm
Part No.: [00D-4627-AN](#)
Mobile Phase: A: 5 mM Ammonium formate in Water
B: 5 mM Ammonium formate in Methanol

Gradient:	Time (min)	% B
	0	2
	1.5	40
	10	52
	17	90
	19	90
	19.1	2
	25	2

Flow Rate: 0.5 mL/min
Inj. Volume: 2 µL
Temperature: 25 °C
Detection: UV @ 230 nm

Sample:

1. Clopyralid
2. Picloram
3. Dicamba
4. Fluroxypyr
5. 2,4-D
6. MCPA
7. Triclopyr
8. 2,4-DP
9. MCPP
10. 2,4-DB
11. MCPB

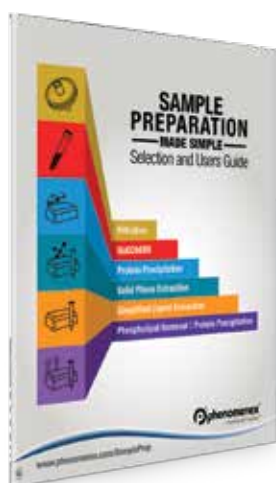
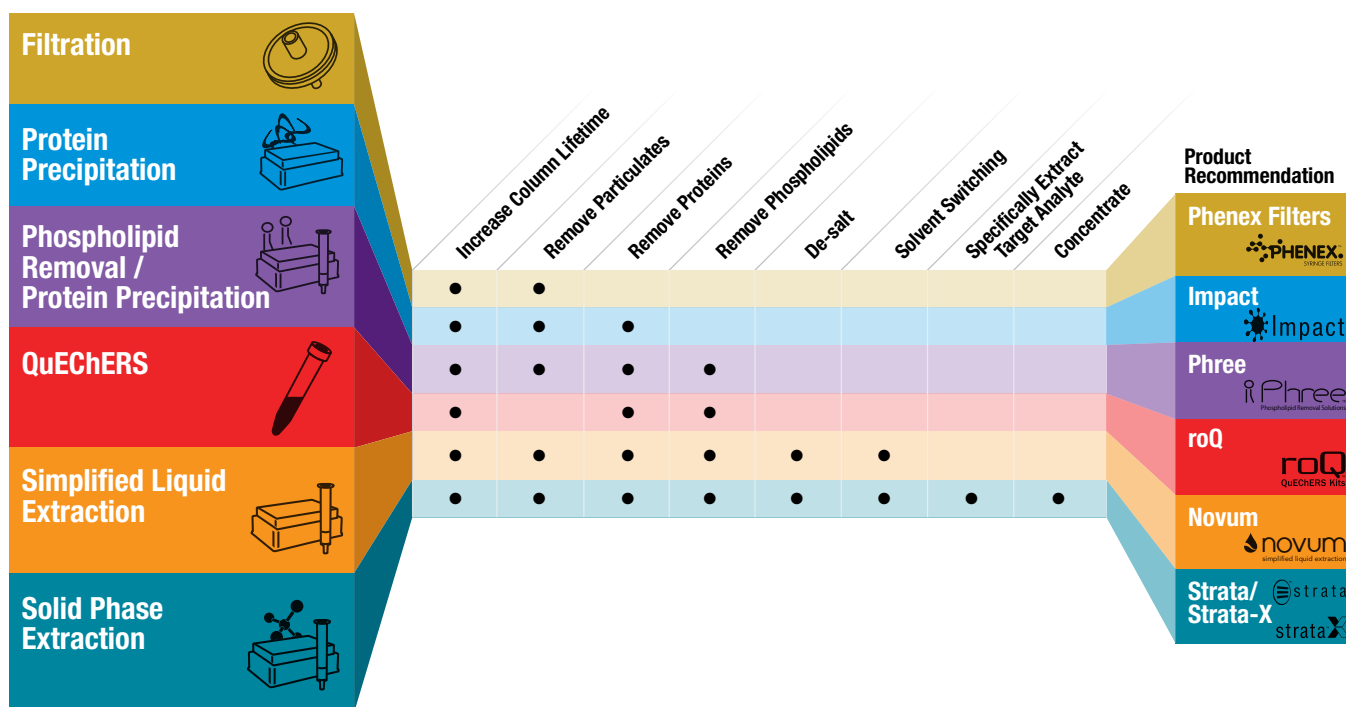


[App ID 23804](#)

Sample Preparation Selection

Sample preparation is crucial to achieving desirable analytical results. Sample matrix effects can result in an array of interferences which can lead to poor chromatography as well as instrumentation drawbacks, hindering your approach and goal for the analysis.

Choose Your Best Sample Preparation Solution



Sample Preparation Selection and Users Guide

Find the right technique and get started!

Request Your Copy: www.phenomenex.com/SPguide

Veterinary Drugs and Medicinal Products

The use of veterinary drugs are on the rise.
Antimicrobial resistance is a global concern.

Multi-Class Screening of Antibiotics in Kidney Juice, Serum, Milk, and Honey

by LC/MS/MS

Sample Preparation

Weigh: 1 g of homogenized beef kidney sample, kidney juice, or serum into a 50 mL FEP (fluorinated ethylene propylene) tube. Alternatively you can use a disposable polypropylene tube.

Add: 5 μ L of the internal standard work solution.

Add: 2 mL of water and 8 mL of acetonitrile.

Mix: using a vortex mixer, and then shake for five minutes.

Centrifuge: @ 3450 g for five minutes.

Decant: supernatant into a 50 mL tube with 500 mg of Septra™ C18-E sorbent.

Mix: using a vortex mixer and shake for 30 seconds.

Centrifuge: @ 3450 g for one minute.

Place: 5 mL aliquot of the supernatant into a graduated tube.

Evaporate: to less than 1 mL.

Dilute: to 1 mL with water.

Filter: extract through a 0.45 μ m Phenex™ RC syringe filter (part no. [AF0-8103-12](#))

Transfer: to a Verex™ autosampler vial (part no. [AR0-9925-13](#)).

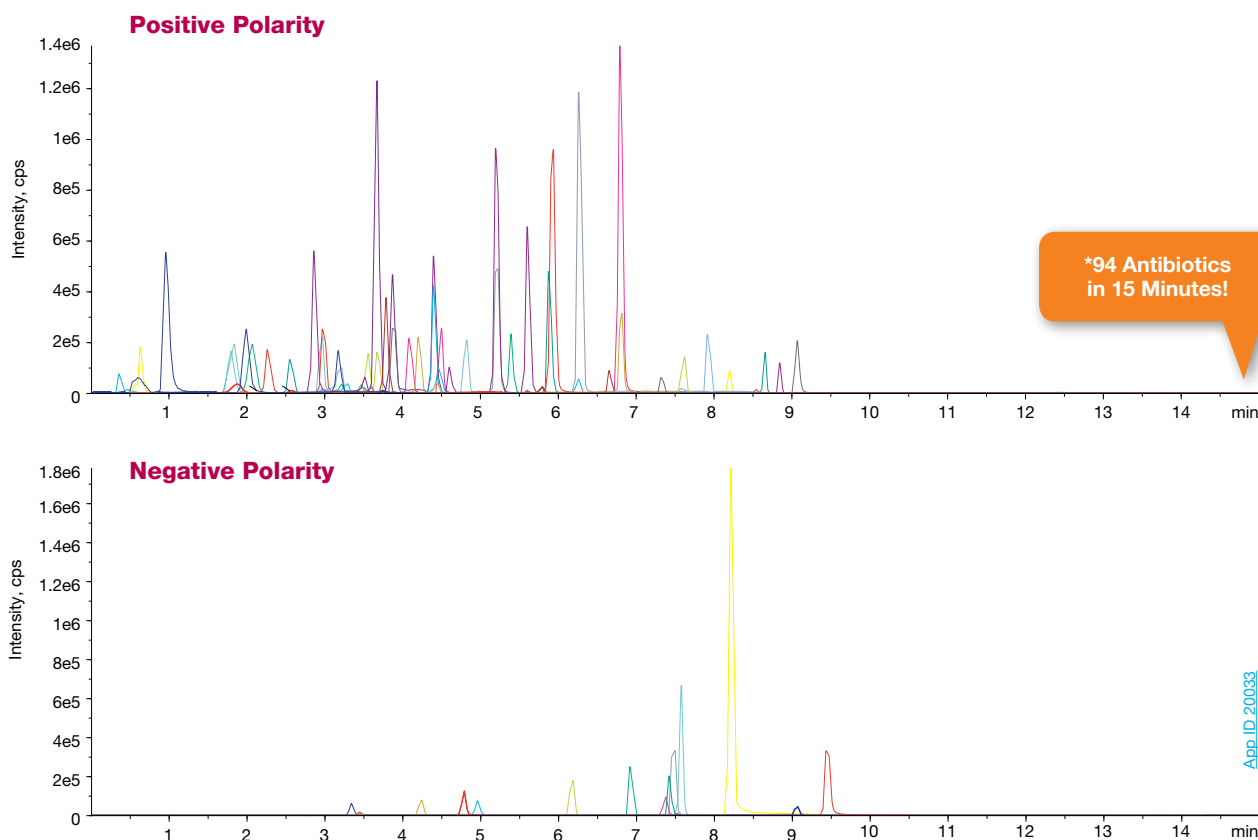
Note: The extracts are now ready for LC/MS/MS analysis

LC Conditions

Column: Gemini® 3 μ m C18
Dimensions: 50 x 2.0 mm
Part No.: [00B-4439-B0](#)
SecurityGuard™ Cartridge: [AJ0-7596](#)
Mobile Phase: A: 0.1 % Formic acid in Water
 B: 0.1 % Formic acid in Methanol
Gradient:

Time (min)	% B
0	2
7.27	80
7.37	99
11	2
15	2

Flow Rate: 500 μ L/min
Temperature: 40 °C
Detection: Tandem Mass Spectrometer (MS/MS) (600 °C)
Detector: SCIEX 4000 QTRAP®



Extracted Ion Chromatogram of antibiotics standard mixture working solution (at 200 ng/mL), obtained on a 4000 QTRAP LC/MS/MS System

* For entire antibiotics list please visit: www.phenomenex.com/Search

20033



Chloramphenicol in Seafood and Dairy Products

by SPE & LC/MS/MS

Solid Phase Extraction (SPE)

Strata[®]-X 60 mg/3 mL

Part No.: 8B-S100-UBJ

Condition: 3 mL Methanol

Equilibrate: 3 mL Water

Load: 10 mL extracted shrimp tissue sample

Wash: 3 x 1 mL Water

Dry: 10" Hg for 5-10 minutes to remove residual water

Elute: 3 x 1 mL Ethyl acetate

Dry down: Nitrogen gas at 55 °C

Reconstitute: 500 µL of Acetonitrile/Water (20:80)



LC Conditions

Column: Kinetex[®] 2.6 µm C18

Dimensions: 50 x 2.1 mm

Part No.: 00B-4462-AN

Mobile Phase: A: 5 mM Ammonium bicarbonate

B: Acetonitrile

Gradient: Time (min) %B

0 5

2 5

2.01 95

4.5 95

Flow Rate: 0.4 mL/min

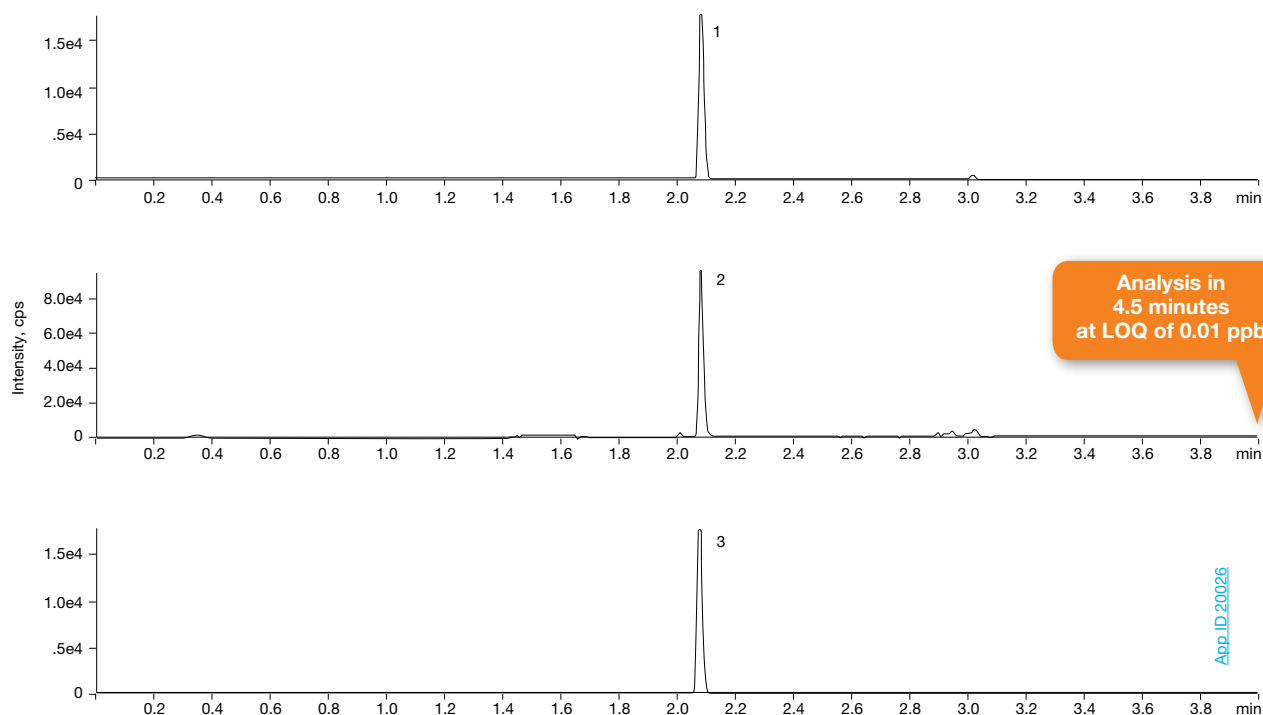
Temperature: 20 °C

Injection Volume: 25 µL

Detection: Tandem Mass Spectrometer (MS/MS) (450 °C)

Detector: SCIEX API 4000™

Sample: 1. Chloramphenicol 1
2. Chloramphenicol 2
3. D5-Chloramphenicol



Antibiotics in Meat

by LC/MS/MS



Column: Kinetex® 2.6 µm C18
Dimensions: 50 x 2.1 mm
Part No.: 00B-4462-AN
Mobile Phase: A: 0.1 % Formic Acid in Water
 B: 0.1 % Formic Acid in Methanol
Gradient:

Time (min)	% B
0	2
0.30	2
7.27	80
7.37	99
8.27	99
13	2

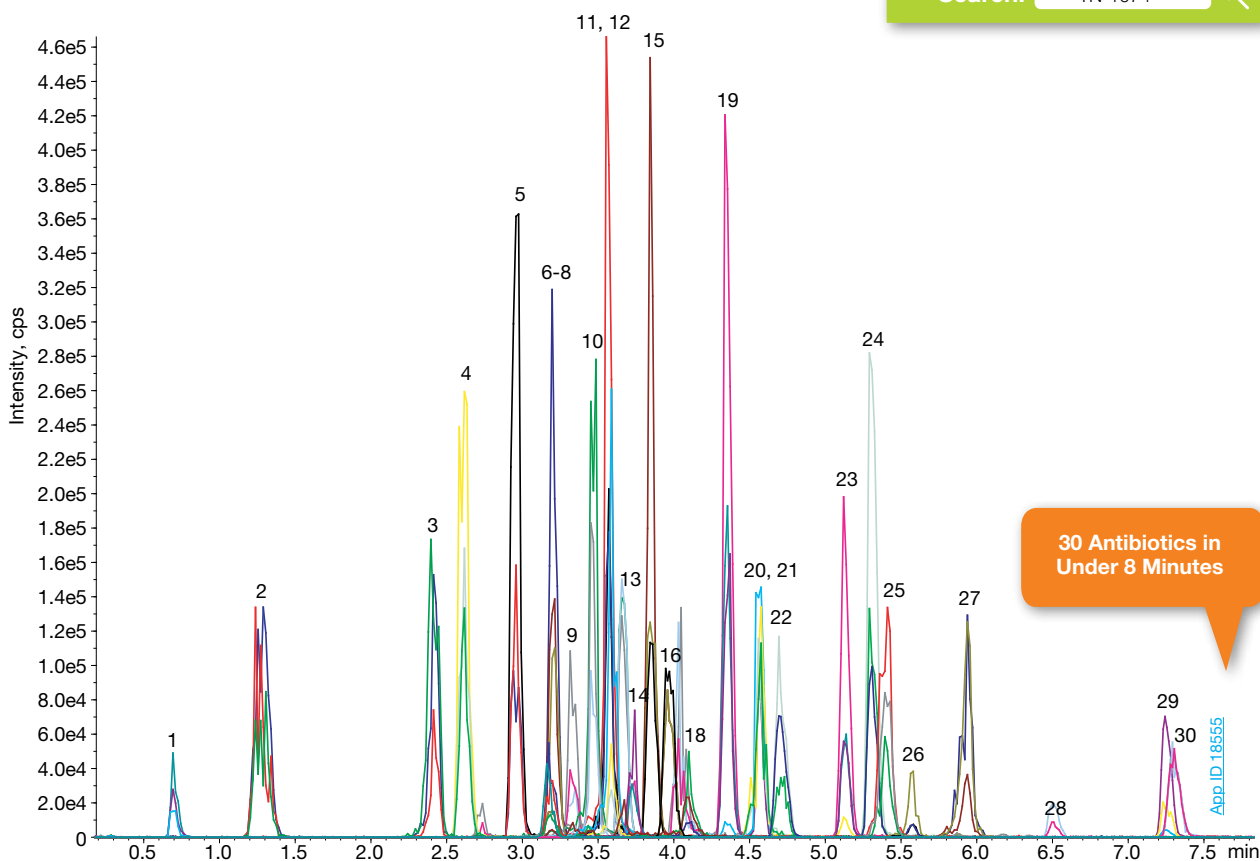
Flow Rate: 0.5 mL/min
Temperature: 40 °C
Inj. Volume: 10 µL
Detection: Mass Spectrometer (MS) (300 °C)

Sample:

1. Sulfanilamide	16. Florfenicol
2. Amoxicillin	17. Spiramycin
3. Lincomycin	18. Chlorotetracycline
4. Sulfadiazine	19. Sulfadoxine
5. Sulfathiazole	20. Clindamycin
6. Ampicillin	21. Tilimicosin
7. Thiamphenicol	22. Chloramphenicol
8. Sulfamerazine	23. Sulfadimethoxine
9. Tetracycline	24. Sulfquinoloxaline
10. Ciprofloxacin	25. Erythromycin
11. Enrofloxacin	26. Tulosin
12. Danofloxacin	27. Josamycin
13. Sulfamethazine	28. Penicillin G
14. Sarafloxacin	29. Cloxacillin
15. Sulfamethoxypyridazine	30. Flunixin

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Note: Analytes spiked at 100 ng/mL

Nitrofuran Metabolites

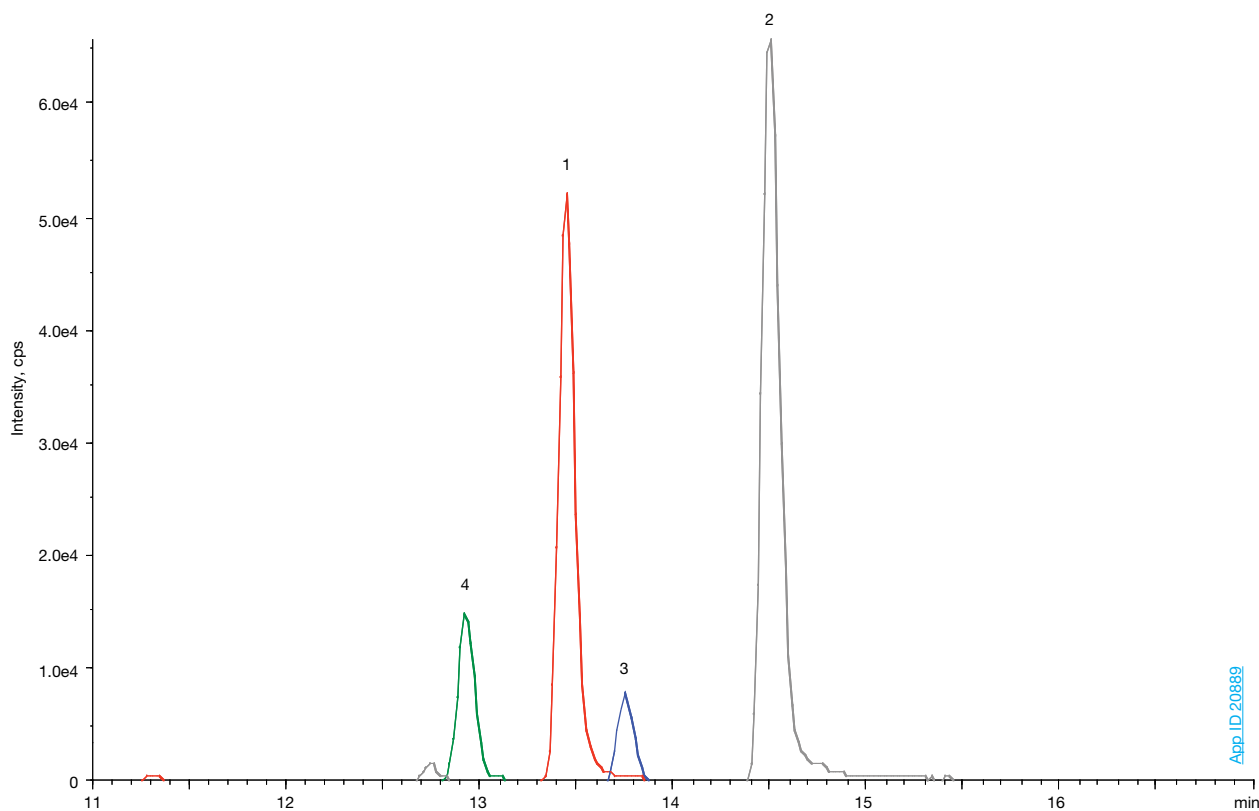
by LC/MS/MS

Column: Luna® 3 µm C18(2)
Dimensions: 150 x 2.0 mm
Part No.: 00F-4251-B0
Mobile Phase: A: 1 mM Ammonium Acetate in Water
B: 1 mM Ammonium Acetate in Methanol
Gradient:

Time (min)	% B
0	10
15	90
19.5	90
20	10

Flow Rate: 200 µL/min
Temperature: 25 °C
Detection: Tandem Mass Spectrometer (MS/MS) (600 °C)
Detector: SCIEX 3200 QTRAP®
Sample:

1. 3-Amino-2-oxazolidinone (AOZ)
2. 3-Amino-5-morpholinomethyl-2-oxazolidinone (AMOZ)
3. Semicarbazide (SEM)
4. 1-Amino-hydrantoin (AHD)



App ID 20889

Sulphonamides in Honey

by SPE and LC/MS/MS

Solid Phase Extraction (SPE)

Strata-X-C 60 mg/3 mL

Part No.: 8B-S029-UBJ

Condition: 2 mL of Methanol

Equilibrate: 2 mL of Water

Load: Pre-treated honey sample (pre-treatment procedure)

Wash 1: 2 x 2 mL Water

Wash 2: 2 x 2 mL Methanol/Acetonitrile (50:50)

Dry: 2 mins at 10" of Hg Pressure

Elute: 2 mL 2% Ammonium hydroxide in Methanol

LC Conditions

Column: Gemini® 5 µm C18 110 Å

Dimensions: 150 x 3.0 mm

Part No.: 00F-4435-Y0

Mobile Phase: A: 0.1 % Formic Acid in Water

B: 0.1 % Formic Acid in Acetonitrile

Gradient: Time (min) % B

0 10

8 70

Flow Rate: 0.6 mL/min

Temperature: Ambient

Detection: Mass Spectrometer (MS) (ambient)

Detector: SCIEX API 3000™

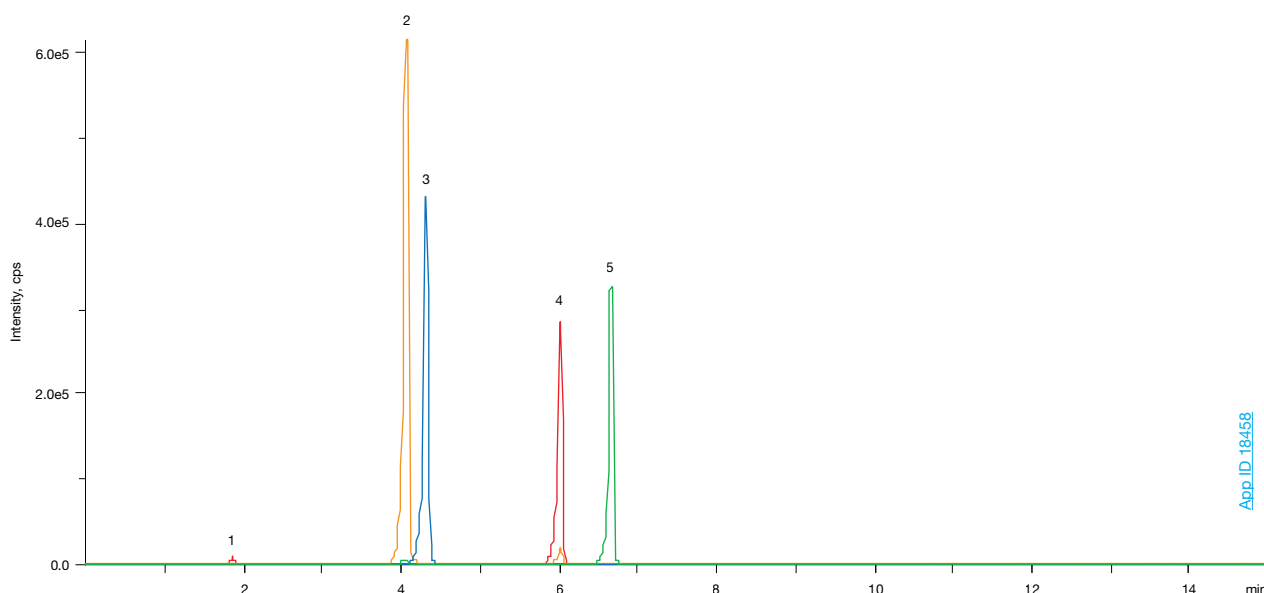
Sample: 1. Sulfanilamide

2. Sulfathiazole

3. Sulfamerazine

4. Sulfamethoxazole

5. Sulfaquinoxaline (IS)



App ID 18458



For complete technical note visit:
www.phenomenex.com/Search

Search:

Sulphonamides in Meat

by SPE and LC/MS/MS

Solid Phase Extraction (SPE)

Strata[®]-X 60 mg/3 mL

Part No.: 88-S100-UBJ

Condition: 4 mL of Methanol

Equilibrate: 4 mL 0.1 % Formic acid in Water

Load: Pre-treated sample

Wash 1: 2 mL 0.1 % Formic acid in Water

Dry: 2 mins under full vacuum

Elute: 1 mL Methanol

LC Conditions

Column: Gemini[®] 3 μ m C18 110Å

Dimensions: 50 x 4.6 mm

Part No.: 00B-4439-EQ

SecurityGuard[™] Cartridge: AJ0-7597

Mobile Phase: A: 0.1 % Formic Acid in Water
B: Acetonitrile

Gradient	Time (min)	% B
	0	2
	2	2
	2.1	15
	6.5	50
	7.1	100
	8.0	100
	8.1	2
	10	2

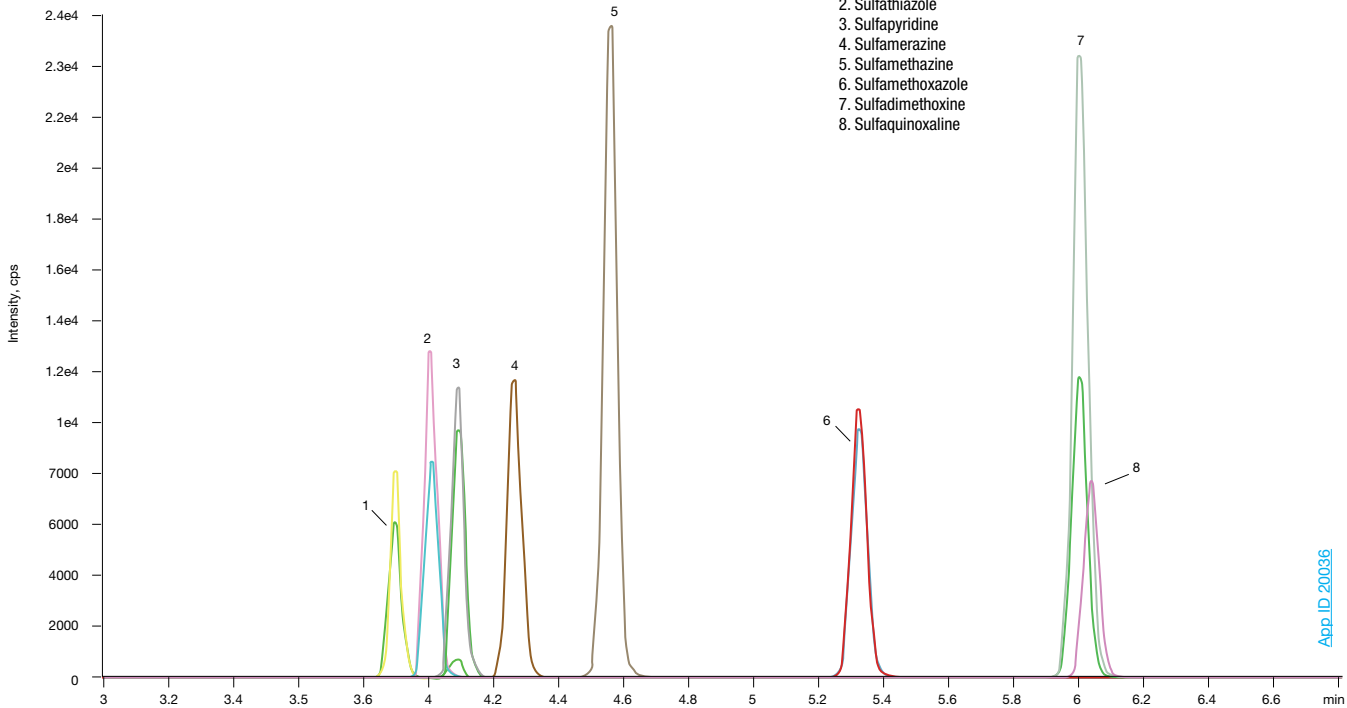
Flow Rate: 800 μ L/min

Temperature: Ambient

Detection: Tandem Mass Spectrometer (MS/MS) (300 °C)

Detector: SCIEX API 3200[™]

Sample:
1. Sulfadiazine
2. Sulfathiazole
3. Sulfapyridine
4. Sulfamerazine
5. Sulfamethazine
6. Sulfamethoxazole
7. Sulfadimethoxine
8. Sulfaquinoxaline



Penicillin in Meat

by SPE and LC/MS/MS

Solid Phase Extraction (SPE)

Strata® **C18-E 200** mg/3 mL

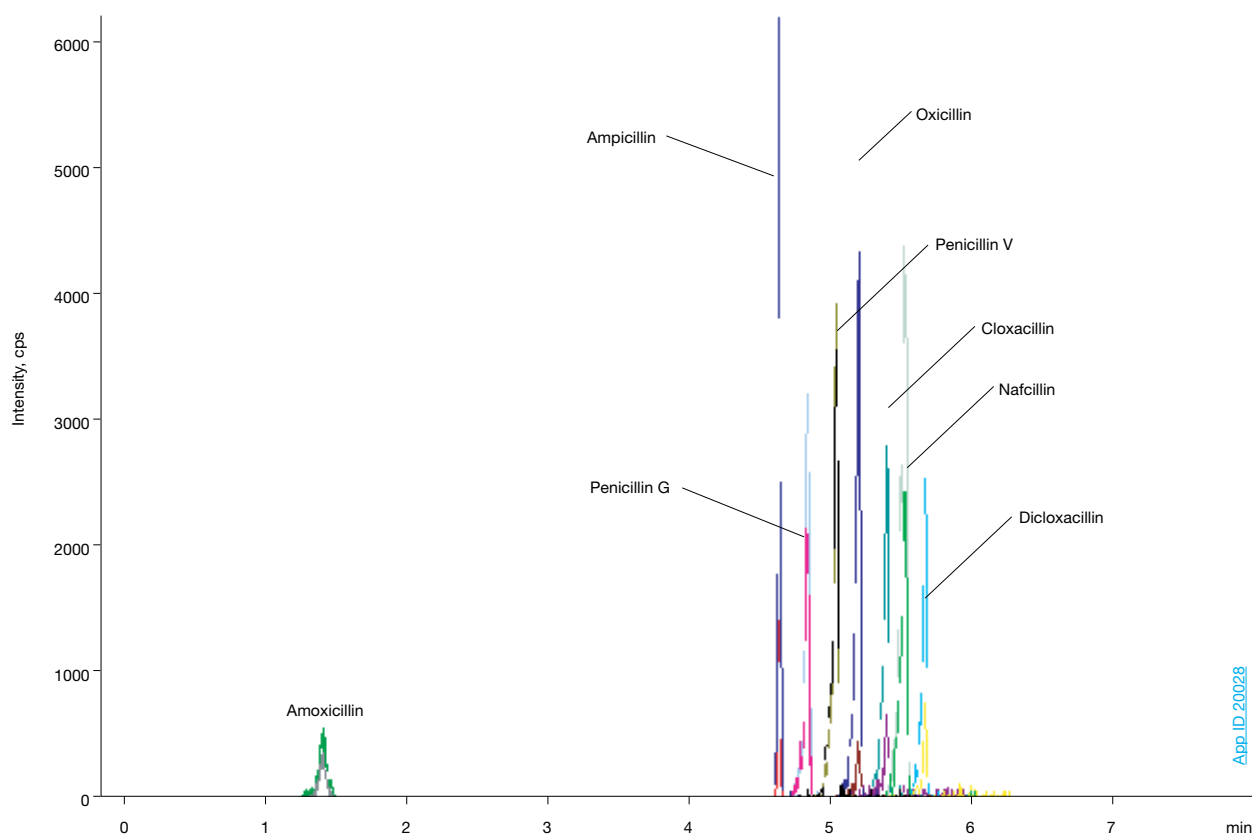
Part No.: [8B-S001-FBJ](#)
Condition: 4 mL Methanol
Equilibrate: 4 mL Water
Load: 2 mL Pretreated sample
Wash: 4 mL 0.1 % Formic acid in Water
Elute: 2x 2 mL Acetonitrile
Dry down: Evaporate under a slow stream of nitrogen gas
Reconstitute: 200 µL Water

LC Conditions

Column: Gemini® 3 µm C18
Dimensions: 150 x 4.6 mm
Part No.: [00F-4439-E0](#)
Mobile Phase: A: 0.1 % Ammonia in Water
 B: Acetonitrile/Water/Ammonia (95:5:0.1)
Gradient:

Time (min)	% B
0	2
2	2
2.42	10
6	50
6.1	100
6.6	100
6.8	2
8	2

Flow Rate: 800 µL/min
Temperature: 40 °C
Detection: Tandem Mass Spectrometer (MS/MS)@ -4500 V/40 psi (600 °C)
Detector: SCIEX API 3200™ QTRAP®
Sample: 1. Amoxicillin
 2. Ampicillin
 3. Penicillin G
 4. Penicillin V
 5. Oxacillin
 6. Cloxacillin
 7. Nafcillin
 8. Dicloxacillin



App ID 20028

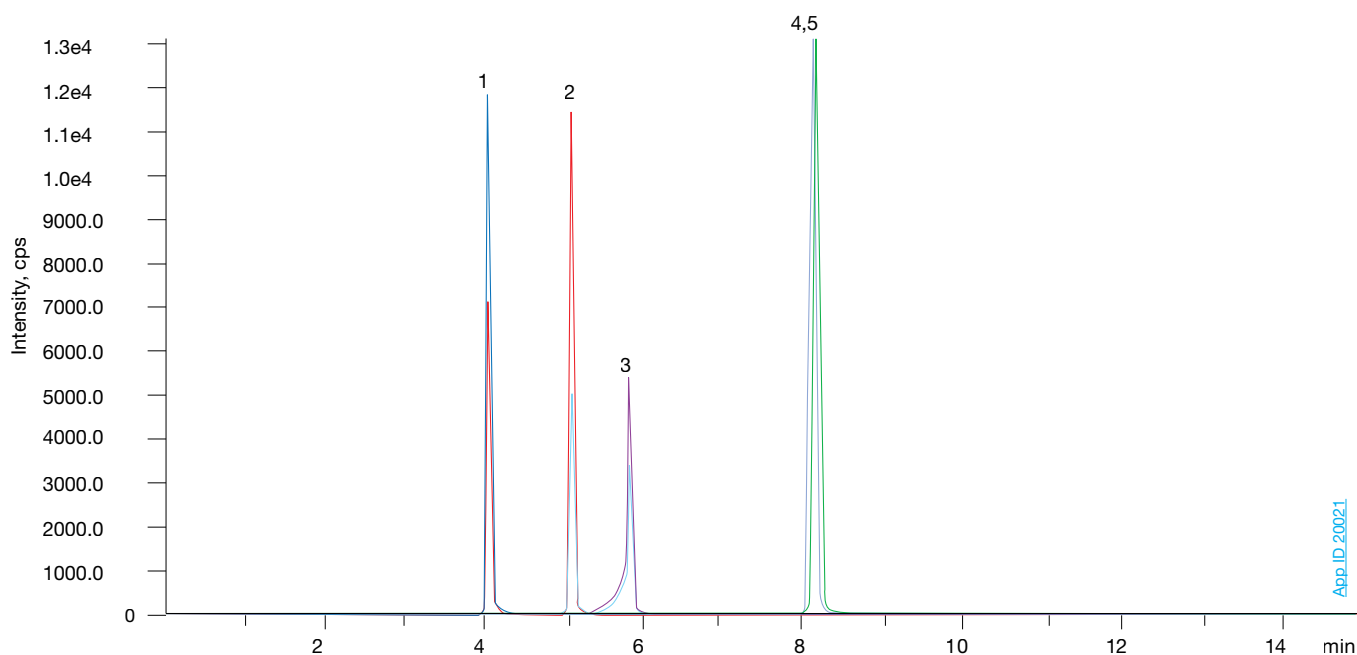
Malachite Green and Related Triphenylmethane Dyes

by LC/MS/MS

Column: Synergi™ 4 µm Max-RP
Dimensions: 50 x 2.0 mm
Part No.: 008-4337-B0
SecurityGuard™ Cartridge: AJ0-6073
Mobile Phase: A: 10 mM Ammonium acetate and 0.1 % Formic acid in Water
B: Acetonitrile/Water (90:10) with 10 mM Ammonium acetate and 0.1 % Formic acid
Gradient:

Time (min)	% B
0	30
8	90
14	90
15	30

Flow Rate: 0.4 mL/min
Temperature: 30 °C
Detection: Tandem Mass Spectrometer (MS/MS) (ambient)
Detector: SCIEX API 3000™
Sample: 1. Malachite Green
2. Crystal Violet
3. Brilliant Green
4. D5-Leucomalachite Green
5. Leucomalachite Green



App ID 20021

Tetracyclines in Meat

by SPE and LC/MS/MS

Solid Phase Extraction (SPE)

Strata®-X 60 mg/3 mL

Part No.: 88-S100-UBJ

Condition: 4 mL Methanol

Equilibrate: 4 mL 0.1 % Formic Acid

Load: 2 mL Pretreated sample

Wash: 2 mL 0.1 % Formic acid in Water

Elute: 1 mL Methanol

Dry down: Evaporate under a slow stream of nitrogen gas

Reconstitute: 200 µL Water

LC Conditions

Column: Gemini® 5 µm C18 100 Å

Dimensions: 50 x 4.6 mm

Part No.: 008-4435-E0

SecurityGuard™ Cartridge: AJO-7597

Mobile Phase: A: 0.1 % Formic Acid in Water
B: Acetonitrile

Gradient:	Time (min)	% B
	0	2
	2	2
	2.1	15
	6.5	50
	7.1	100
	8	100
	8.1	2
	10	2

Flow Rate: 0.8 mL/min

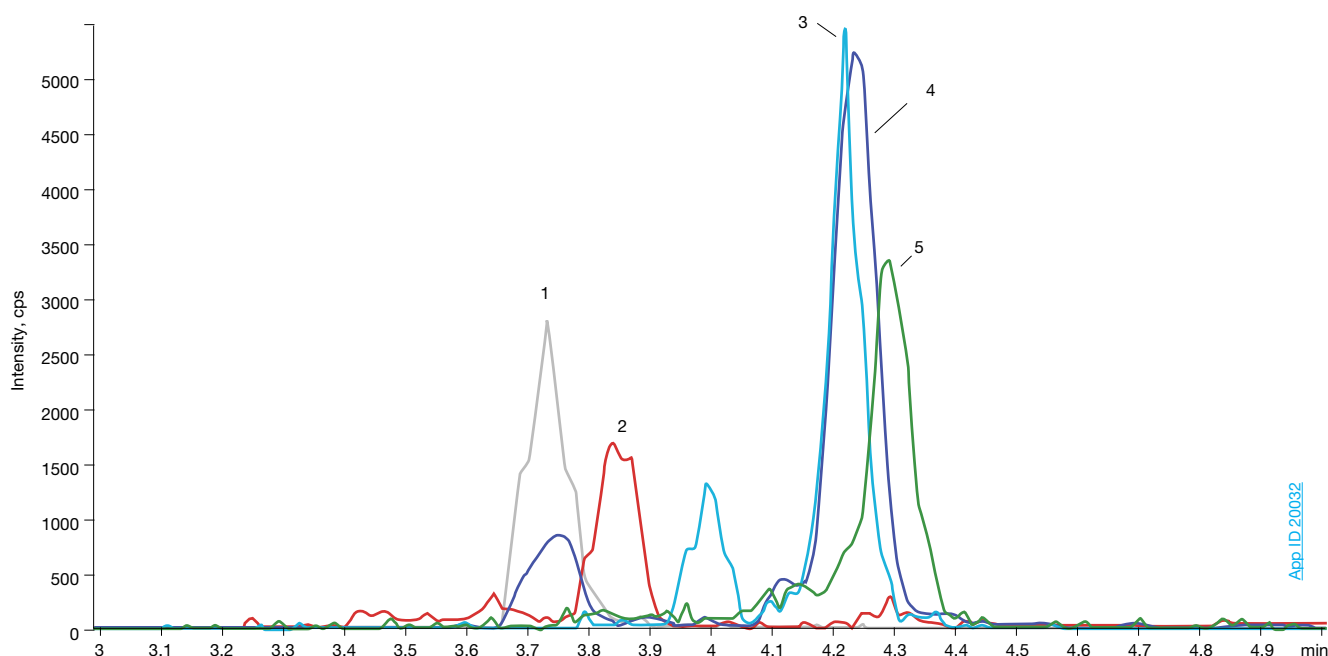
Temperature: 40 °C

Detection: Tandem Mass Spectrometer (MS/MS) (600 °C)

Detector: SCIEX API 3200 QTRAP®

Sample:

1. Oxytetracycline
2. Tetracycline
3. Chlortetracycline
4. Methacycline
5. Doxycycline



Boar Taint Compounds

by LC/MS/MS



Column: Kinetex® 2.6 µm XB-C18
Dimensions: 50 x 2.1 mm
Part No.: [00B-4496-AN](#)
Mobile Phase: A: 0.1 % Formic acid in water
B: 0.1 % Formic acid in acetonitrile

Gradient:	Time (min)	% B
	0	30
	3	90
	5	90
	5.01	30
	8	30

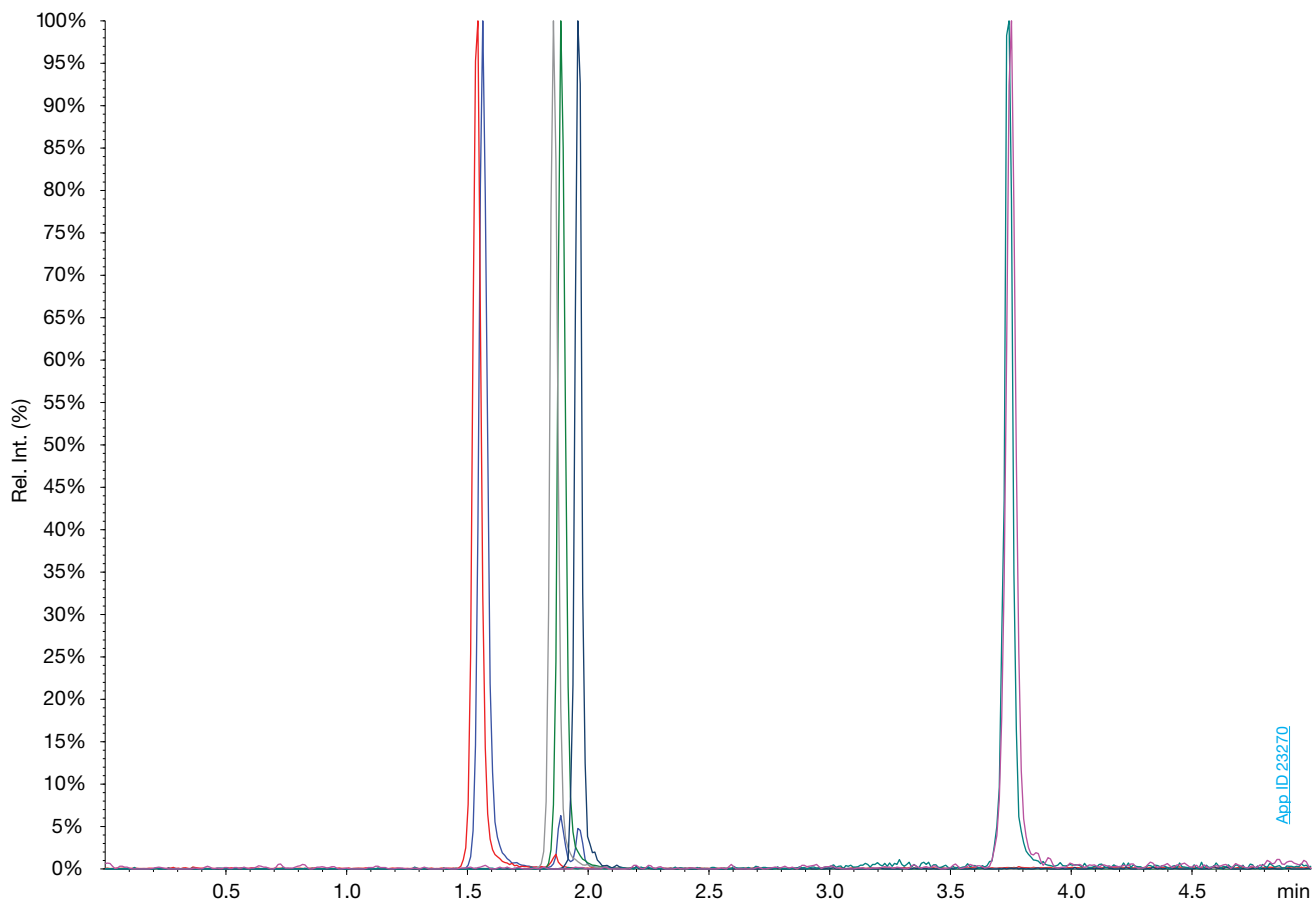
Flow Rate: 400 µL/min

Temperature: 22 °C

Detection: Tandem Mass Spectrometer (MS/MS) APCI+

Instrument: SCIEX 4000 QTRAP®

Sample: 1. D7-Indole
2. Indole
3. D8-Skatole
4. Skatole
5. 5-Chloroindole
6. D4-Androstenone
7. Androstenone



Phenylbutazone in Ground Meat

by SPE and LC/MS/MS

Solid Phase Extraction (SPE)

Strata®-X-A, 100 mg/6 mL

Part No.: [8B-S123-ECH](#)

Condition: 3 mL Methanol

Equilibrate: 3 mL DI Water

Load: 4 mL of Pretreated sample

Wash 1: 2 mL D.I. Water

Wash 2: 2 mL Acetonitrile

Wash 3: 2 mL Ethyl Acetate

Dry: 5 minutes under full vacuum

Elute: 2x 1.5 mL 1% Formic Acid in Methanol

Dry Down: Evaporate under a stream of nitrogen gas at 50 °C to dryness

Reconstitute: Resuspend the residue with 500 µL of 50:50-Methanol/
0.1% Formic Acid

For complete technical note visit:

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LC/MS/MS Conditions

Column: Kinetex® 2.6 µm XB-C18

Dimensions: 50 x 2.1 mm

Part No.: [00B-4496-AN](#)

Mobile Phase: A: 0.1% Formic acid in Water

B: 0.1% Formic acid in Methanol

Gradient: Time (min) % B

0 50

0.5 50

2 95

3.5 95

3.51 50

5 50

Flow Rate: 450 µL/min

Column Temp: 45 °C

Detection: Triple quad

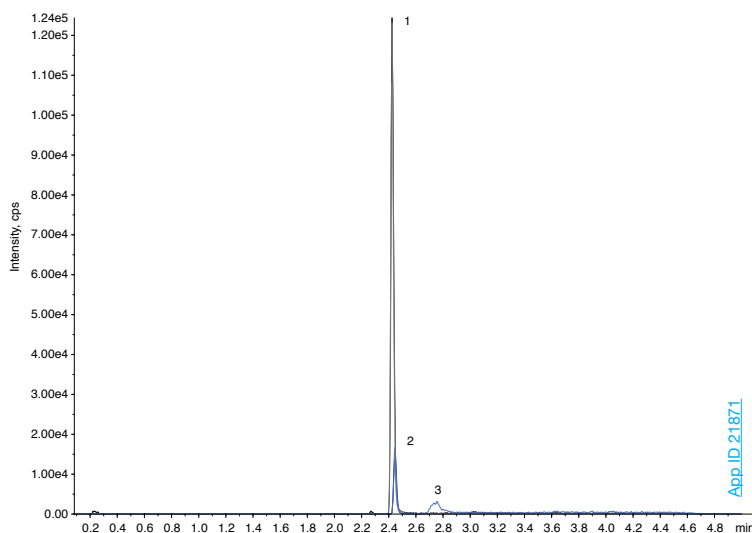
Instrument: SCIEX API 4000™

Analytes: 1. Phenylbutazone-D10 (I.S.)

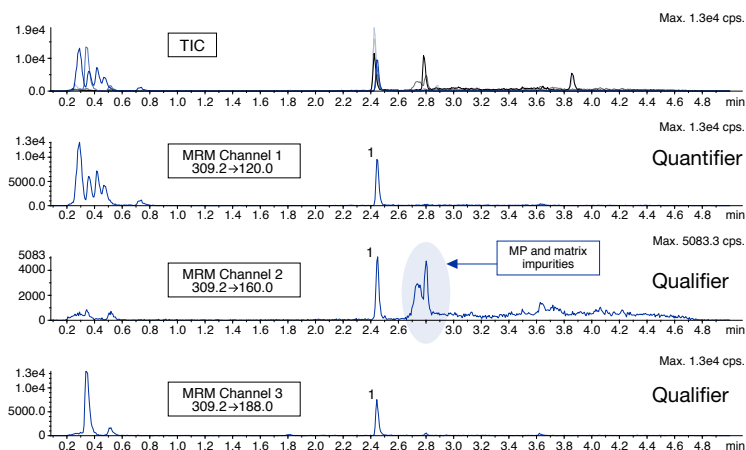
2. Phenylbutazone

3. Solvent/MP impurity

Chromatogram of 10 ppb (µg/Kg) Phenylbutazone and its internal standard



Phenylbutazone extract from ground beef. Total ion chromatogram (TIC) and each individual MRM channels are displayed for clarity. Peak assignment: 1) Phenylbutazone



Multi-Class Antibiotics From Ground Meat

by QuEChERS and LC/MS/MS

Sample Preparation

Extraction from Ground Meat (Sausage)

2 mL of 1 % formic acid solution was added to 2 g of ground sausage. The sample was mixed well and was further homogenized using an Omni TH hand homogenizer. 8 mL of methanol was added to the mixture. The sample was placed on a mechanical shaker for 30 minutes at high setting and then centrifuged at 4000 g for 5 minutes.

dSPE Cleanup

5 mL of supernatant from the extraction step was transferred to a roQ™ QuEChERS dSPE tube containing 900 mg of MgSO₄, 150 mg of PSA and 150 mg of C18E (p/n [KS0-8921](#)). The sample was shaken vigorously for 1 minute and centrifuged at 4000 g for 5 minutes.

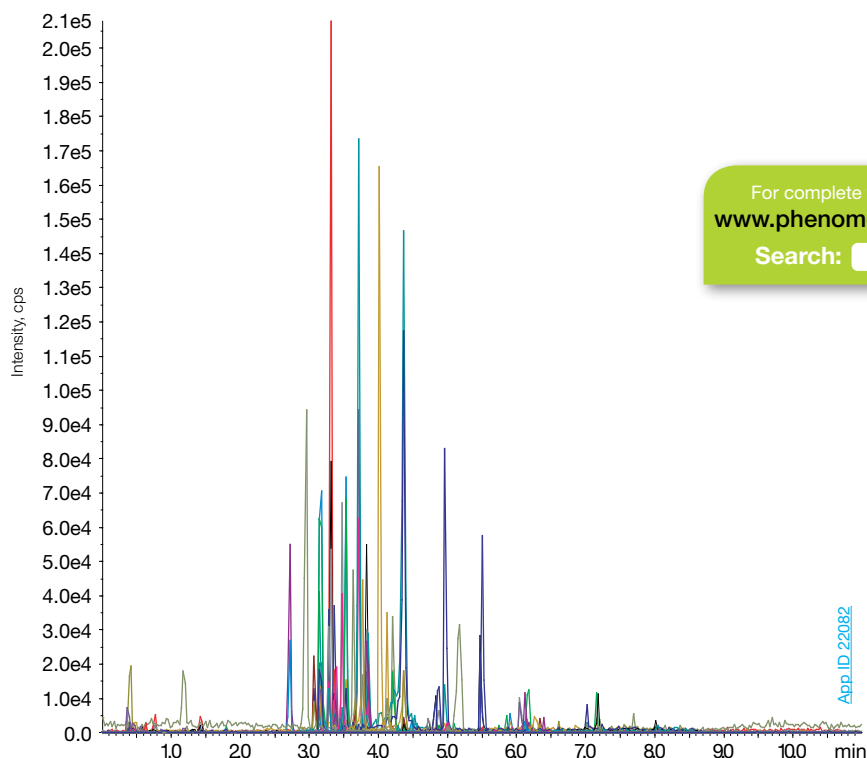
Reconstitution

2 mL of supernatant from the dSPE step was evaporated over a stream of nitrogen at 60 °C to dryness. The sample was reconstituted in 1 mL of 0.1 % formic acid/acetonitrile-methanol (50:50) with 0.1 % formic acid (95:5) for analysis.



LC/MS/MS Conditions

Column:	Kinetex® 2.6 µm XB-C18	
Dimensions:	100 x 2.1 mm	
Part No.:	00D-4496-AN	
SecurityGuard™ Cartridge:	AJ0-8768	
Mobile Phase:	A: 0.1 % Formic acid in water B: Methanol/Acetonitrile (50:50) with 0.1 % Formic acid	
Gradient:	Time (min)	% B
	0	5
	1	5
	4	50
	6	95
	7.5	95
	7.51	5
	10	5
Flow Rate:	0.45 mL/min	
Injection Volume:	10 µL	
Temperature:	50 °C	
Detection:	Tandem Mass Spectrometer (MS/MS)	
Instrument:	SCIEX API 5000™	



Representative chromatogram of meat fortified with 50 ppb antibiotic mixture

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Nitrates and Nitrites

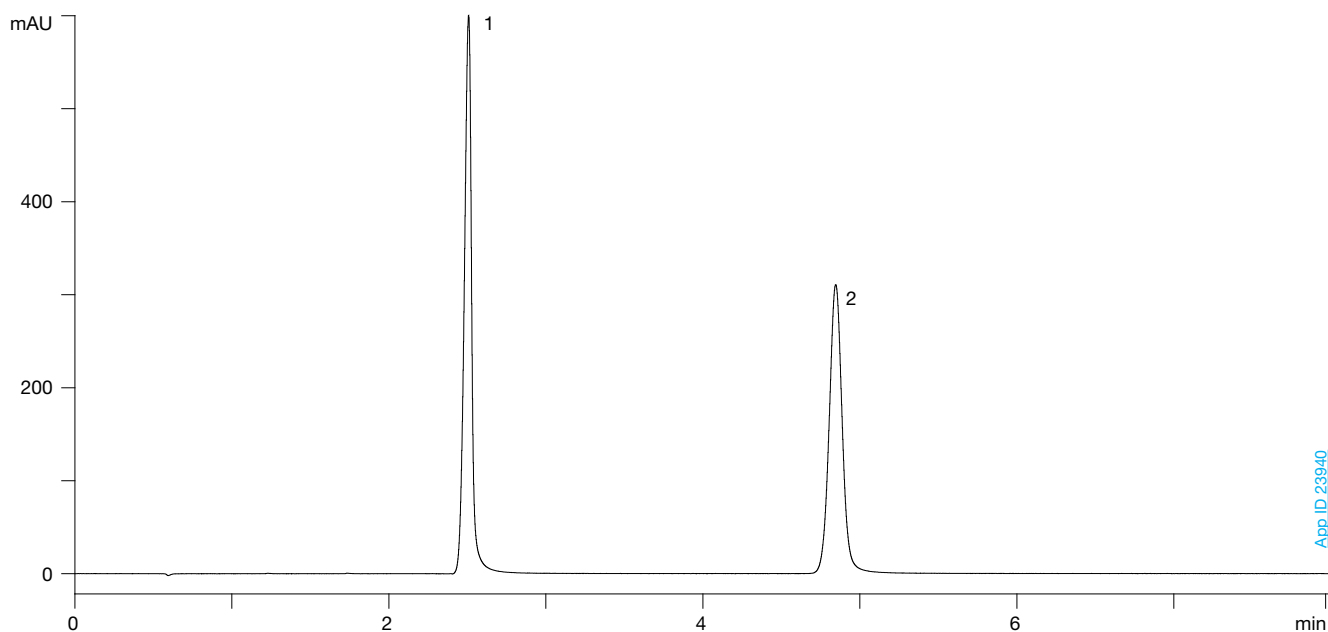
by Ion Pair LC/UV

LC Conditions

Columns: Kinetex® 2.6 µm C18
Dimensions: 100 x 3.0 mm
Part No.: 00D-4462-Y0
Mobile Phase: 5 mM Tetrabutylammonium Hydrogen Sulfate + 5 mM Ammonium Bicarbonate (pH adjusted to 6.5 with Sodium Hydroxide)
Gradient:

Time (min)	% B
0	90
4	71
6	49

Flow Rate: 0.6 mL/min
Injection: 20 µL (in DI water)
Temperature: Ambient
Detector: UV/Vis @ 218 nm (Bandwidth 4 nm)
HPLC System: Agilent® 1100 HPLC with Quaternary Pump
Analytes:
1. Nitrite
2. Nitrate



App ID 23940

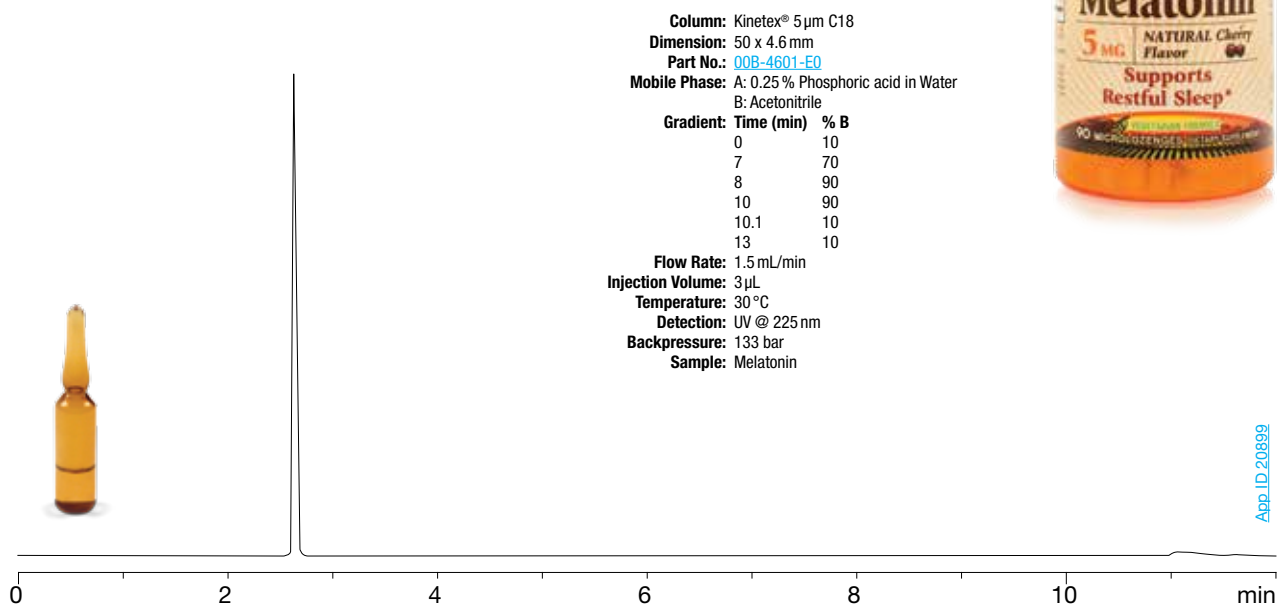
Dietary Supplements

Dietary Supplement Testing Modernization is necessary not just for laboratory product safety and quality but also for improved productivity.

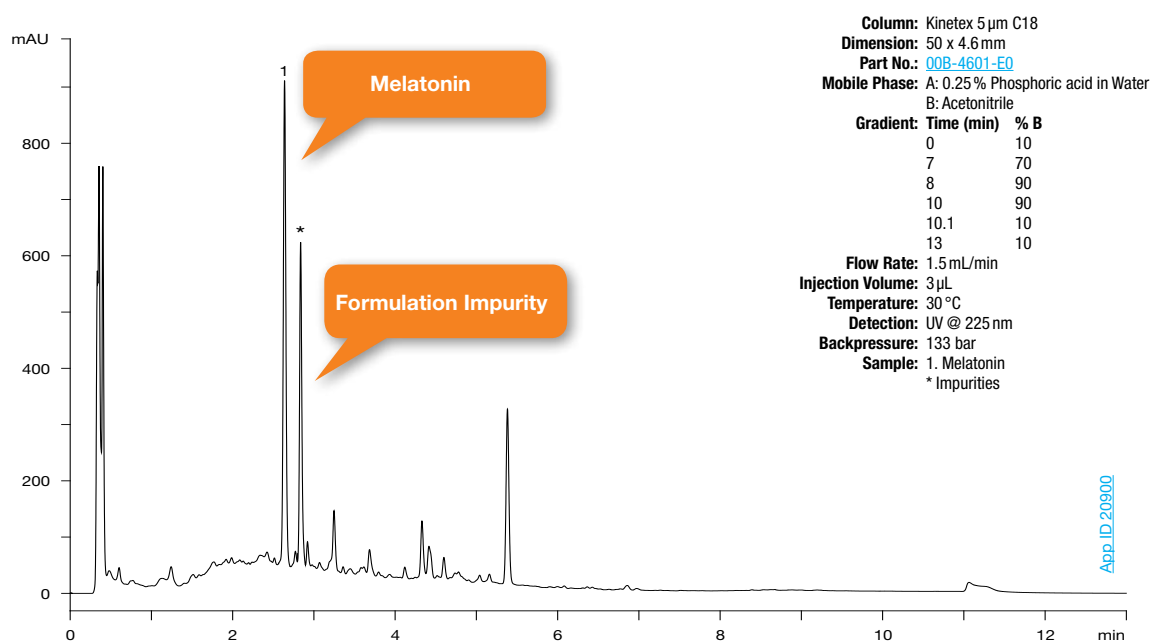
Melatonin

by LC/UV

Standard



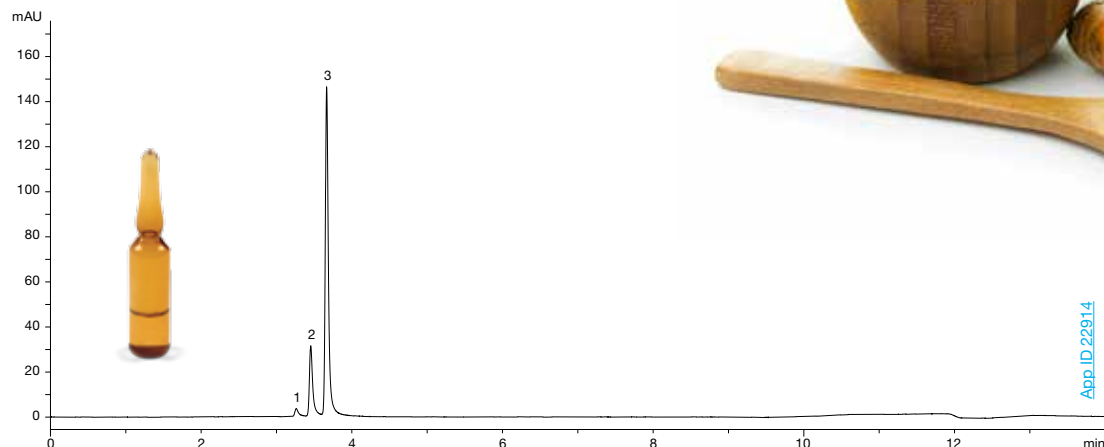
Commercial Gel Cap Formulation



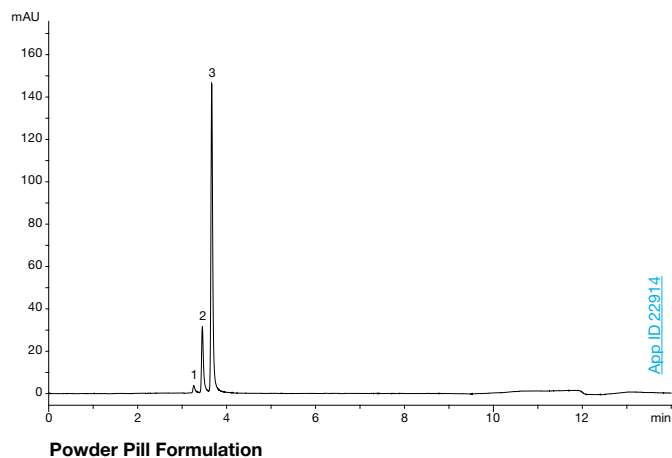
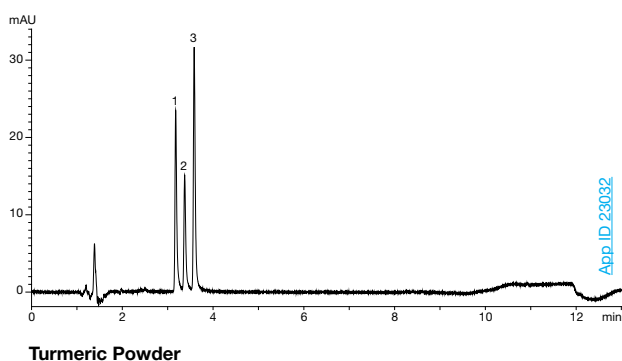
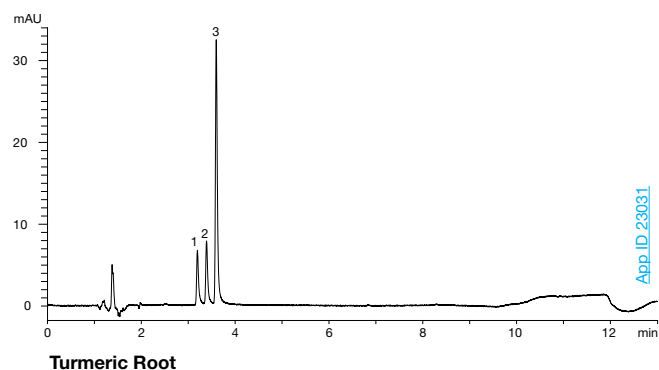
Curcuminoids

by LC/UV

Standard



Extracts



Conditions for all separations:

Column: Kinetex® 2.6 µm C18

Dimensions: 150 x 4.6 mm

Part No.: 00F-4462-E0

Mobile Phase: A: 0.1 % Formic Acid in Water

B: Acetonitrile

Gradient:	Time (min)	% B
	0	55
	8	70
	9	100
	10	100
	11	55

Flow Rate: 1.0 mL/min

Temperature: Ambient

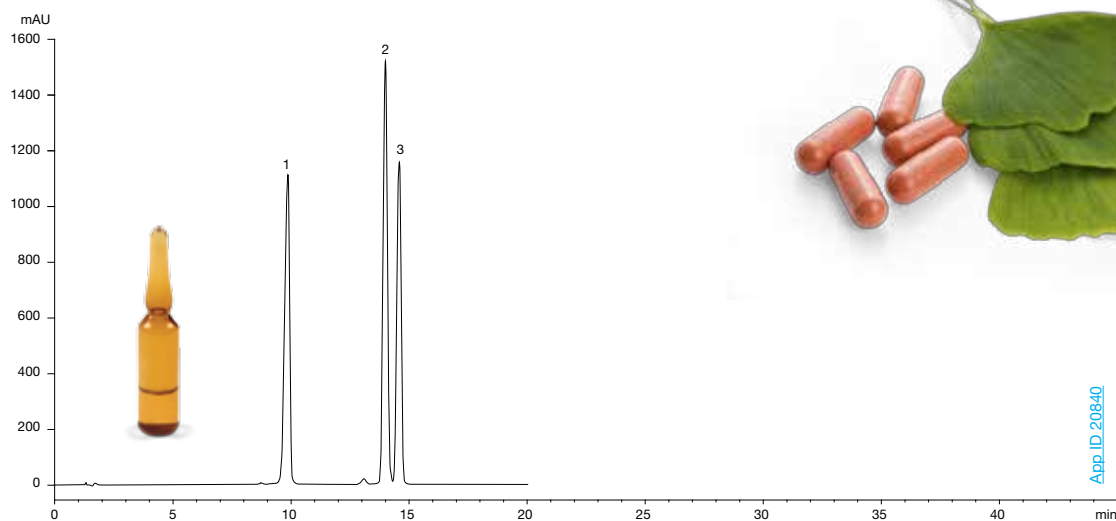
Detection: UV @ 425 nm

Sample: 1. Bis-demethoxy-curcumin
2. Demethoxy-curcumin
3. Curcumin

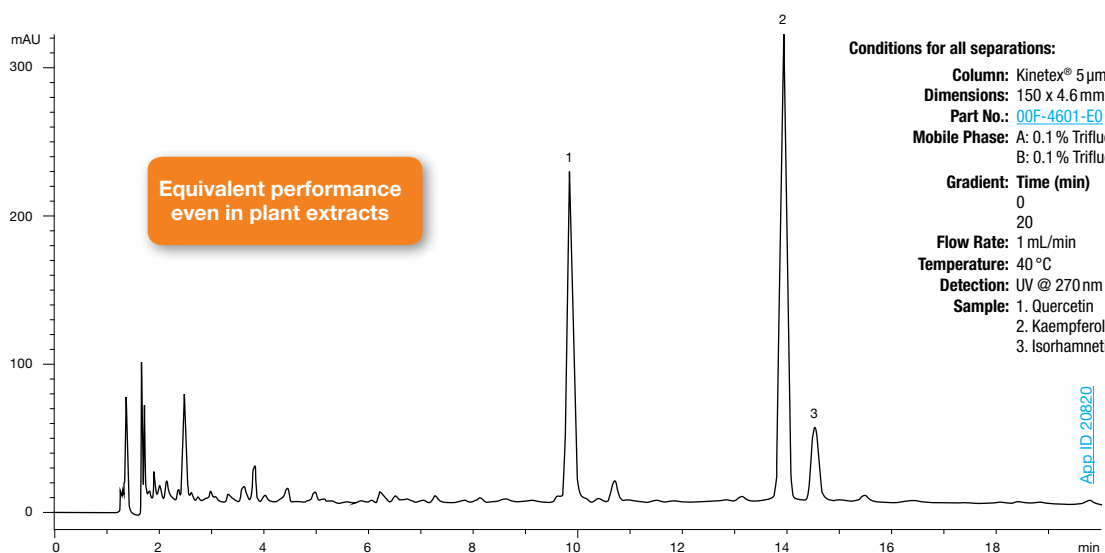
Ginkgo Biloba—Flavanoids

by LC/UV

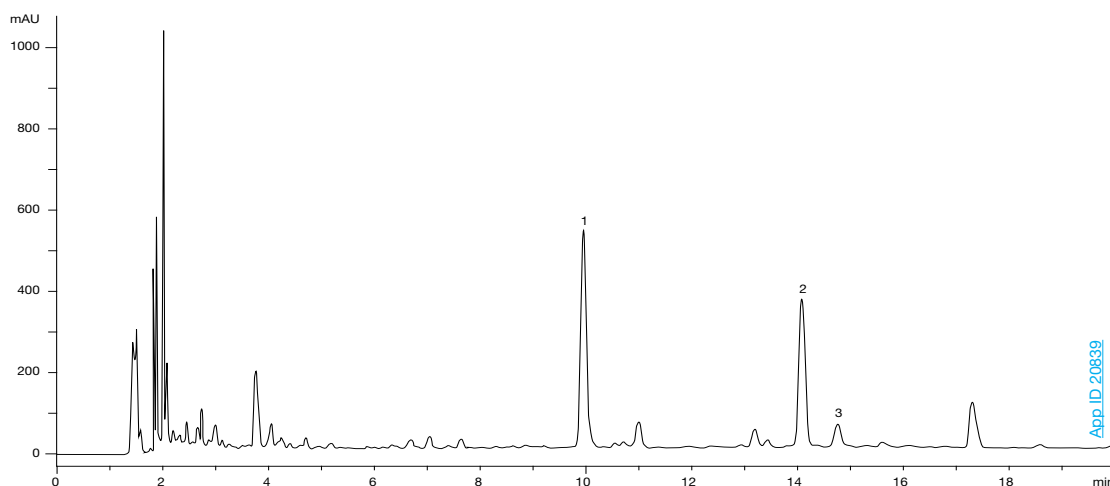
Standard



Extracts



Leaf Sample



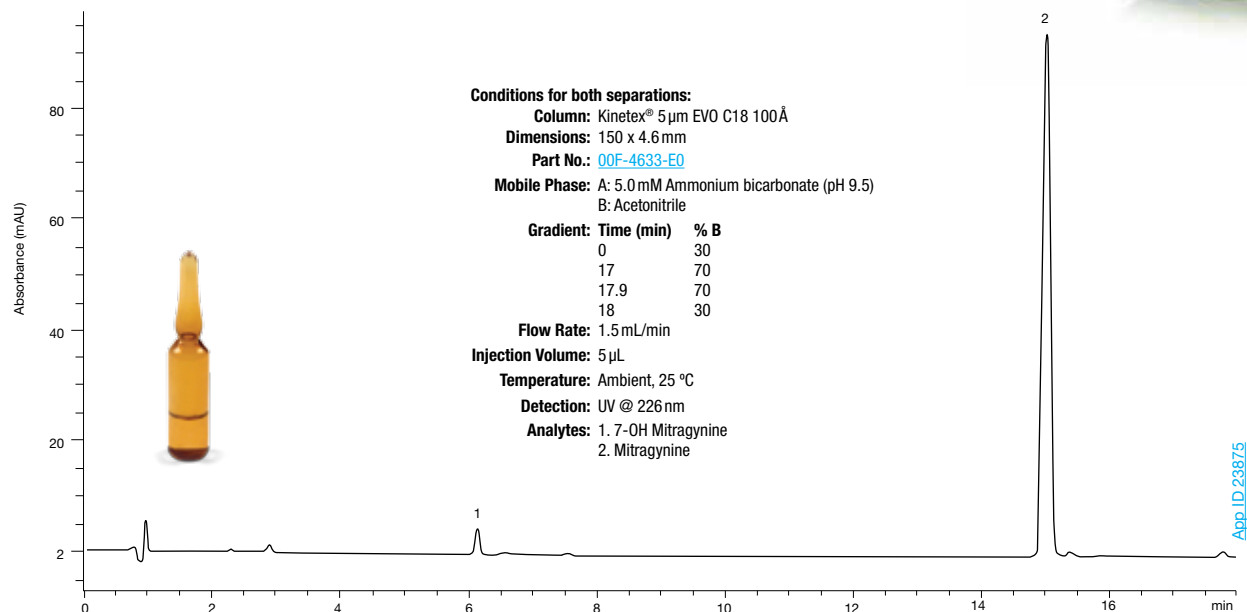
Pill Formulation

Mitragynine and 7-Hydroxy (7-OH) Mitragynine from Raw Materials

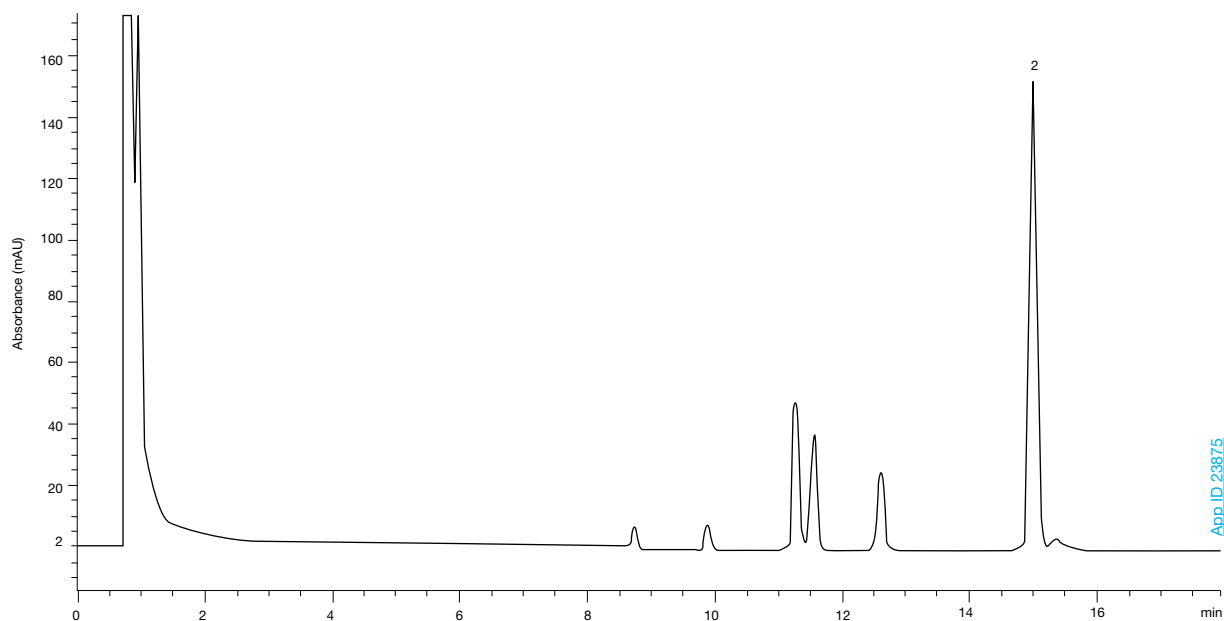
by HPLC-UV



Standard



Raw Materials

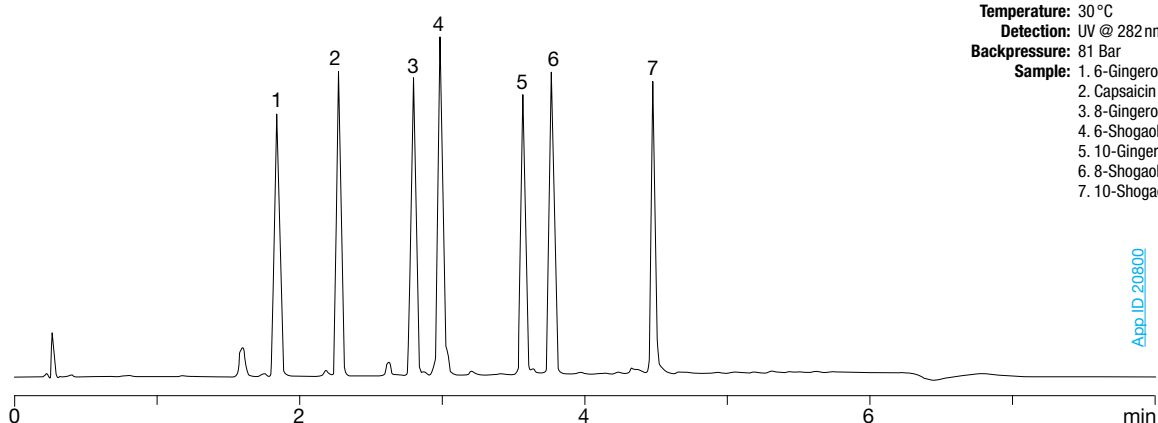


Gingerols

by LC/UV



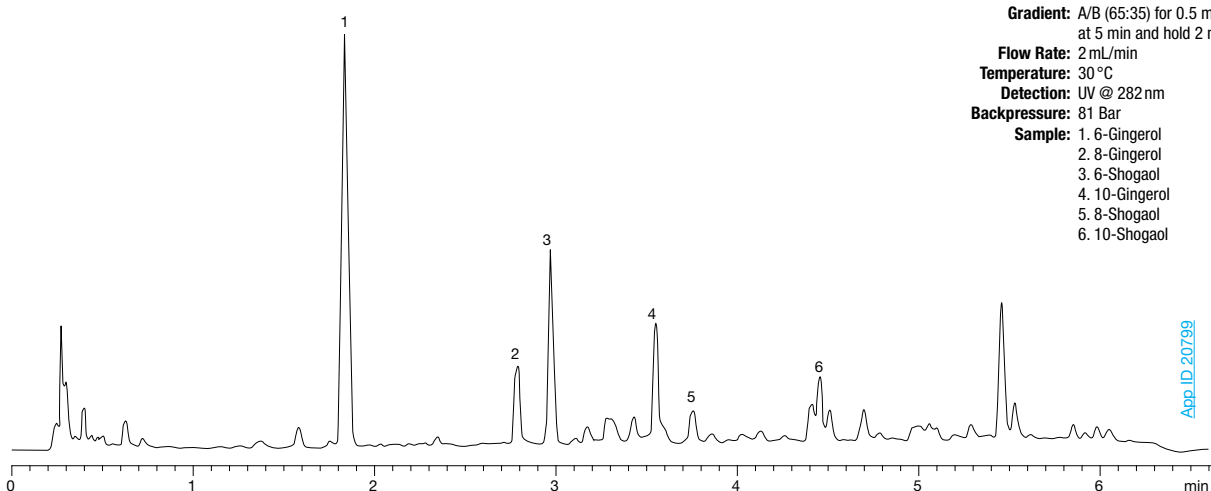
Standard



Column: Kinetex® 5 µm C18
Part No.: 00B-4601-E0
Dimensions: 50 x 4.6 mm
Mobile Phase: A: Water
 B: Acetonitrile
Gradient: A/B (65:35) for 0.5 min to (5:95) at 5 min and hold 2 min
Flow Rate: 2 mL/min
Temperature: 30 °C
Detection: UV @ 282 nm
Backpressure: 81 Bar
Sample: 1. 6-Gingerol
 2. Capsaicin
 3. 8-Gingerol
 4. 6-Shogaol
 5. 10-Gingerol
 6. 8-Shogaol
 7. 10-Shogaol

App ID 20800

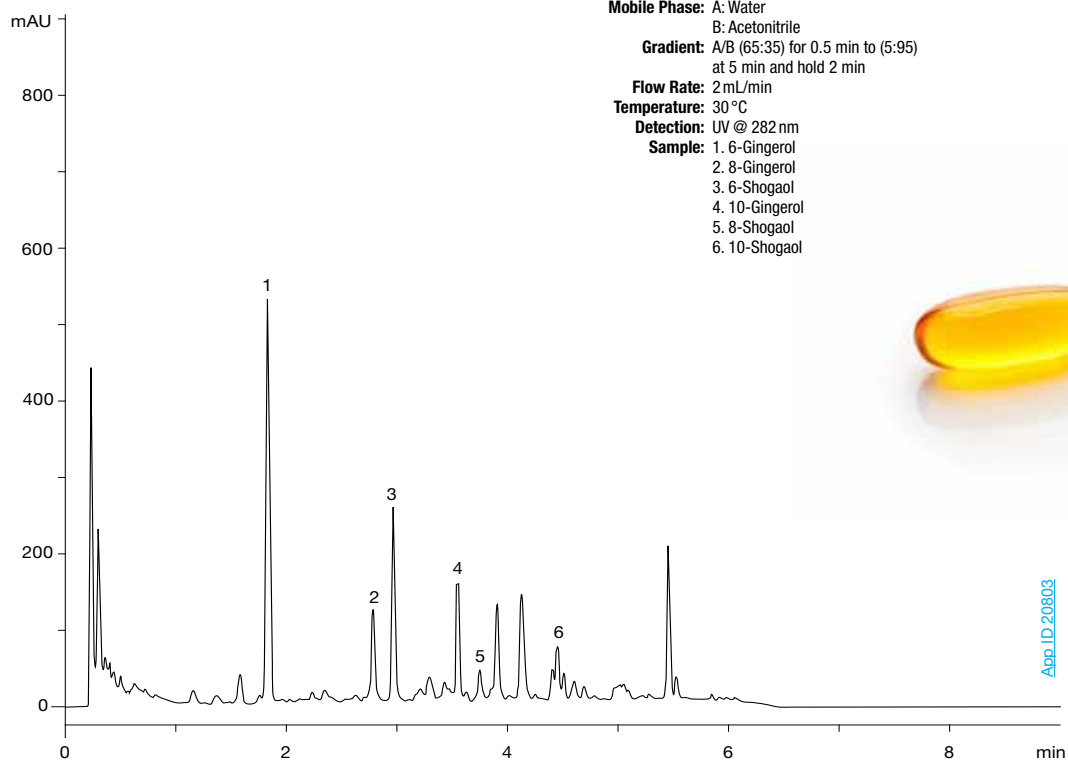
Ginger Root Biomass Extract



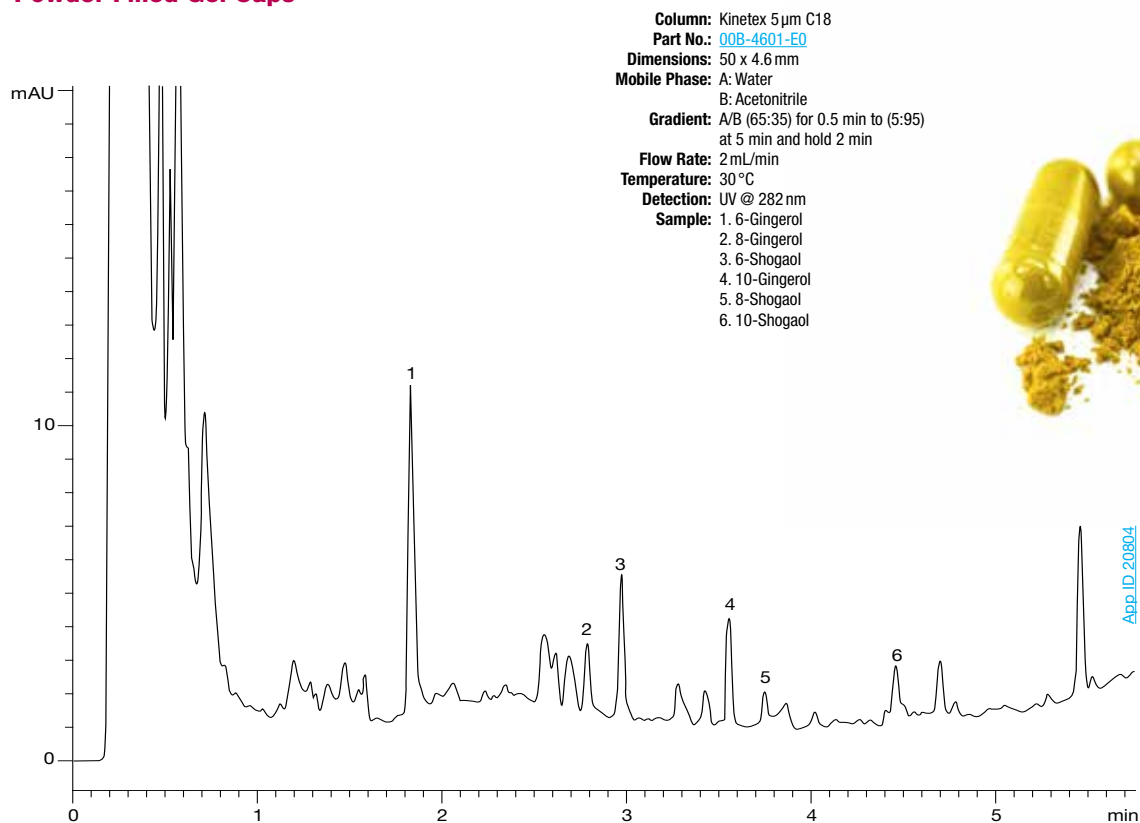
Column: Kinetex 5 µm C18
Part No.: 00B-4601-E0
Dimensions: 50 x 4.6 mm
Mobile Phase: A: Water
 B: Acetonitrile
Gradient: A/B (65:35) for 0.5 min to (5:95) at 5 min and hold 2 min
Flow Rate: 2 mL/min
Temperature: 30 °C
Detection: UV @ 282 nm
Backpressure: 81 Bar
Sample: 1. 6-Gingerol
 2. 8-Gingerol
 3. 6-Shogaol
 4. 10-Gingerol
 5. 8-Shogaol
 6. 10-Shogaol

App ID 20799

Liquid Filled Gel Caps



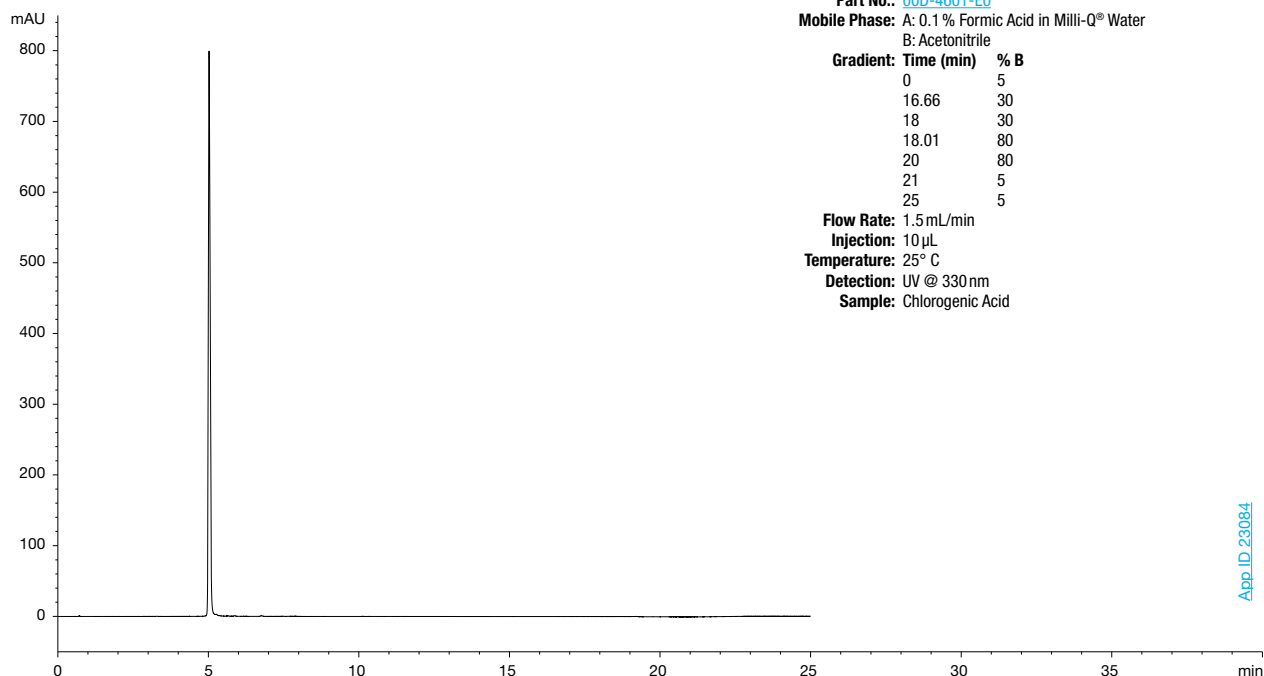
Powder Filled Gel Caps



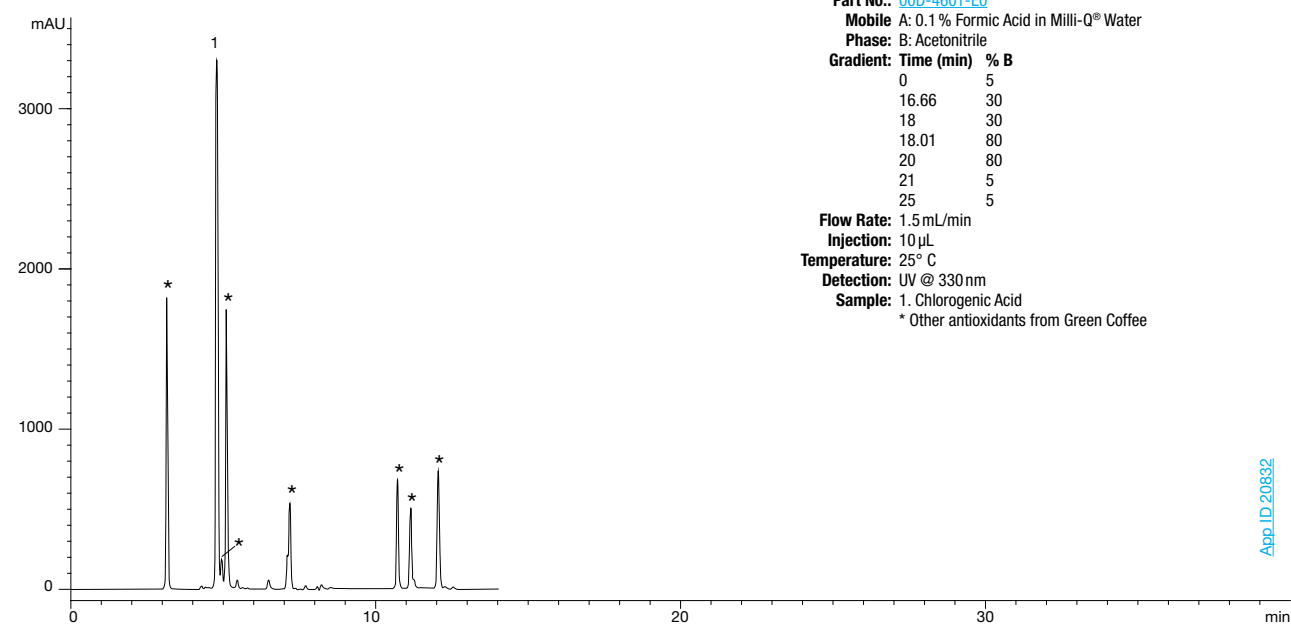
Chlorogenic Acids

by LC/UV

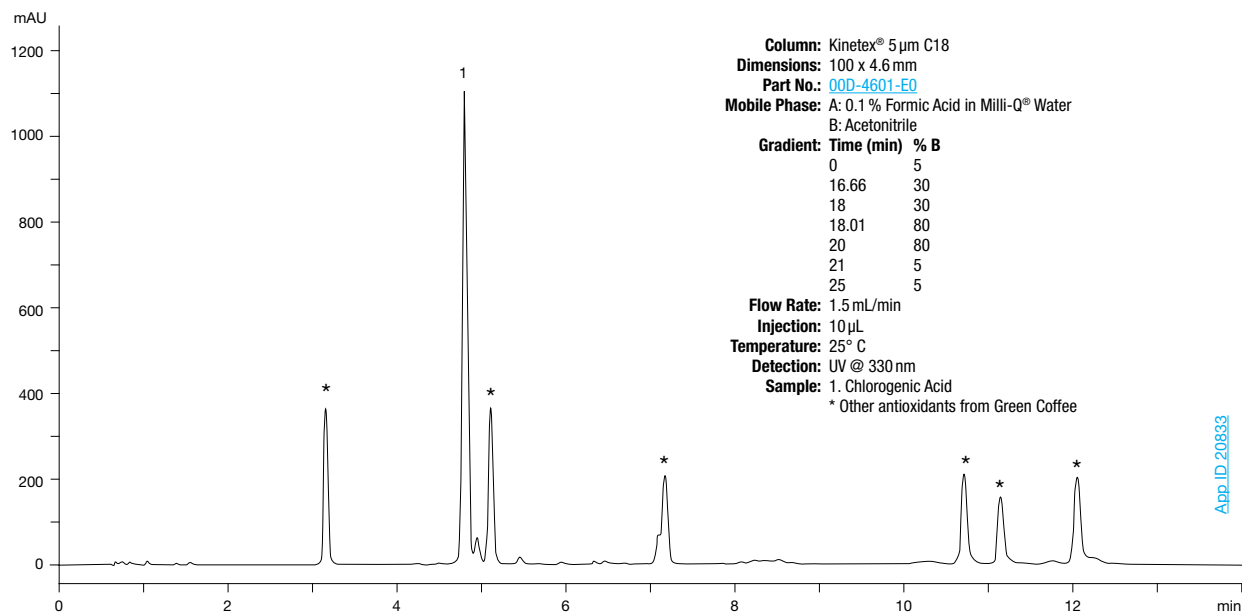
Standard



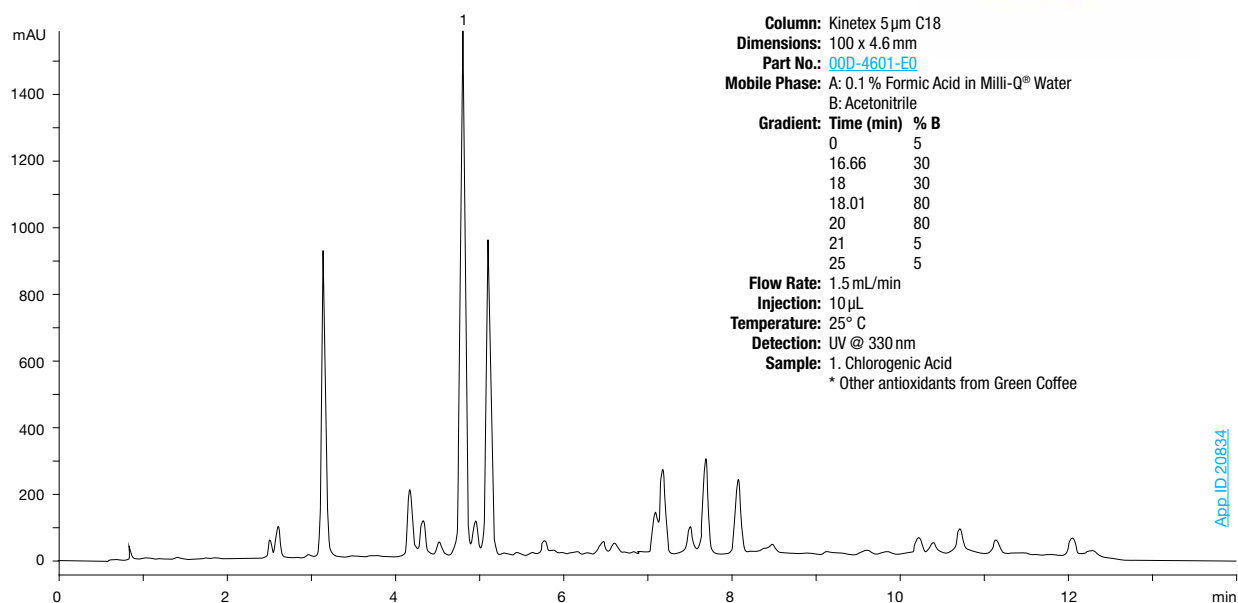
Green Coffee Extract



Green Coffee Energy Drink



Green Coffee Brewed Coffee



Ginseng — Ginsenosides

by LC/UV

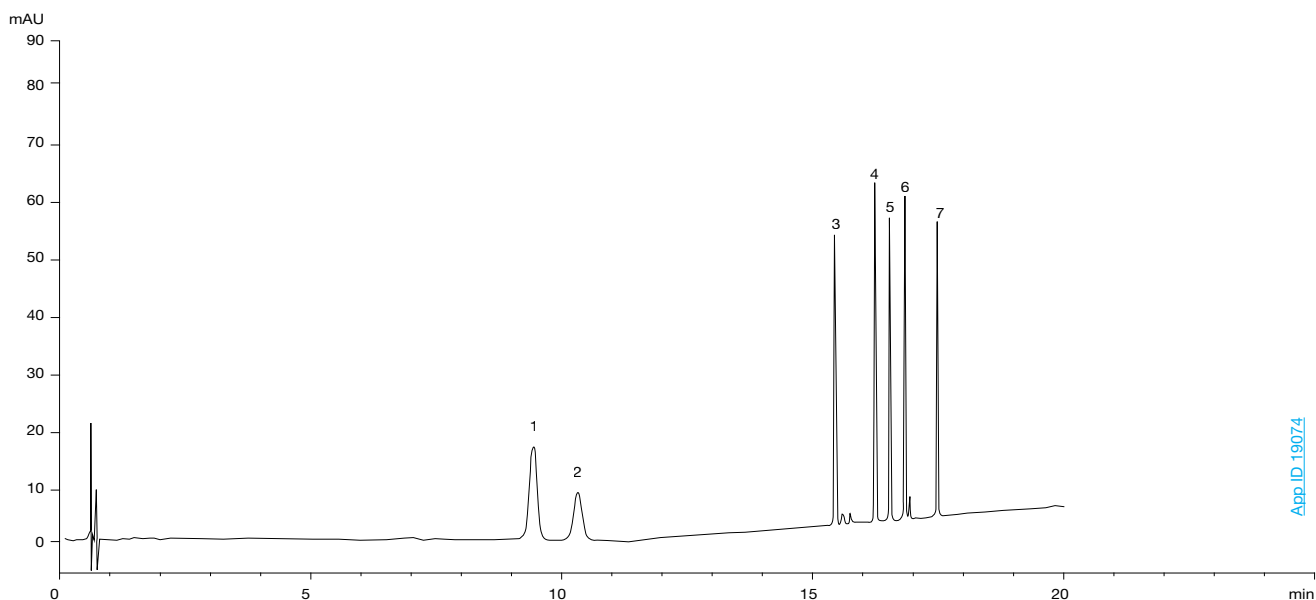
Column: Kinetex® 2.6µm C18
Dimensions: 100 x 4.6 mm
Part No.: [00D-4462-E0](#)
Mobile Phase: A: 0.1 % Phosphoric Acid in Water
B: Acetonitrile
Gradient:

Time (min)	% B
0	22
10	22
20	50

Flow Rate: 1.0 mL/min
Temperature: 30 °C
Detection: UV @ 200 nm
Sample: 1. Ginsenoside Rg1
2. Ginsenoside Re
3. Ginsenoside Rf
4. Ginsenoside Rb1
5. Rebaudioside Rc
6. Ginsenoside Rb 1
7. Ginsenoside Rd



Standard



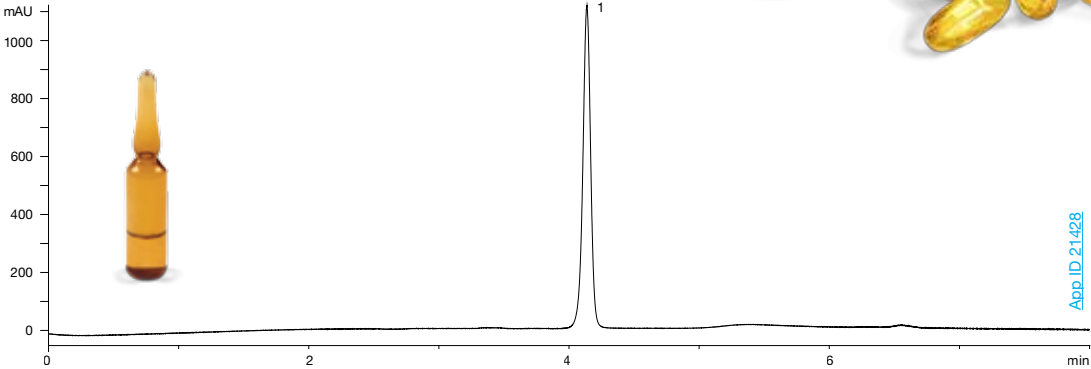
App ID 19074

Ascorbic Acid

by LC/UV



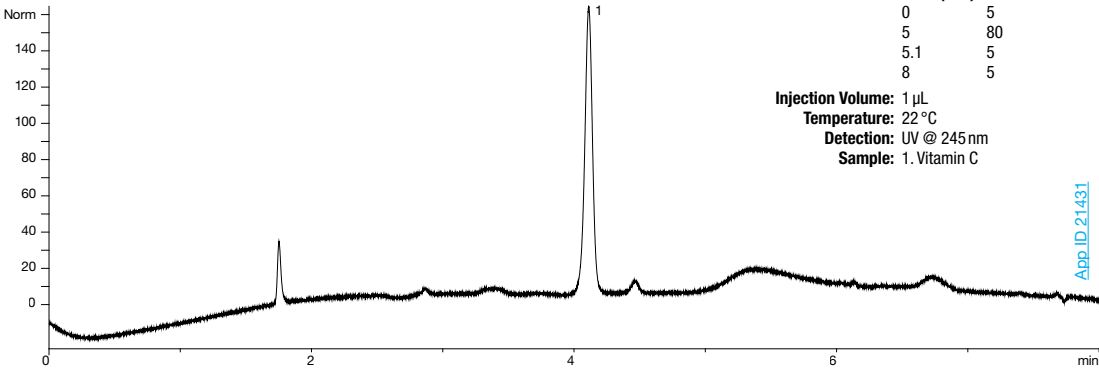
Standard (1000 µg/mL)



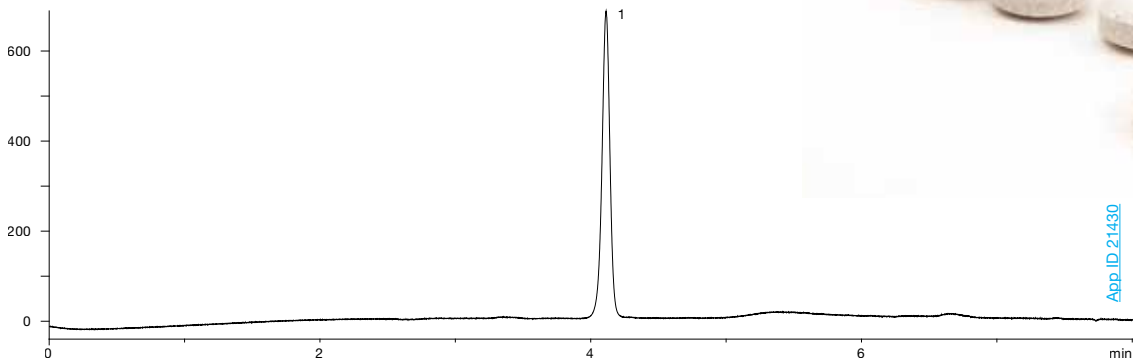
Conditions for all separations:

Column: Gemini® 3 µm C18
Dimensions: 150 x 4.6 mm
Part No.: 00F-4439-E0
Mobile Phase: A: 0.1 % Formic acid in Water
B: Methanol
Flow Rate: 600 µL/min
Gradient: Time (min) % B
0 5
5 80
5.1 5
8 5
Injection Volume: 1 µL
Temperature: 22 °C
Detection: UV @ 245 nm
Sample: 1. Vitamin C

Commercial Soft-Gel Formulation



Commercial Tablet Formulation



Hypericin and Pseudohypericin

St. Johns Wort

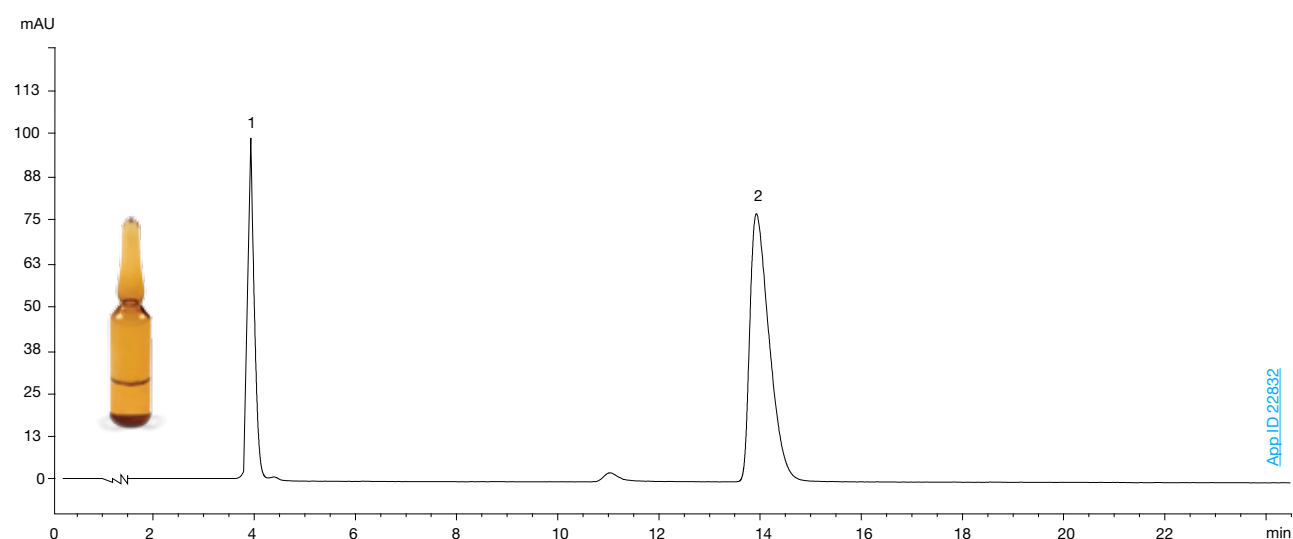
by LC/UV

Conditions for both separations:

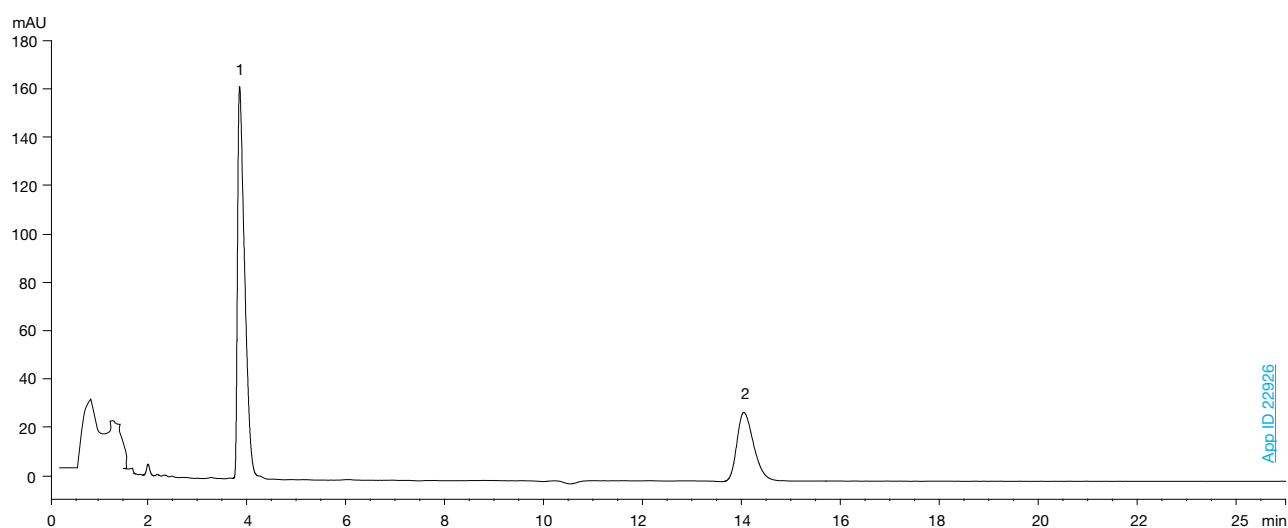
Column: Luna® 5 µm C18(2) 100 Å
Dimensions: 150 x 4.6 mm
Part No.: 00F-4252-EQ
Mobile Phase: Acetonitrile/Methanol/0.1 M Ammonium acetate
(50:30:20)
Flow Rate: 1.5 mL/min
Temperature: Ambient
Detection: UV @ 590 nm
Sample: 1. Pseudohypericin
2. Hypericin



Standard



Extract

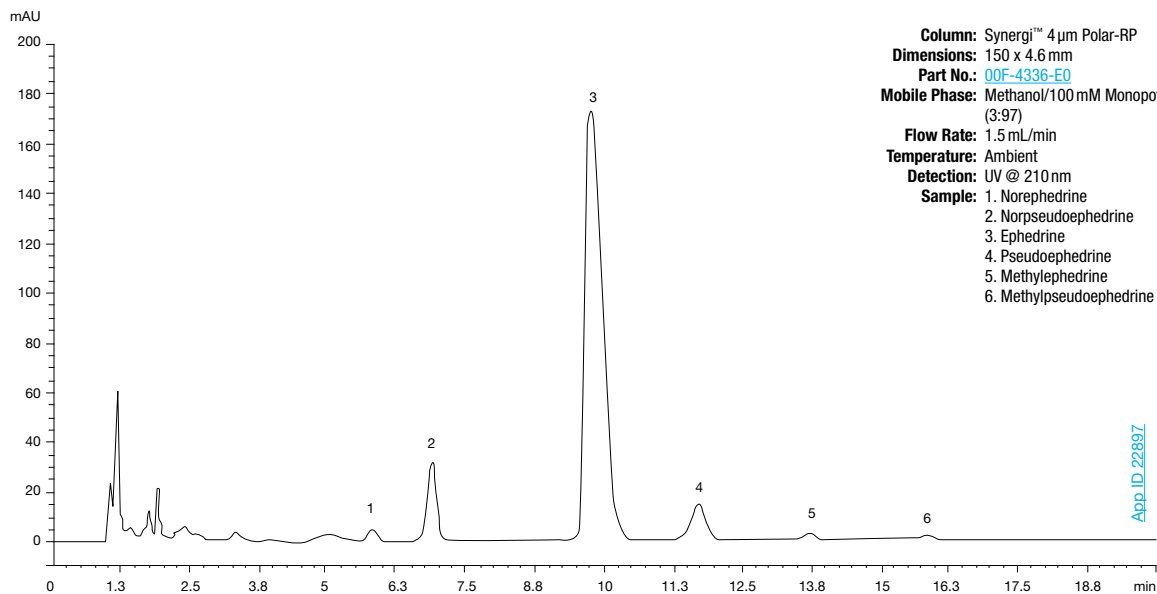


Ephedrine Alkaloids

by LC/UV



Extract

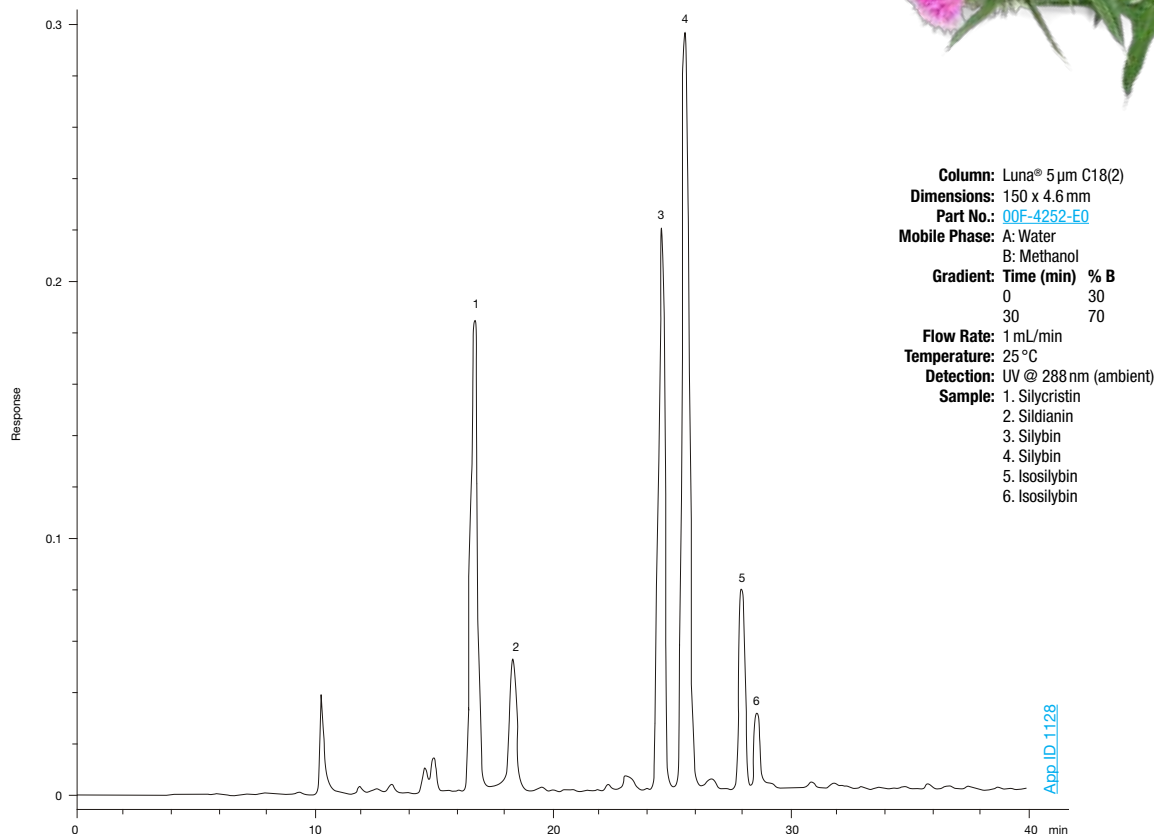


Milk Thistle

by LC/UV



Extract

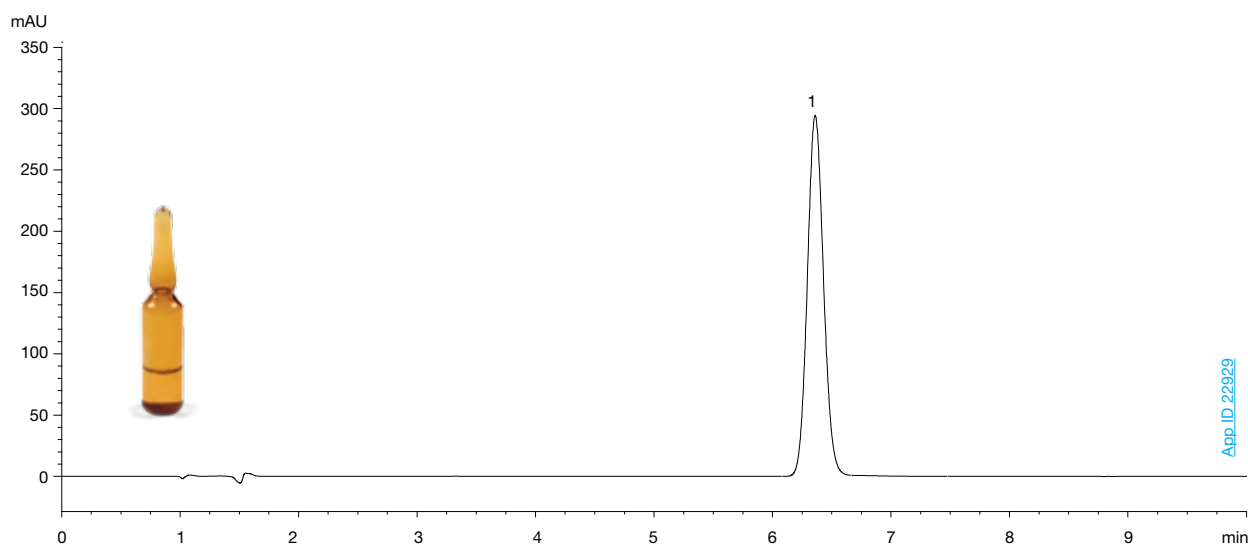
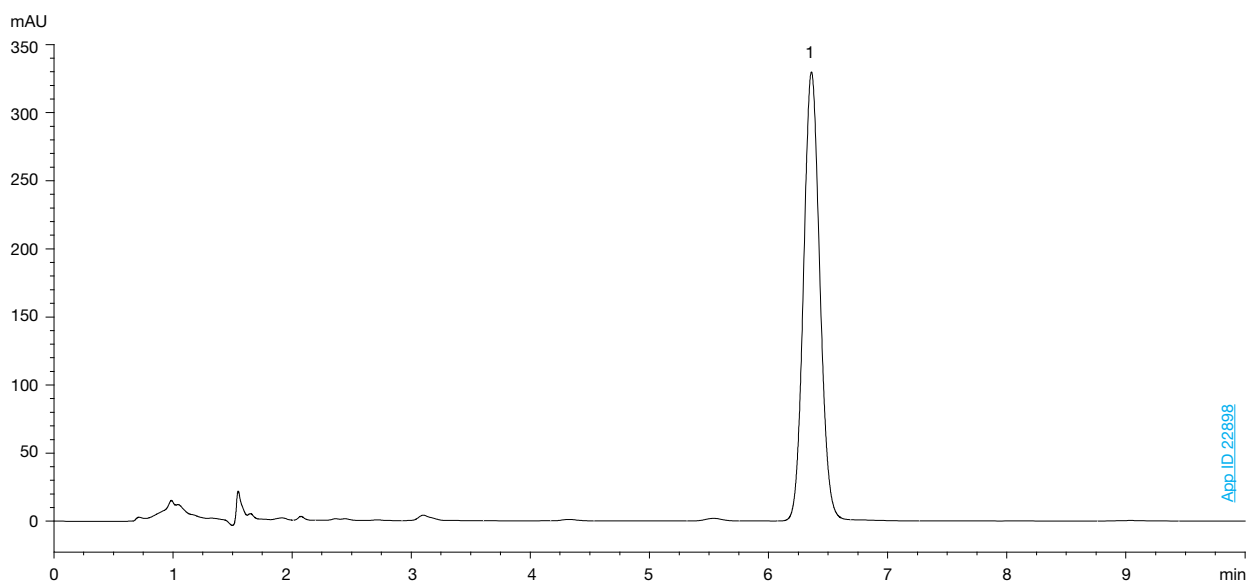


Caffeine

by LC/UV

Conditions for both separations:

Column: Synergi™ 4 µm Max-RP
Dimensions: 150 x 4.6 mm
Part No.: 00F-4337-E0
Mobile Phase: Acetonitrile/50 mM Sodium acetate (10:90)
Flow Rate: 1.5 mL/min
Temperature: Ambient
Detection: UV @ 273 nm
Sample: 1. Caffeine

**Standard****Extract**

Catechins

by LC/UV

Conditions for both separations:

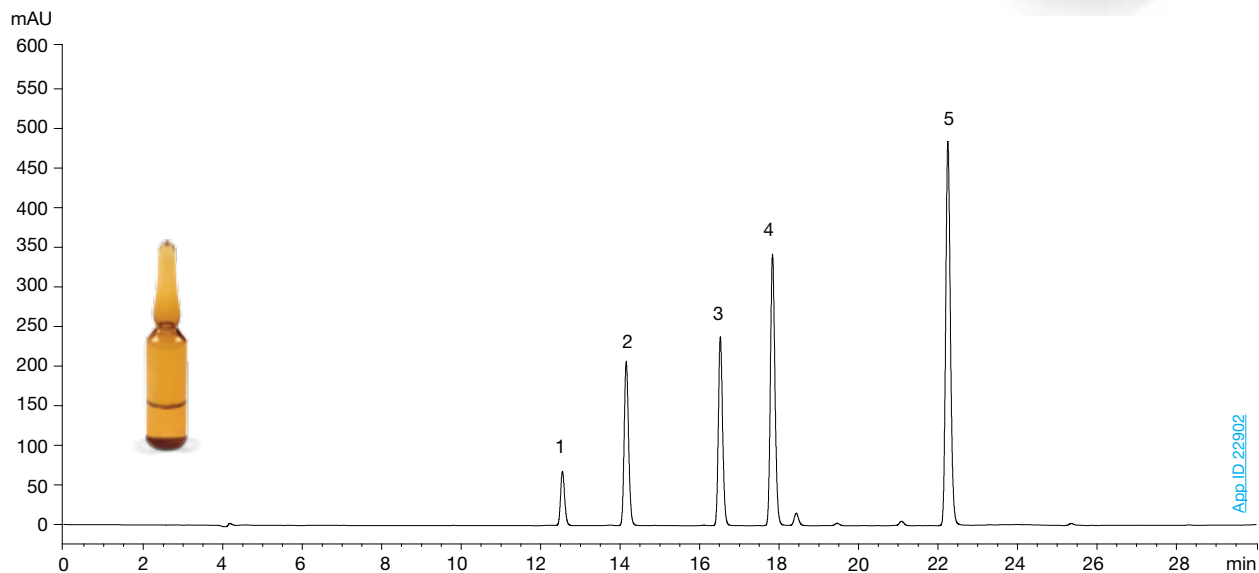
Column: Luna® 5 µm Phenyl-Hexyl
Dimensions: 250 x 4.6 mm
Part No.: 00G-4257-E0
Mobile Phase: A: 0.1 % Phosphoric Acid in Water
 B: Acetonitrile
Gradient:

Time (min)	% B
0	5
30	35

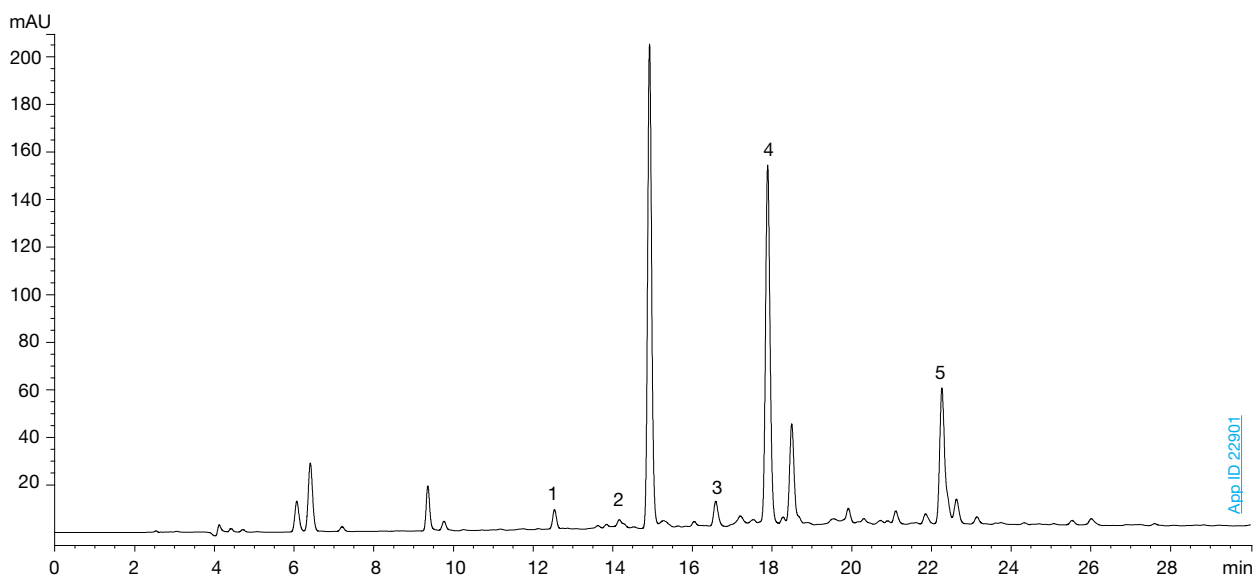
Flow Rate: 1 mL/min
Temperature: 35 °C
Detection: UV @ 278 nm (ambient)
Sample: 1. Epigallocatechin
 2. Catechin
 3. Epicatechin
 4. Epigallocatechin Gallate
 5. Epicatechin Gallate



Standard



Extract

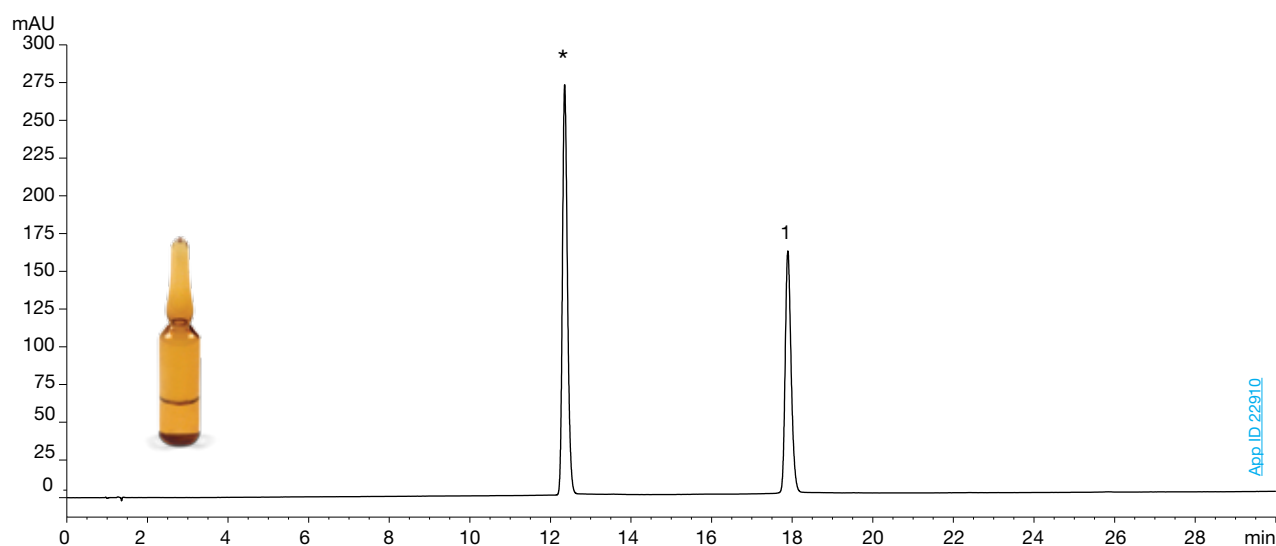
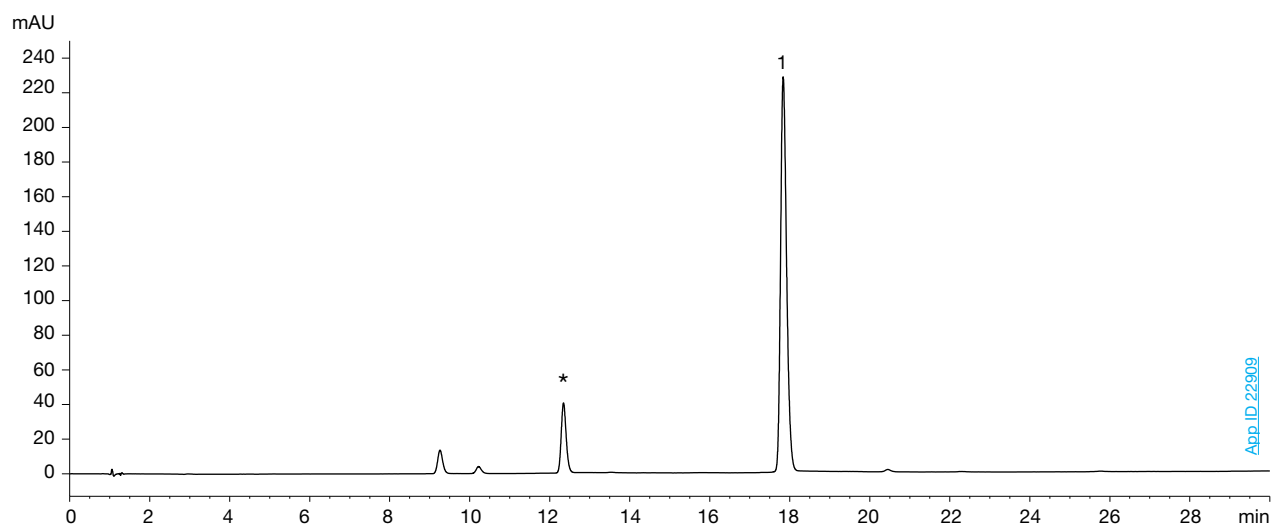


Hydroxytryptophan

by LC/UV

Conditions for both separations:**Column:** Luna® 5 µm C18(2)**Dimensions:** 150 x 4.6 mm**Part No.:** 00F-4252-E0**Mobile:** A: Water/Methanol/H₃PO₄ + 10 mM HSA (95:5:0.2)**Phase:** B: Water/Methanol/H₃PO₄ + 10 mM HSA (50:50:0.2)

Gradient:	Time (min)	% B
	0	0
	30	100

Flow Rate: 1.5 mL/min**Temperature:** 25 °C**Detection:** UV @ 280 nm (ambient)**Sample:** 1. 5-Hydroxytryptophan
* Pyridoxine HCl**Standard****Extract**

Pantothenic Acid

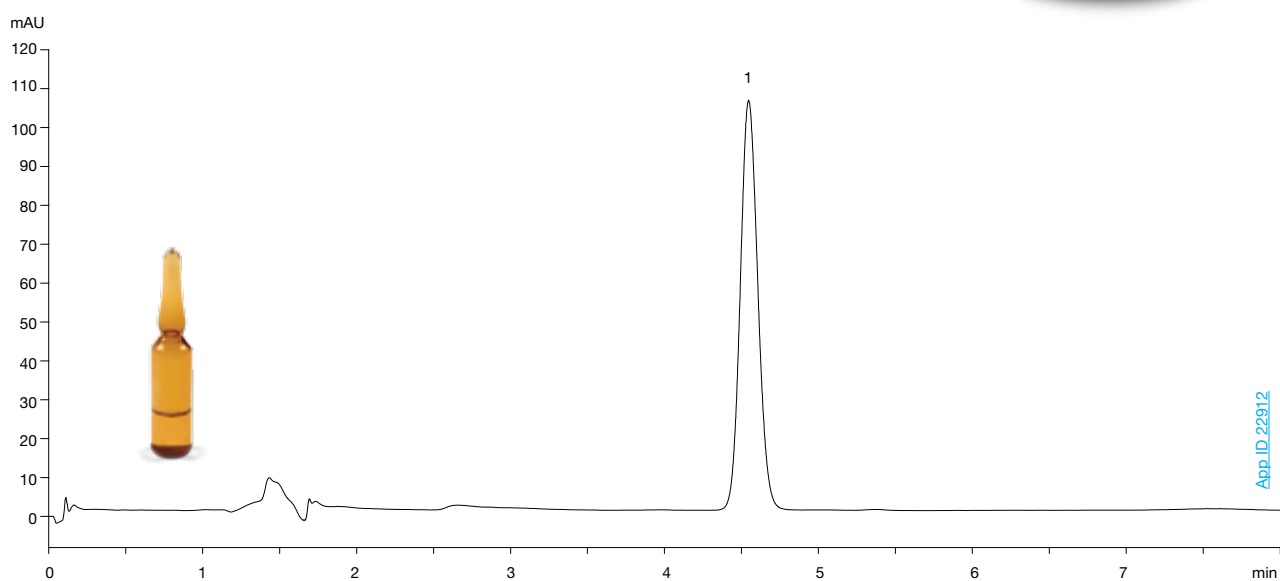
by LC/UV

Conditions for both separations:

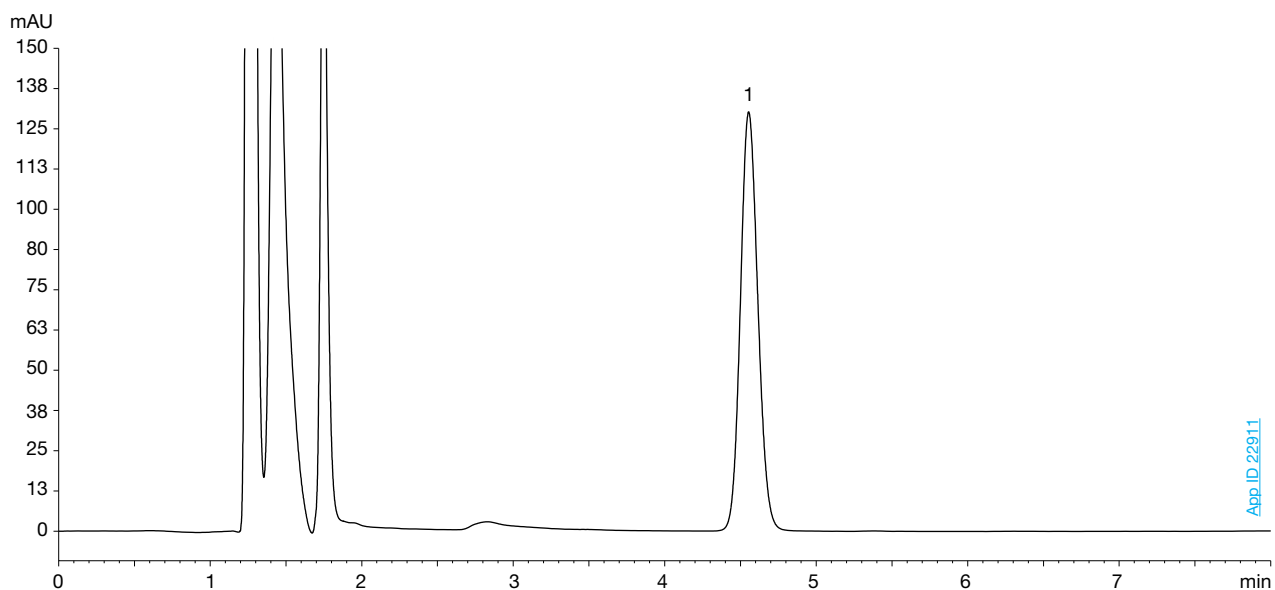
Column: Synergi™ 4 µm Hydro-RP
Dimensions: 150 x 4.6 mm
Part No.: [00F-4375-EO](#)
Mobile Phase: Acetonitrile / Water / Phosphoric Acid, 85 % (3:97:0.1)
Flow Rate: 1.5 mL/min
Temperature: Ambient
Detection: UV @ 210 nm
Sample: 1. Pantothenic Acid



Standard



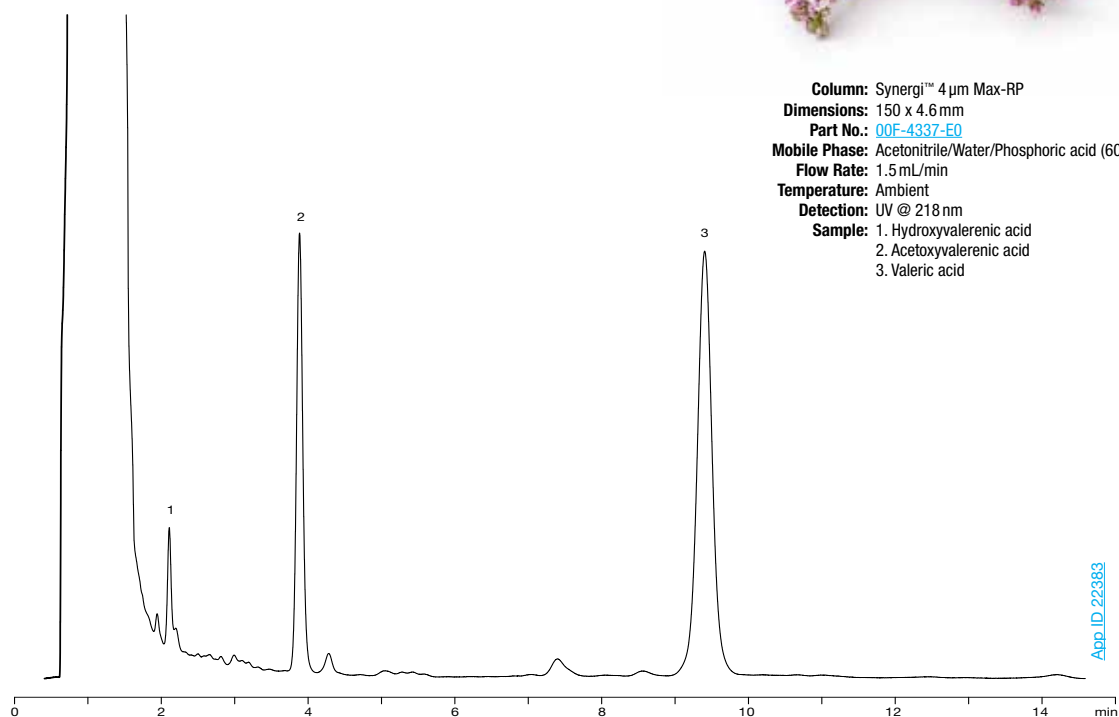
Extract



Valerian

by LC/UV

Extract



Column: Synergi™ 4 µm Max-RP
Dimensions: 150 x 4.6 mm
Part No.: [00F-4337-E0](#)
Mobile Phase: Acetonitrile/Water/Phosphoric acid (60:40:0.1)
Flow Rate: 1.5 mL/min
Temperature: Ambient
Detection: UV @ 218 nm
Sample: 1. Hydroxyvalerenic acid
 2. Acetoxyvalerenic acid
 3. Valeric acid

App ID: 22383

Echinacea

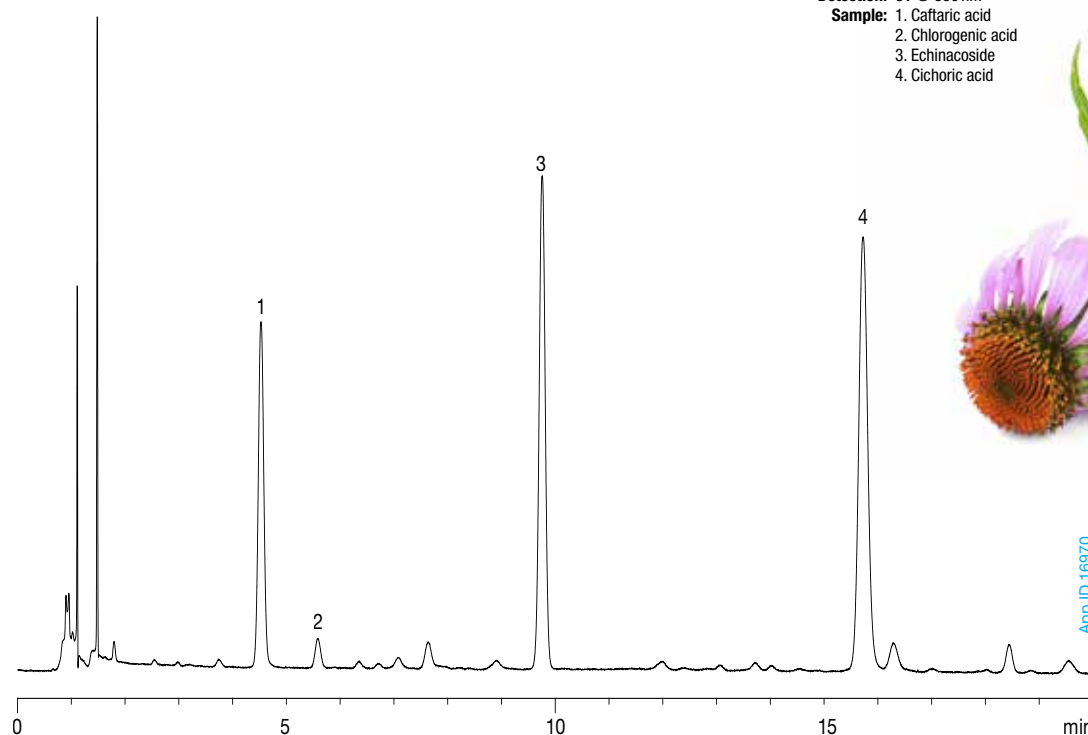
by LC/UV

Extract

Column: Synergi™ 4 µm Hydro-RP
Dimensions: 150 x 4.6 mm
Part No.: [00F-4375-E0](#)
Mobile Phase: A: 0.1 % Phosphoric acid in Water
 B: 0.1 % Phosphoric acid in Acetonitrile
Gradient:

Time (min)	% B
0	10
20	25

Flow Rate: 1.5 mL/min
Temperature: Ambient
Detection: UV @ 330 nm
Sample: 1. Caftaric acid
 2. Chlorogenic acid
 3. Echinacoside
 4. Cichoric acid



App ID: 16970

Pre-Workout Powder Components

by LC/UV

Sample Prep

10 mg of Pre-Workout powder was dissolved into 1 mL of DI water and vortexed for 1 minute at 3000 rpm to ensure the sample was fully dissolved. The samples were then diluted to a concentration of 2.5 mg/mL with DI water for HPLC injection.

For complete technical note visit:

www.phenomenex.com/Search

Search:

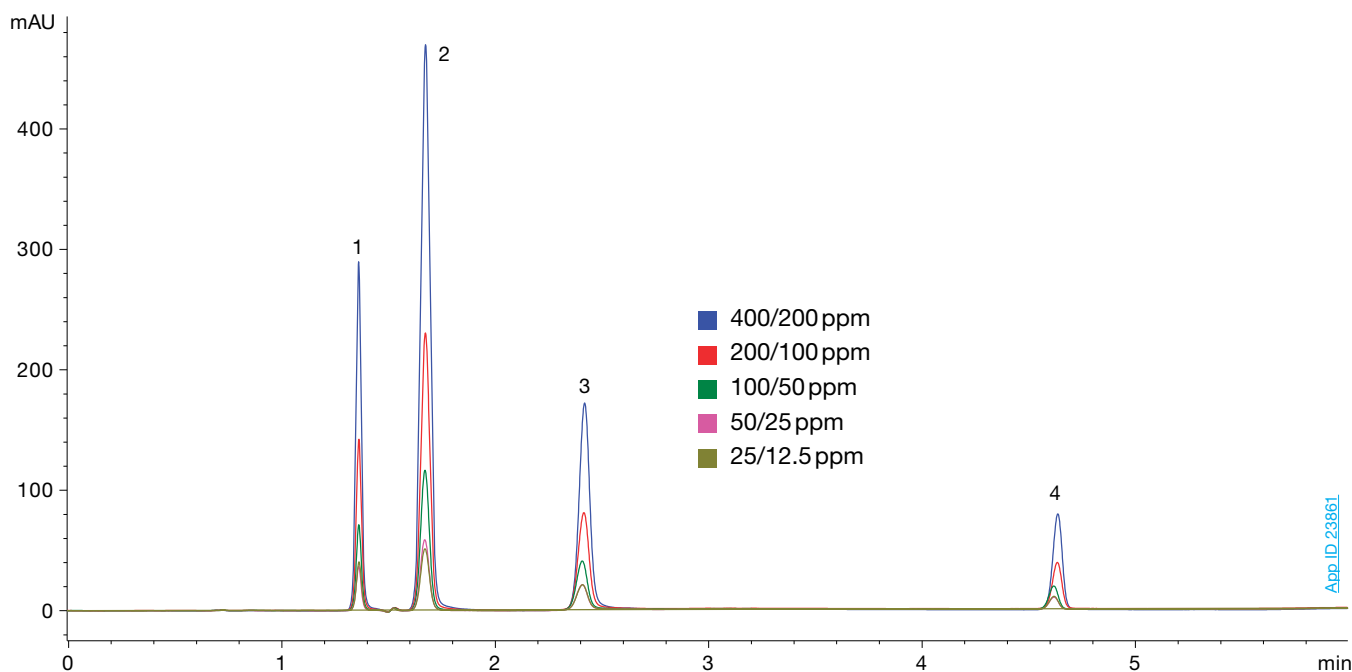


LC Conditions

Column: Luna® 3 µm HILIC 200Å
Dimensions: 150 x 4.6 mm
Part No.: 00F-4449-E0
Mobile Phase: A: 1 mM Sodium Acetate pH 5.5 (pH Adjusted with acetic acid)
B: Acetonitrile
Gradient:

Time (min)	% B
0	90
4	71
6	49

Flow Rate: 1.5 mL/min
Temperature: 35°C
Detector: UV/Vis @ 218 nm (Bandwidth 4 nm) (ambient)
Injection: 1 µL (in water)
Analytes:
1. Caffeine (200 ppm)
2. Dicyandiamide (200 ppm)
3. Creatinine (400 ppm)
4. Creatine (400 ppm)



App ID 23861

Cobalamins (Vitamin B12) from Dietary Supplements

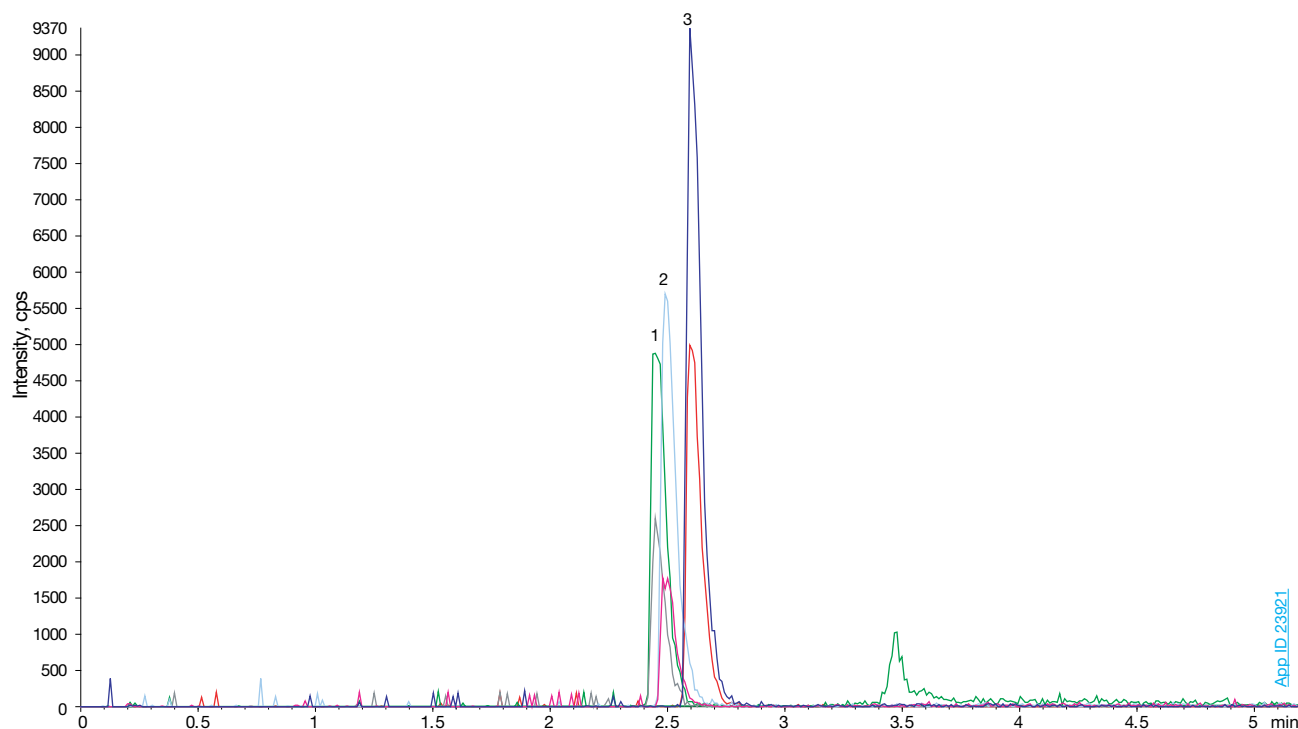
by LC/MS/MS

Column: Synergi™ 2.5 µm Fusion-RP
Dimensions: 50 X 2.0 mm
Part No.: 00B-4423-B0
SecurityGuard™ Cartridge: AJ0-7844
Mobile Phase: A: 10 mM Ammonium Formate pH 3.5
 B: Methanol
Gradient:

Time (min)	% B
0	2
0.2	2
1.8	98
4	98
4.01	2
5.5	2

Flow Rate: 350 µL/min
Inj. Volume: 10 µL
Temperature: 21 °C
Detection: Tandem Mass Spectrometer MS/MS (ESI+) (600 °C)
Instrument: SCIEX Triple Quad™ 4500 and SCIEX 4000 QTRAP®
Sample:

1. Cyanocobalamin (CNB12)
2. Adenosylcobalamin (AdoB12)
3. Methylcobalamin (MeB12)



For complete technical note visit:

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Search:



Vitamin B12 from Pill Formulation

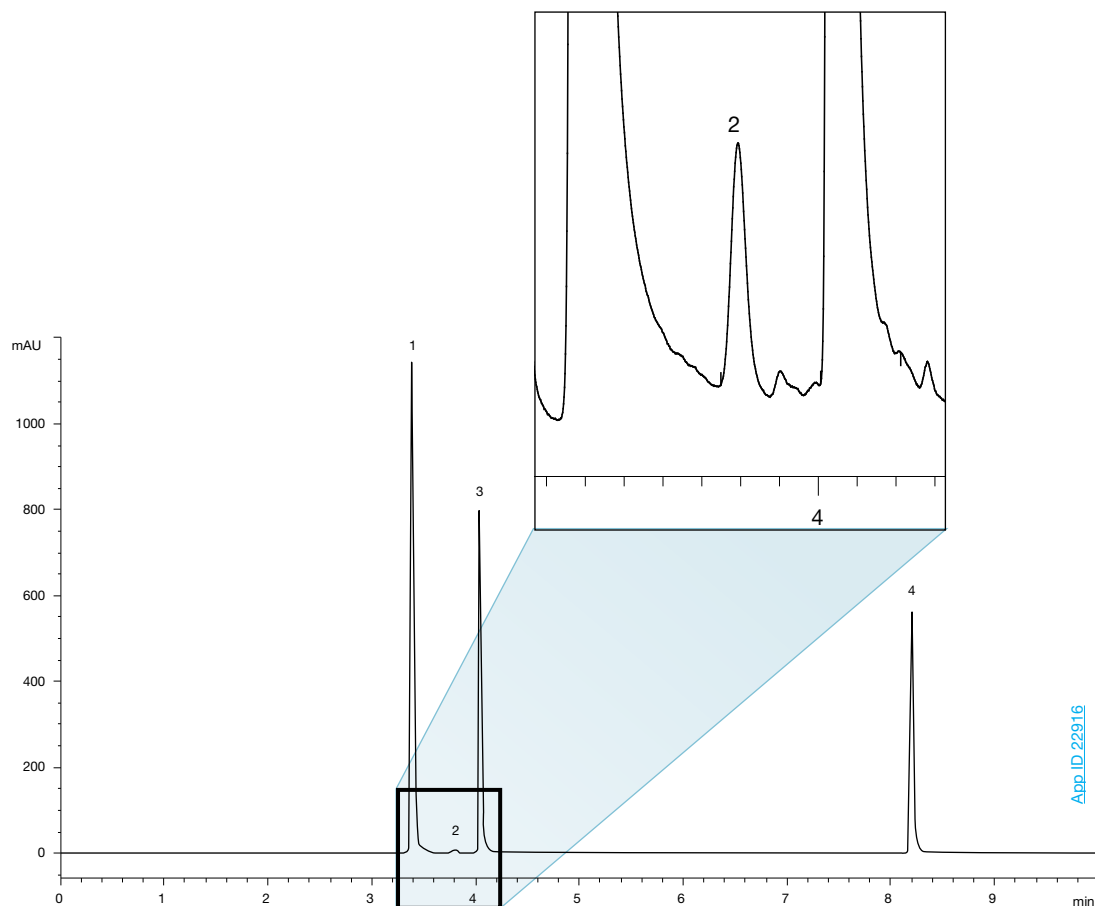
by LC/UV

Column: Kinetex® 5µm EVO C18
Dimensions: 150 x 4.6 mm
Part No.: 00F-4633-E0
Mobile Phase: A: 3 g of Sodium 1-Hexanesulfonate monohydrate with 0.4 mL Triethylamine with 15 mL of Acetic acid into 1985 mL of Milli-Q® Water
B: Acetonitrile
Gradient:

Time (min)	% B
0	5
10	98
12	98
12.1	5
15	5

Flow Rate: 1 mL/min
Inj. Volume: 2 µL
Temperature: Ambient
Detection: UV @ 278 nm
Sample:

1. Vitamin B₆
2. Vitamin B₁₂
3. Vitamin B₁
4. Diclofenac



Vitamin E

by LC/UV

Column: Kinetex® 2.6 µm F5

Dimensions: 150 x 4.6 mm

Part No.: 00F-4723-E0

Mobile Phase: A: Water
B: Methanol

Gradient	Time (min)	% B
	0	85
	1	85
	15	100
	17	100
	18	85
	23	85

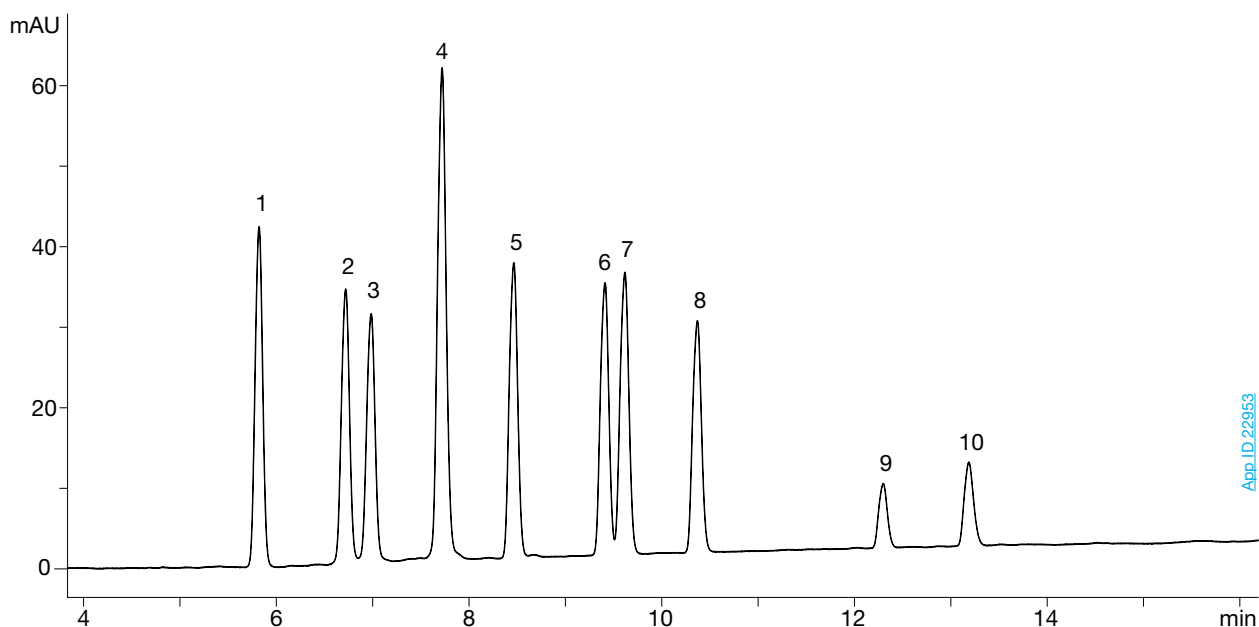
Flow Rate: 1.2 mL/min

Temperature: 42 °C

Detection: UV @ 290 nm

Sample:

1. Delta Tocotrienol	6. Beta Tocopherol
2. Beta Tocotrienol	7. Gamma Tocopherol
3. Gamma Tocotrienol	8. Alpha Tocopherol
4. Alpha Tocotrienol	9. Vitamin E Acetate
5. Delta Tocopherol	10. Tocopherol Nicotinate

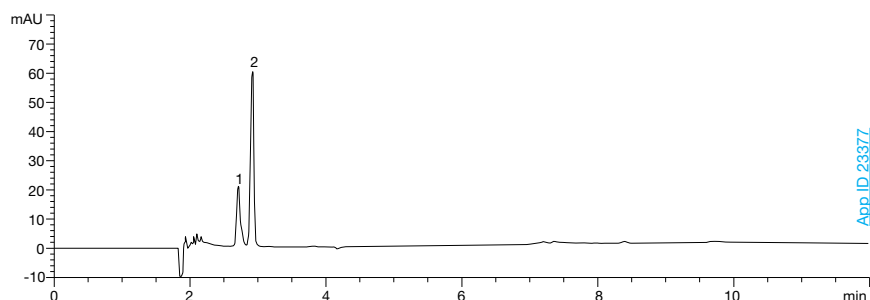


App ID 22953

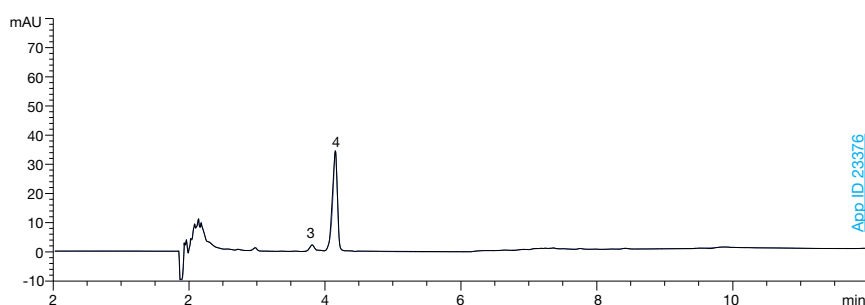
Vitamin A and E Analysis from Infant Formula

by LC-UV / LC-FLD

Enfamil® infant formula (liquid)—Vitamin A forms (UV)



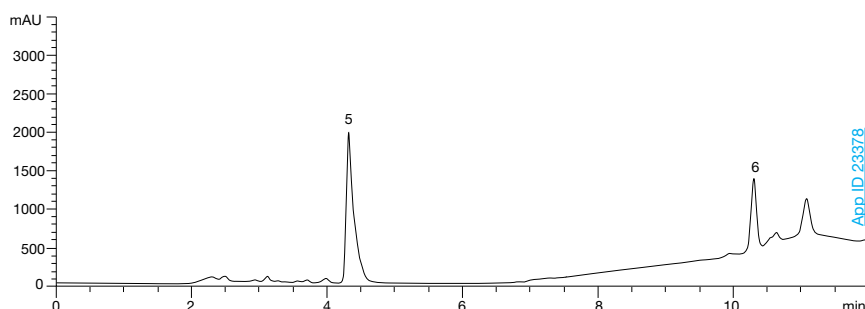
Gerber® infant formula (powder)—Vitamin A forms (UV)



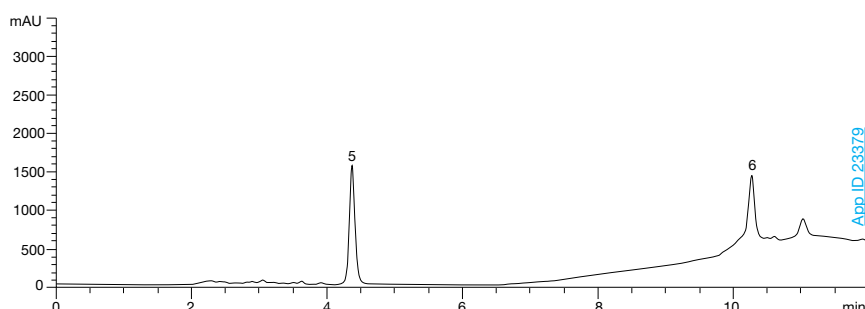
For complete technical note visit:
www.phenomenex.com/Search

Search:

Enfamil infant formula (liquid)—Vitamin E forms (FLD)



Gerber infant formula (powder)—Vitamin E forms (FLD)



LC Conditions

Column: Luna® 3 µm NH₂
Dimensions: 150 x 4.6 mm
Part No.: [00F-4377-E0](#)
Mobile Phase: A: Hexane
 B: Hexane with 50% MTBE
Gradient:

Time (min)	% B
0	0
3	0
8	100
12	100

Flow Rate: 1.0 mL/min
Injection: 50 µL
Temperature: Ambient
Detection UV: 325 nm
Detection FLD: 280/310 nm (emission/excitation)
Sample:

1. Vitamin A Palmitate isomer
2. Vitamin A Palmitate
3. Vitamin A Acetate isomer
4. Vitamin A Acetate
5. Vitamin E Acetate
6. Vitamin E

Water Soluble Vitamins

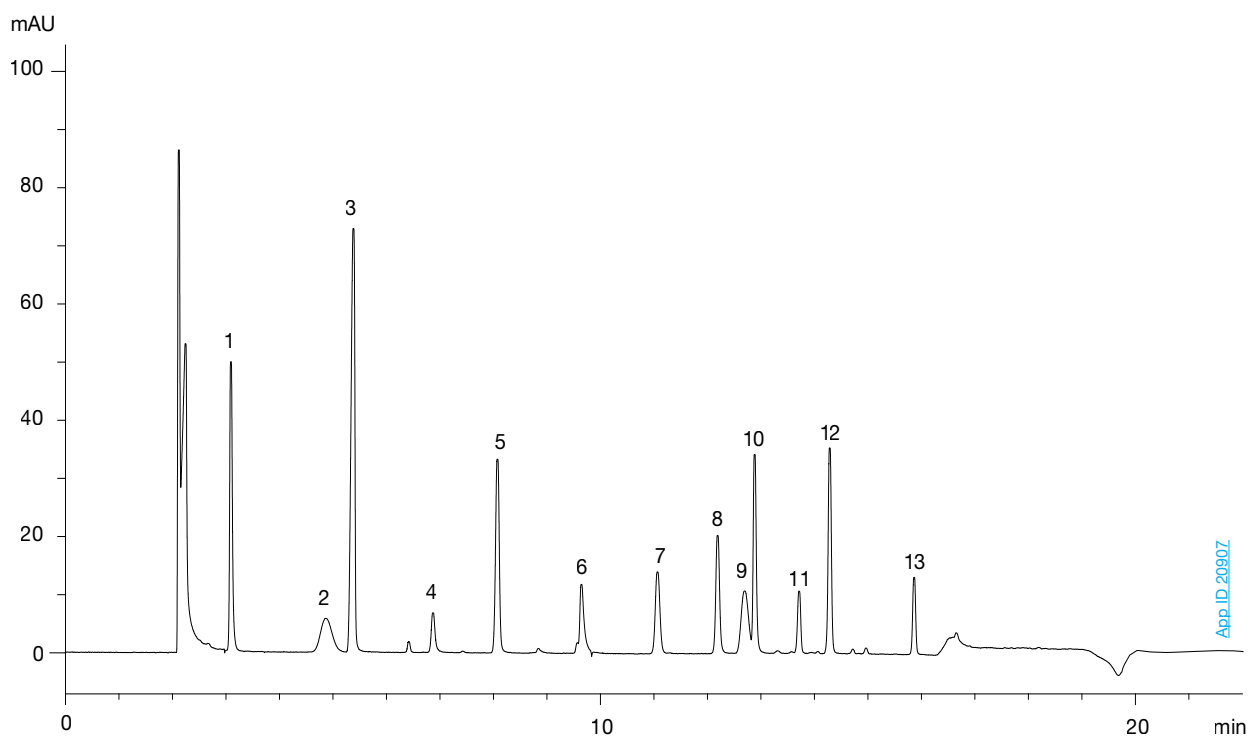
by LC/UV

Column: Kinetex® 2.6 µm C18
Dimensions: 150 x 4.6 mm
Part No: 00F-4462-E0
Mobile Phase: A: 3 g Sodium 1-hexanesulfonate monohydrate/0.4 mL Triethylamine/15 mL Acetic acid in 1985 mL Water
 B: Methanol
Gradient:

Time (min)	% B
0	5
12	47
12.1	98
15	98
15.1	5
22	5

Flow Rate: 0.5 mL/min
Temperature: 25 °C
Detection: UV @ 270 nm (Ambient)
Sample:

1. Ascorbic acid
2. Pyridoxal 5'-phosphate (PLP)
3. Nicotinic acid
4. 4-Pyridoxic acid (4-PA)
5. Nicotinamide
6. Riboflavin 5'-phosphate
7. Pyridoxal (PL)
8. Pyridoxine (PN)
9. Cobalamine
10. Folic Acid
11. Pyridoxamine (PM)
12. Riboflavin (Vitamin B2)
13. Thiamine (Vitamin B1)



App ID 20907

Water Soluble Vitamins

by UHPLC/MS/MS

Conditions for all separations:

Columns: Luna® Omega 1.6 µm Polar C18

Dimension: 50 x 2.1 mm

Part No.: [00B-4748-AN](#)

Mobile Phase: A: 10 mM Ammonium Formate with 0.1 % Formic Acid
B: Acetonitrile with 0.1 % Formic Acid

Gradient:	Time (min)	% B
	0	0
	4	90
	4.1	0
	7	0

Flow Rate: 0.4 mL/min

Temperature: 40 °C

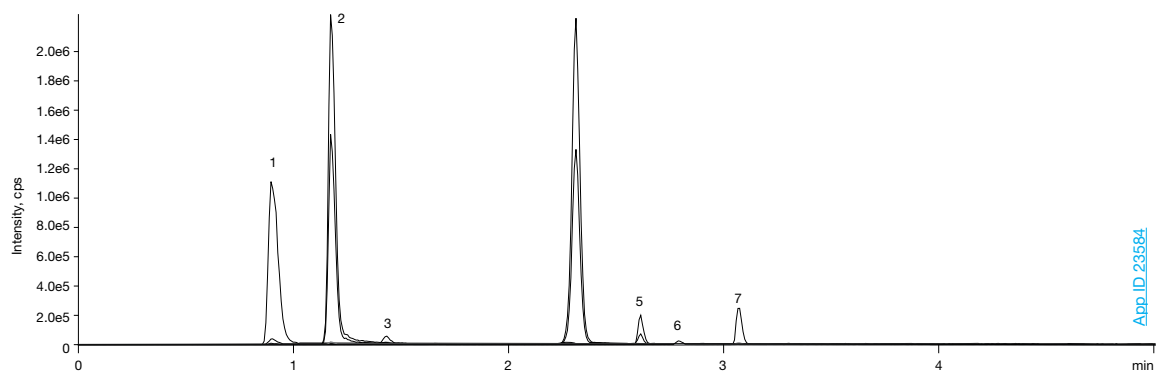
Detection: Tandem Mass Spec (MS/MS) (450 °C)

Instrument: SCIEX API 4000™

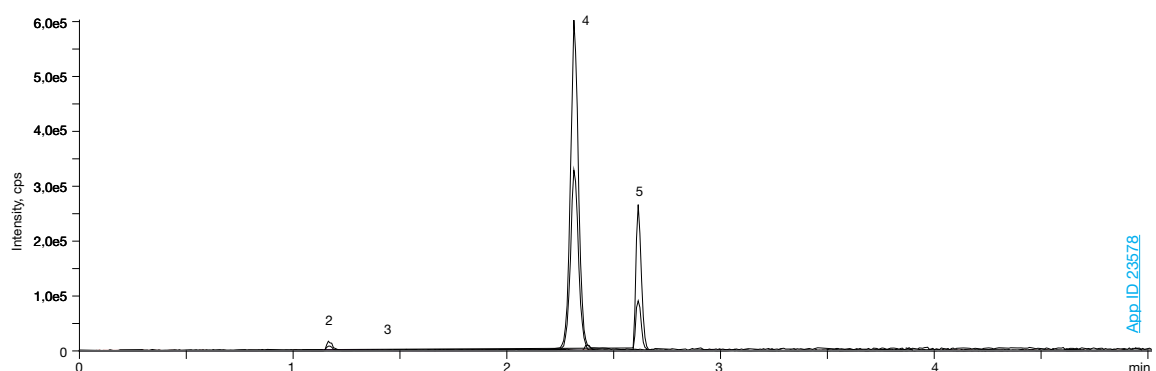
Sample:	1. Pyridoxamine	5. Pantothenic acid
	2. Thiamine	6. Folic acid
	3. Nicotinic acid	7. Riboflavin
	4. Pyridoxine	



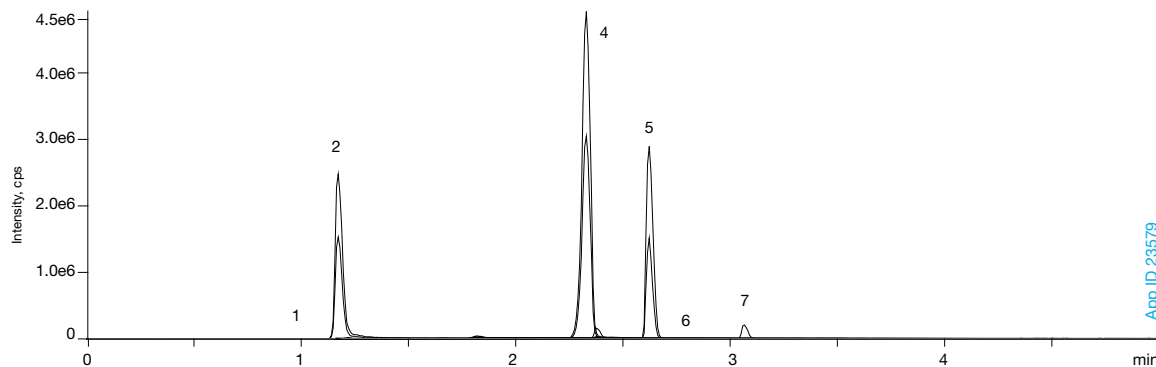
Standards



Vitamin Enriched Drink



Vitamin Tablet



Polyphenols in Wine

by LC/UV

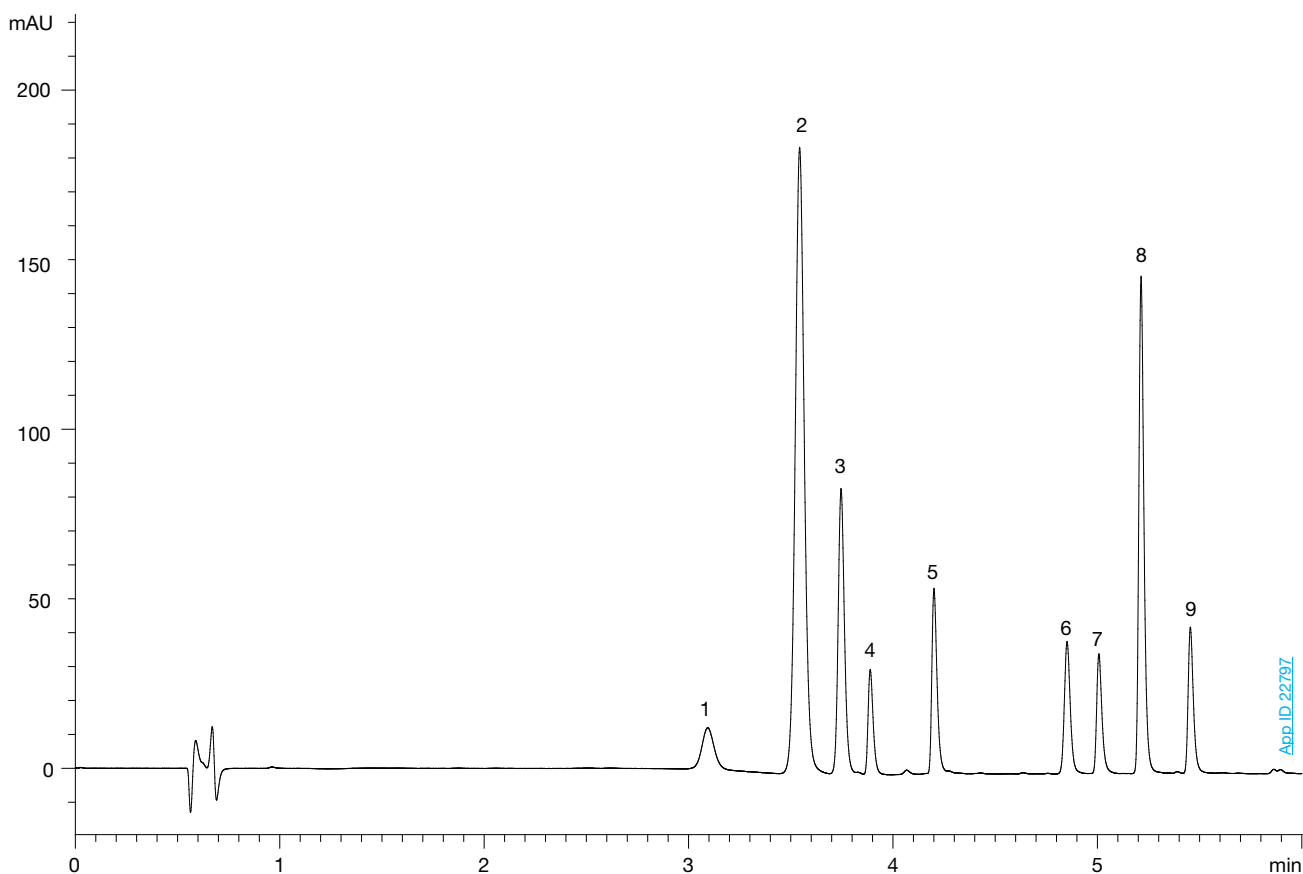


Column: Kinetex® 2.6 µm F5
Dimensions: 100 x 2.1 mm
Part No.: [00D-4723-AN](#)
Mobile Phase: A: 0.1 % TFA in Water
B: Acetonitrile
Gradient:

Time (min)	% B
0	10
5	80
6	80

Flow Rate: 0.4 mL/min
Injection Volume: 10 µL
Temperature: Ambient
Detection: UV @ 280 nm
Sample:

1. Catechin
2. p-Hydroxybenzaldehyde
3. Syringic acid
4. Epicatechin
5. Gallocatechin
6. o-Vanillin
7. Myrcetin
8. Resveratrol
9. Quercetin

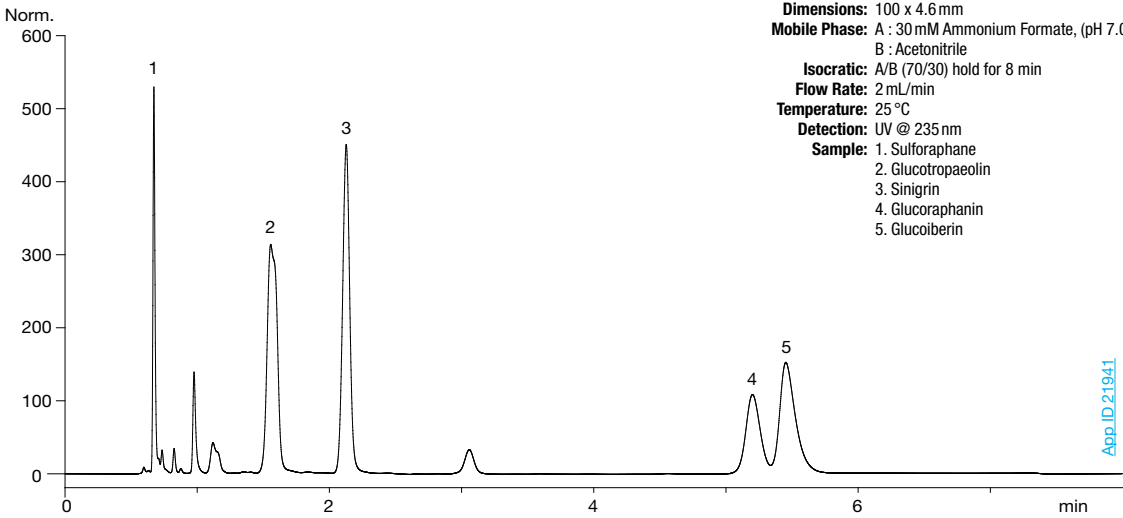


Glucosinolates in Cruciferous Vegetable Extracts

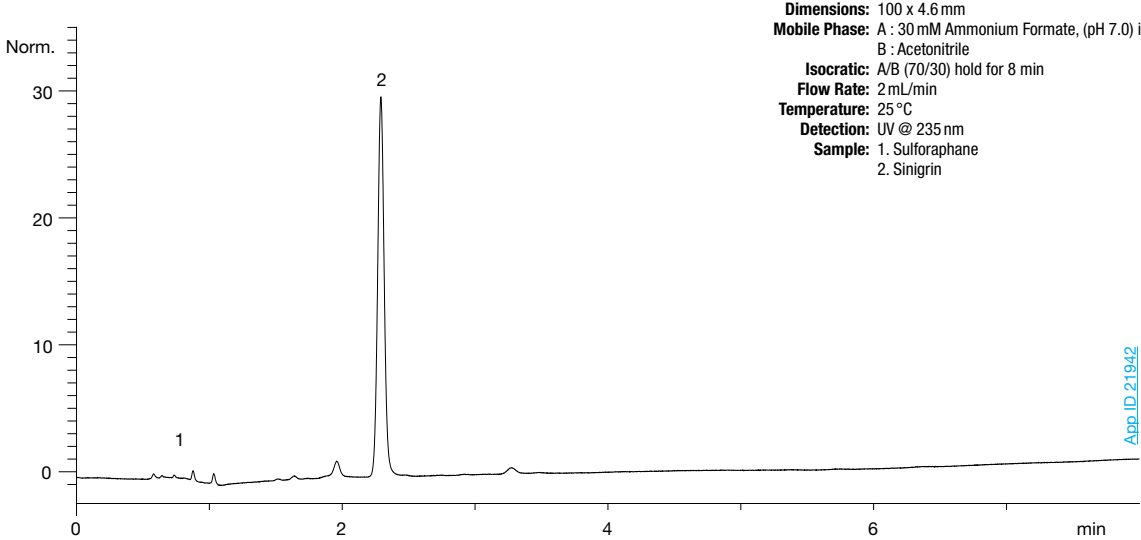
by HPLC/UV



Standard



Mustard Seed Extract



explore

LUNA[®]
OMEGA

World Renowned HPLC Media Reinvented for UHPLC!

New Luna Omega 1.6 μm

- Staggering UHPLC Efficiencies and Performance
- Extreme Ruggedness and Mechanical Strength
- Perfect Complement to Kinetex[®] Core-Shell Technology



Two Superb New Polar Selectivities for UHPLC and HPLC

- 1.6 μm Polar C18
- 5 μm Polar C18
- 1.6 μm PS C18
- 5 μm PS C18

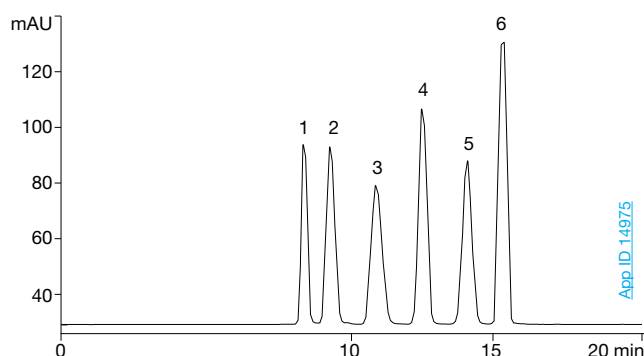
Carbohydrates/Sugars and Organic Acids

Carbohydrates are the body's most important source of energy

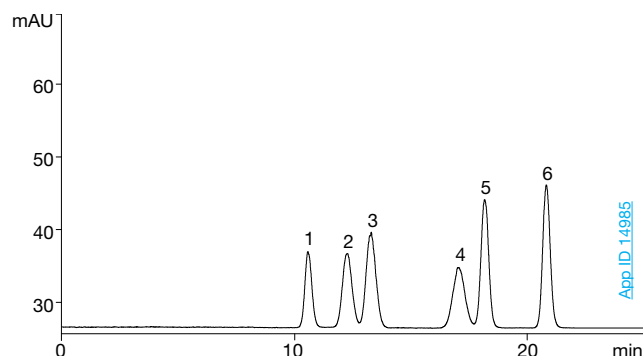
Carbohydrates/Sugars

by LC/ELSD or LC/RI

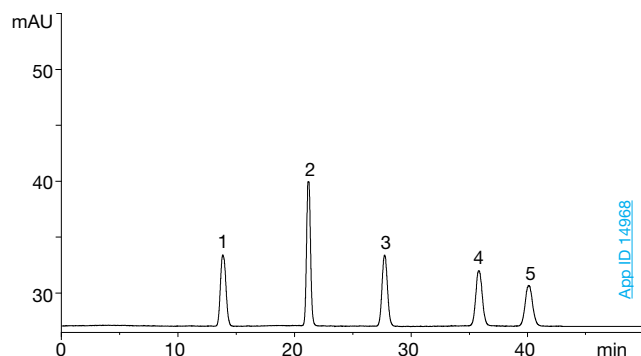
Column: Rezex™ RCM-Monosaccharide
Dimensions: 300 x 7.8 mm
Part No.: 00H-0130-K0
Mobile Phase: Water
Flow Rate: 0.6 mL/min
Temperature: 80 °C
Detection: ELSD
Sample: 1. Melezitose 4. Mannose
 2. Maltose 5. Fructose
 3. Glucose 6. Ribitol



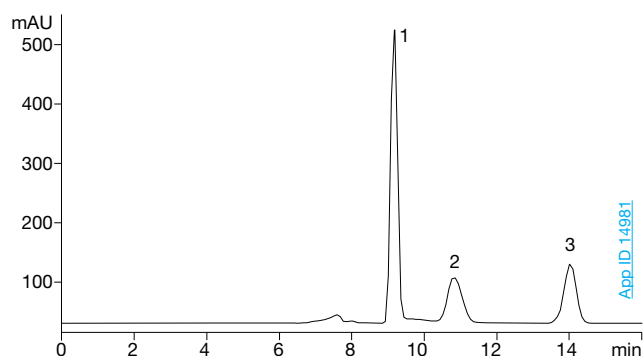
Column: Rezex RPM-Monosaccharide
Dimensions: 300 x 7.8 mm
Part No.: 00H-0135-K0
Mobile Phase: Water
Flow Rate: 0.6 mL/min
Temperature: 75 °C
Detection: ELSD
Sample: 1. Melezitose 4. Mannose
 2. Maltose 5. Fructose
 3. Glucose 6. Ribitol



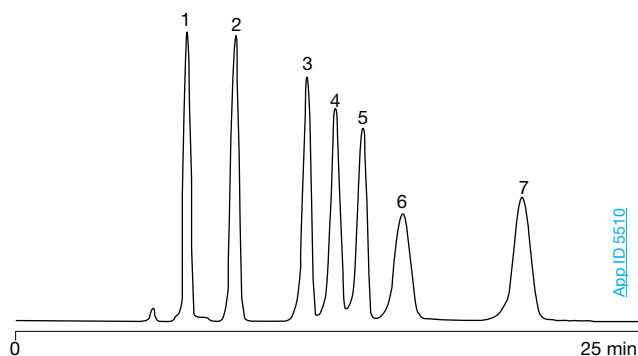
Column: Rezex RPM-Monosaccharide
Dimensions: 300 x 7.8 mm
Part No.: 00H-0135-K0
Mobile Phase: Water
Flow Rate: 0.6 mL/min
Temperature: 75 °C
Detection: ELSD
Sample: 1. Glucose 4. Xylitol
 2. Erythritol 5. Sorbitol
 3. Mannitol



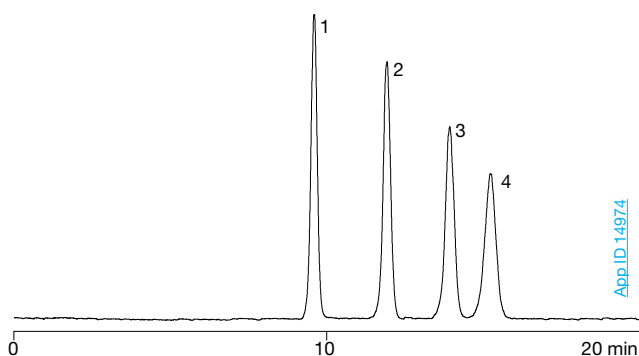
Column: Rezex RCM-Monosaccharide
Dimensions: 300 x 7.8 mm
Part No.: 00H-0130-K0
Mobile Phase: Water
Flow Rate: 0.6 mL/min
Temperature: 80 °C
Detection: ELSD
Sample: 1. Sucrose
 2. Glucose
 3. Fructose



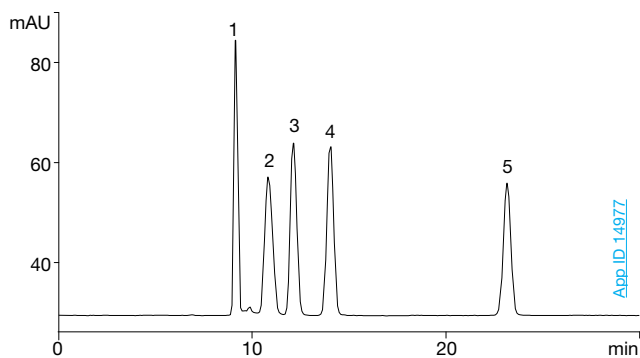
Column: Rezex™ RNM-Carbohydrate
Dimensions: 300 x 7.8 mm
Part No.: 00H-0136-K0
Mobile Phase: Water
Flow Rate: 0.6 mL/min
Temperature: 75 °C
Detection: RI
Sample: 1. Stachyose 5. Arabinose
 2. Cellobiose 6. Ribose
 3. Glucose 7. Salicin
 4. Fructose



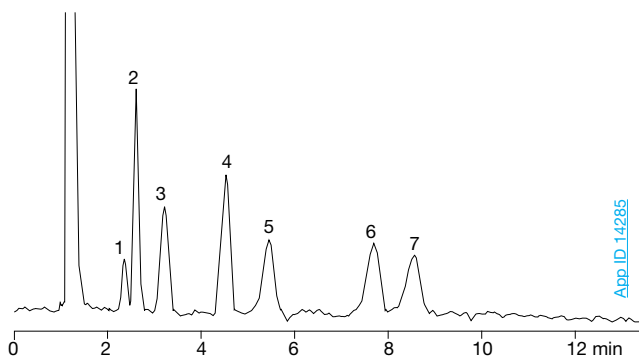
Column: Rezex RAM-Carbohydrate
Dimensions: 300 x 7.8 mm
Part No.: 00H-0131-K0
Mobile Phase: Water
Flow Rate: 0.6 mL/min
Temperature: 80 °C
Detection: ELSD
Sample: 1. Sucrose 3. Arabinose
 2. Glucose 4. Ribose



Column: Rezex RCM-Monosaccharide
Dimensions: 300 x 7.8 mm
Part No.: 00H-0130-K0
Mobile Phase: Water
Flow Rate: 0.6 mL/min
Temperature: 80 °C
Detection: ELSD
Sample: 1. Sucrose 4. Fructose
 2. Glucose 5. Sorbitol
 3. Galactose



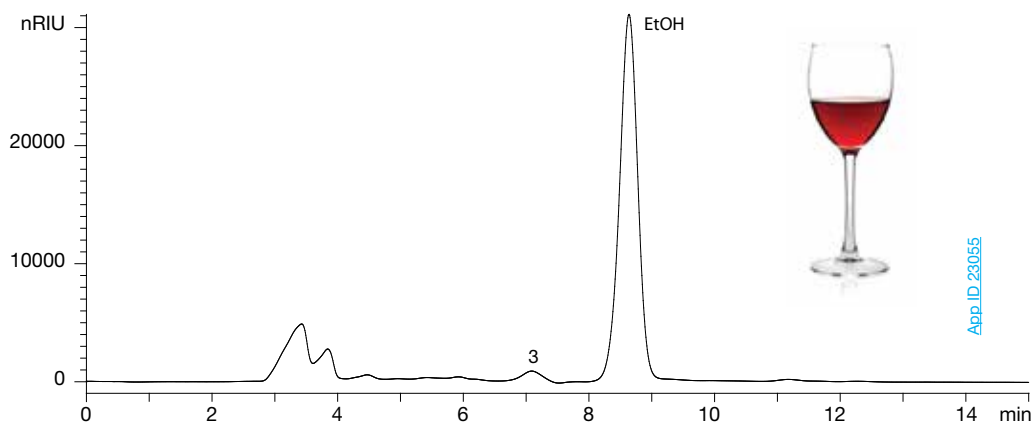
Column: Luna® 5 µm NH₂
Dimensions: 250 x 4.6 mm
Part No.: 00G-4378-E0
Mobile Phase: Acetonitrile/Water (80:20)
Flow Rate: 3 mL/min
Temperature: 40 °C
Detection: RI
Sample: 1. Xylose 5. Maltose
 2. Fructose 6. Melezitose
 3. Glucose 7. Raffinose
 4. Sucrose



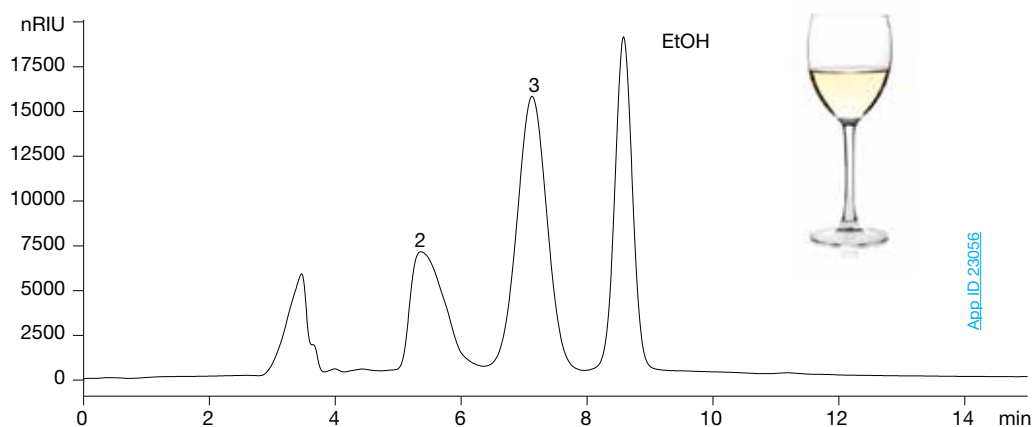
Carbohydrates/Sugars from Beverages

by LC/RI

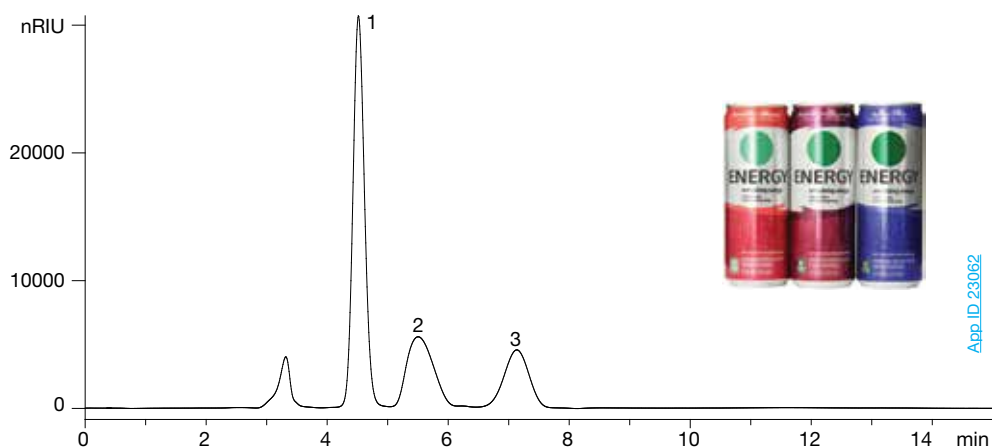
Merlot (Red Wine)



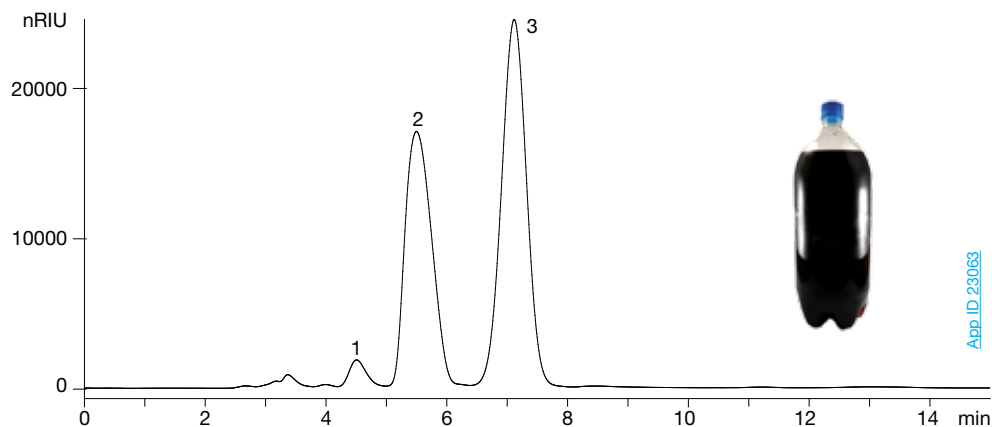
Moscato (White Wine)



Energy Drink



Cola



Conditions for all separations:

Column: Rezex™ RCM-Monosaccharide

Dimensions: 100 x 7.8 mm

Part No.: 00D-0130-K0

Mobile Phase: Water

Flow Rate: 0.4 mL/min

Temperature: 80 °C

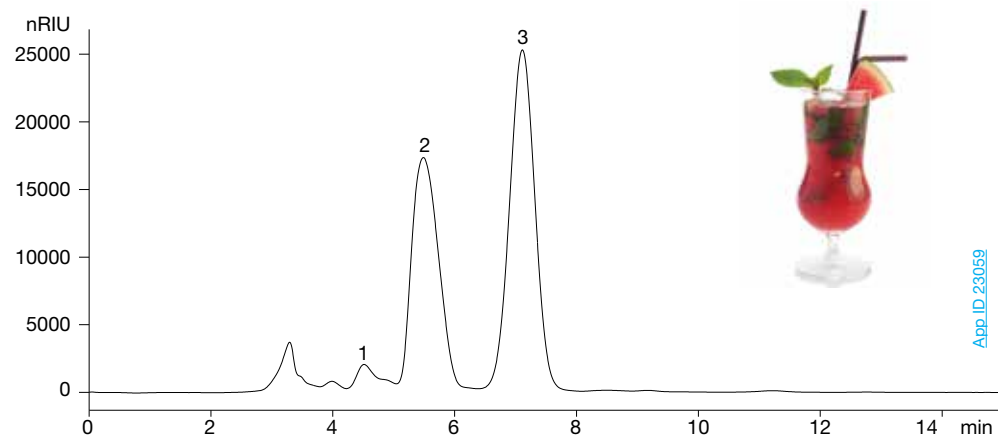
Detector: RI (Refractive Index) @ 35°C

Sample: 1. Sucrose

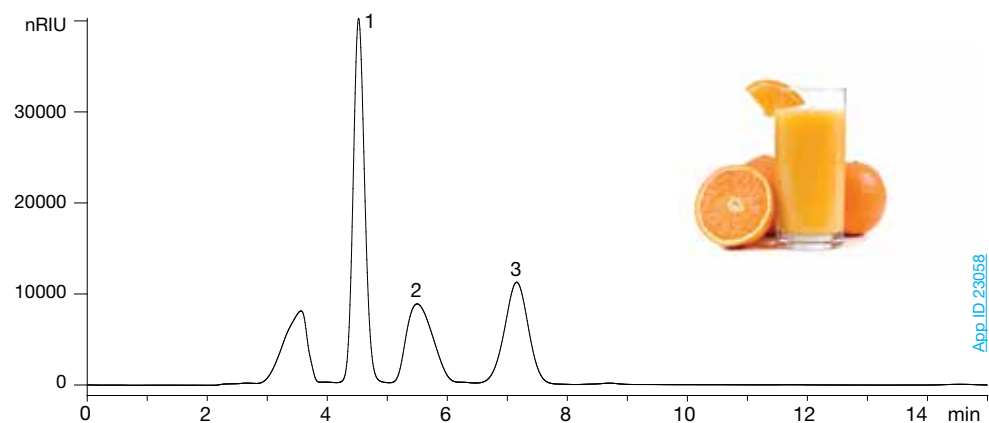
2. Glucose

3. Fructose

Fruit Punch



Orange Juice



Stevia

by LC/UV

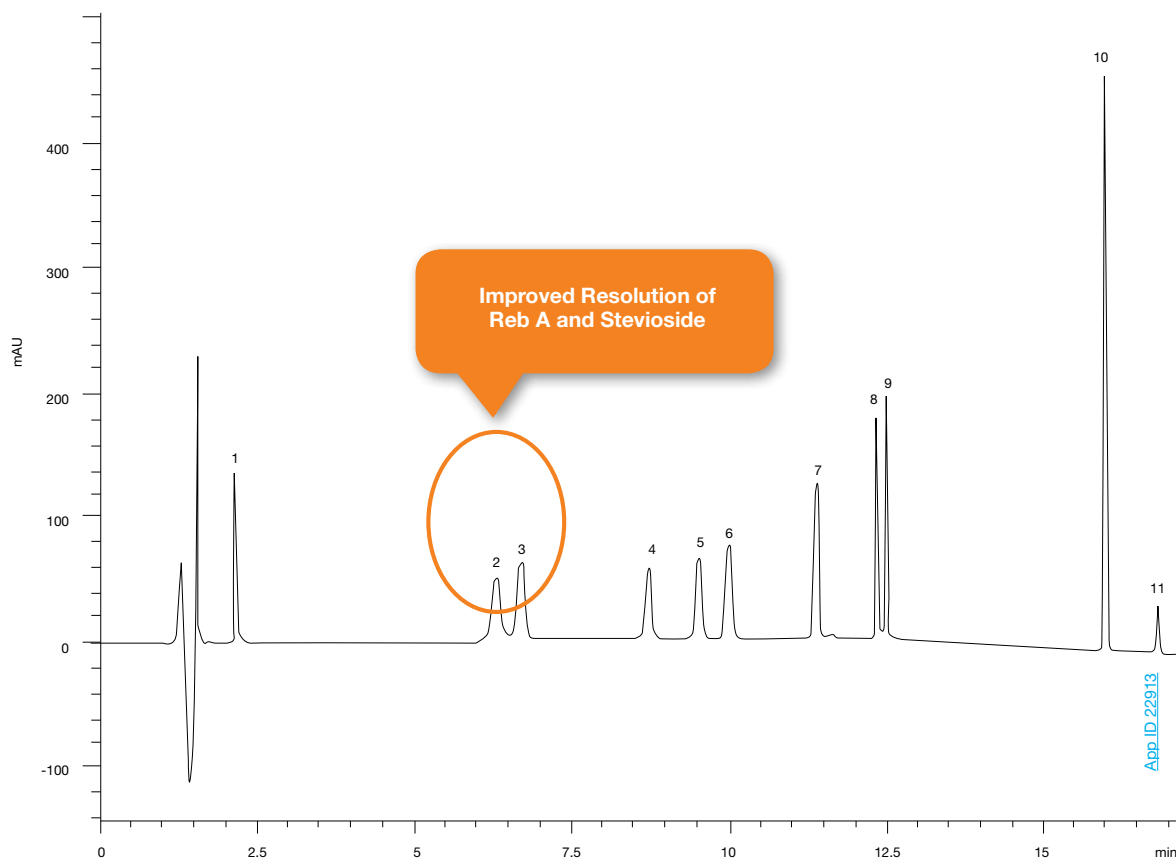
Enhanced Separation of Reb A, Stevioside and Stevia Active Components

Column: Kinetex® 1.7 µm C18
Dimensions: 150 x 2.1 mm
Part No.: 00F-4475-AN
Mobile Phase: A: 0.1 % Formic Acid in Water
 B: 0.1 % Formic Acid in Acetonitrile
Gradient:

Time (min)	% B
0.2	28
2.01	28
5	32
12	32
16	99
17	99
25	28

Flow Rate: 0.2 mL/min
Temperature: Ambient
Detection: UV @ 202 nm
Sample:

1. Rebaudioside D
2. Rebaudioside A
3. Stevioside
4. Rebaudioside F
5. Rebaudioside C
6. Dulcoside A
7. Rubsode
8. Rebaudioside B
9. Steviobioside
10. Steviol
11. Isosteviol



Artificial Sweeteners

by LC/MS

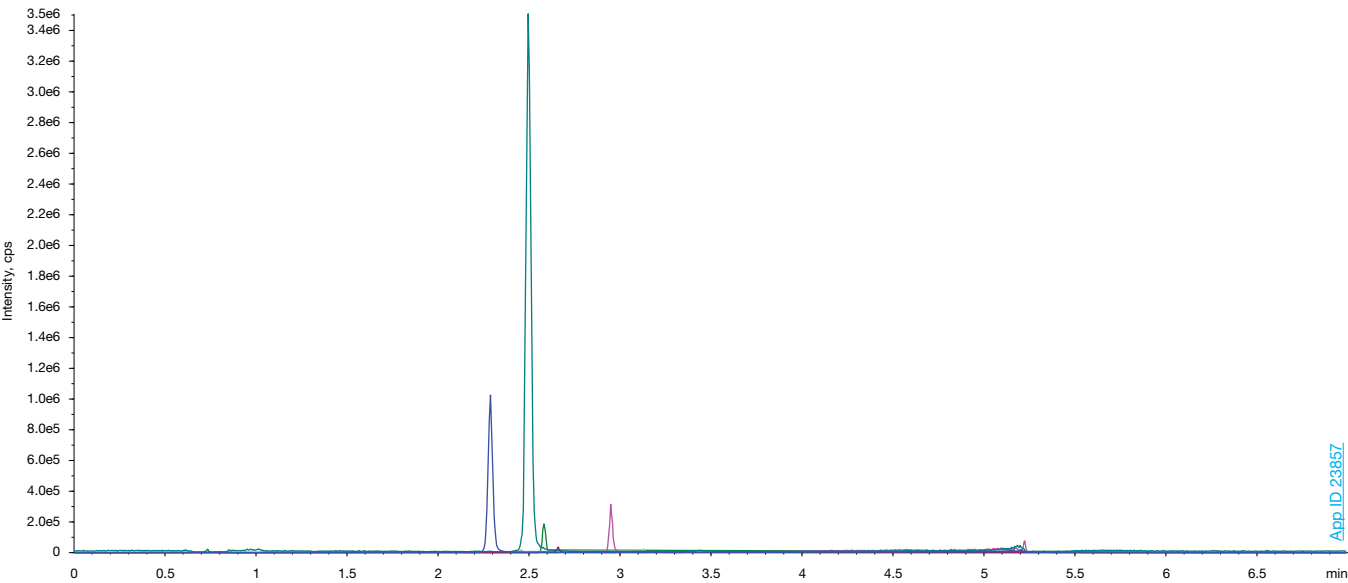
Column: Luna® Omega 5 µm Polar C18
Dimensions: 50 x 4.6 mm
Part No.: [00B-4754-E0](#)
Mobile Phase: A: 0.1 % Formic Acid in Water
B: 0.1 % Formic Acid in Acetonitrile
Gradient:

Time (min)	% B
0	3
4	100
4.1	3
7	3

Flow Rate: 0.7 mL/min
Temperature: 22 °C
Detection: Tandem Mass Spectrometer (MS/MS)
Instrument: SCIEX API 4000™
Sample: 1. Acesulfame K
2. Cyclamate
3. Saccharin
4. Aspartame
5. Sucralose
6. Alitame
7. Neohesperidine
8. Neotame



Overlaid Extracted Ion Chromatogram (XIC)



For more details please visit: www.phenomenex.com/Search

23857

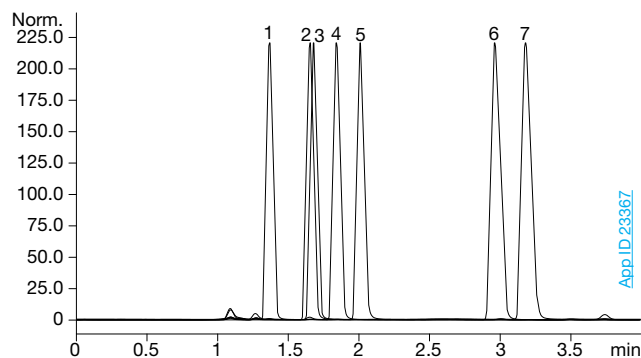


Organic Acids

by LC/UV

Wine

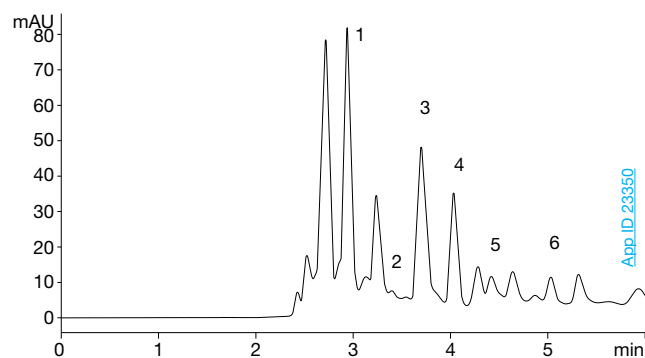
Column: Kinetex® 2.6µm F5
Dimensions: 150 x 4.6 mm
Part No.: [00F-4723-E0](#)
Mobile Phase: 20 mM Potassium Phosphate, pH 1.6
Flow Rate: 1.25 mL/min
Temperature: Ambient
Detection: UV @ 210 nm
Sample: 1. Tartaric Acid 5. Acetic Acid
 2. Shikimic Acid 6. Citric Acid
 3. Malic Acid 7. Succinic Acid
 4. Lactic Acid



Mixed Red Wine

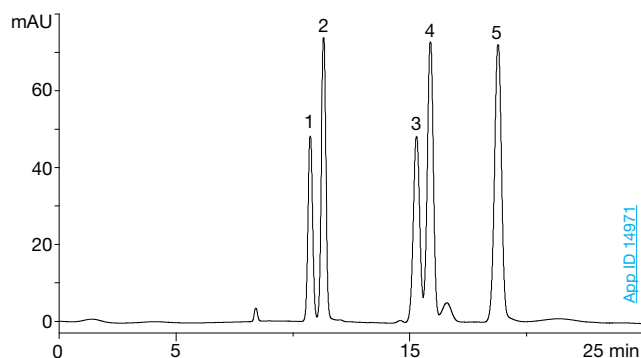
Column: Synergi™ 4µm Hydro-RP
Dimensions: 250 x 4.6 mm
Part No.: [00G-4375-E0](#)
Mobile Phase: A: 20 mM Potassium Phosphate, pH 1.5
 B: Methanol
Gradient: Time (min) % B
 0 0
 2.5 0
 2.6 30
 2.9 30
 3.0 0
 10 0

Flow Rate: 1 mL/min
Temperature: 60 °C
Detection: UV @ 210 nm (ambient)
Injection: 20 µL
Sample: 1. Tartaric Acid
 2. Malic Acid
 3. Shikimic Acid
 4. Lactic Acid
 5. Acetic Acid
 6. Citric Acid
 7. Succinic Acid



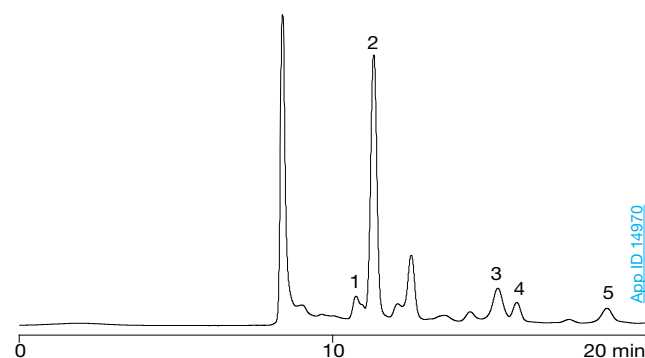
Wine

Column: Rezex™ ROA-Organic Acid
Dimensions: 300 x 7.8 mm
Part No.: [00H-0138-K0](#)
Mobile Phase: 0.005 N H₂SO₄
Flow Rate: 0.5 mL/min
Temperature: 40 °C
Detection: UV @ 210 nm
Sample: 1. Citric Acid 4. Lactic Acid
 2. Tartaric Acid 5. Acetic Acid
 3. Succinic Acid



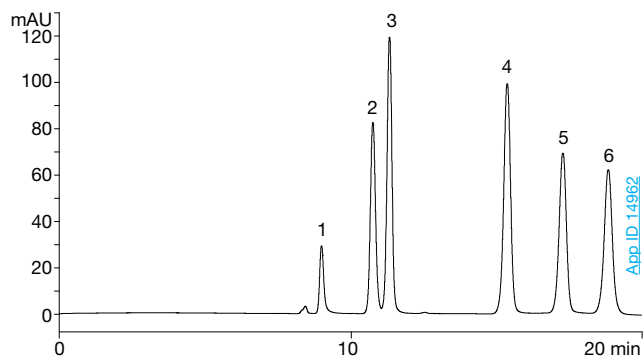
White Wine

Column: Rezex ROA-Organic Acid
Dimensions: 300 x 7.8 mm
Part No.: [00H-0138-K0](#)
Mobile Phase: 0.005 N H₂SO₄
Flow Rate: 0.5 mL/min
Temperature: 40 °C
Detection: UV @ 210 nm
Sample: 1. Citric Acid 4. Lactic Acid
 2. Tartaric Acid 5. Acetic Acid
 3. Succinic Acid



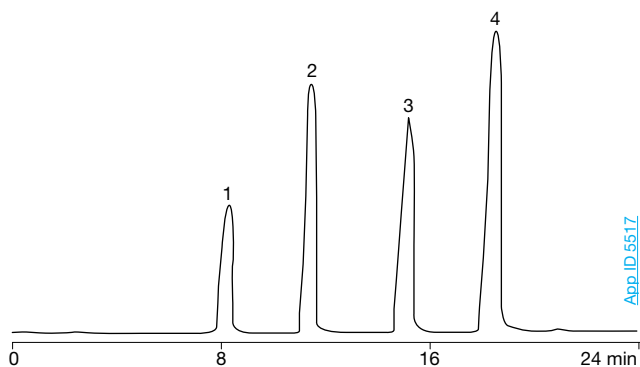
Aliphatic Acids

Column: Rezex™ ROA-Organic Acid
Dimensions: 300 x 7.8 mm
Part No.: 00H-0138-K0
Mobile Phase: 0.005 N H₂SO₄
Flow Rate: 0.5 mL/min
Temperature: 40 °C
Detection: UV @ 210 nm
Sample: 1. Oxalic Acid 4. Succinic Acid
 2. Citric Acid 5. Formic Acid
 3. Tartaric Acid 6. Acetic Acid



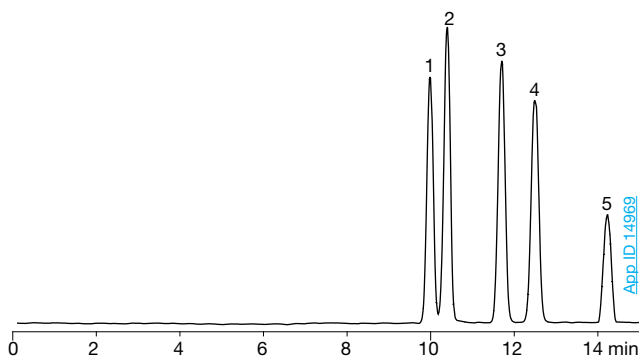
Carboxylic Acids

Column: Rezex ROA-Organic Acid
Dimensions: 300 x 7.8 mm
Part No.: 00H-0138-K0
Mobile Phase: 0.5% Trifluoroacetic Acid
Flow Rate: 1.0 mL/min
Temperature: 40 °C
Detection: RI
Sample: 1. Acetylene Carboxylic Acid
 2. Maleic Acid
 3. Succinic Acid
 4. Fumaric Acid



Sugars and Organic Acids

Column: Rezex ROA-Organic Acid
Dimensions: 300 x 7.8 mm
Part No.: 00H-0138-K0
Mobile Phase: 0.1% Formic Acid
Flow Rate: 0.5 mL/min
Temperature: 75 °C
Detection: ELSD
Sample: 1. Citric Acid 4. Fructose
 2. Tartaric Acid 5. Succinic Acid
 3. Glucose



Organic Acids from Wine

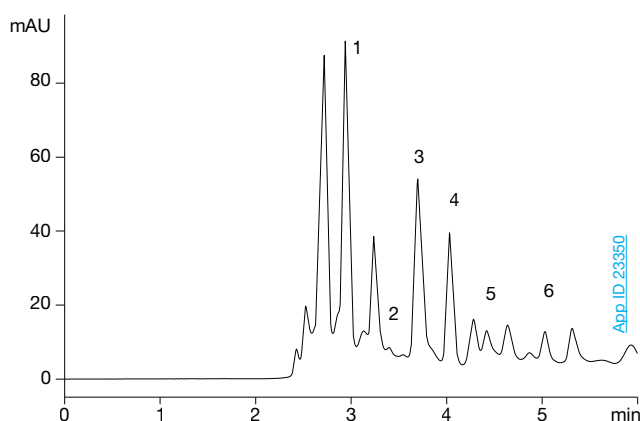
by LC/UV

Conditions for all separations:

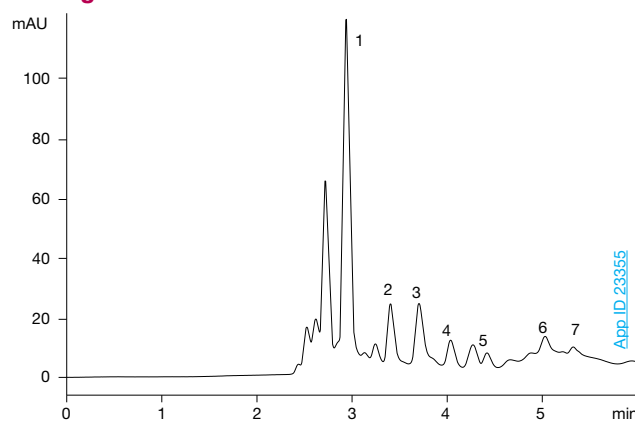
Column: Synergi™ 4 µm Hydro-RP
Dimensions: 250 x 4.6 mm
Part No.: 00G-4375-E0
Mobile: A: 20 mM Potassium Phosphate, pH 1.5
Phase: B: Methanol
Gradient: Time (min) % B
 0 0
 2.5 0
 2.6 30
 2.9 30
 3.0 0
 10 0
Flow Rate: 1 mL/min
Temperature: 60 °C
Detection: UV @ 210 nm (ambient)
Injection: 20 µL
Sample: 1. Tartaric Acid
 2. Malic Acid
 3. Shikimic Acid
 4. Lactic Acid
 5. Acetic Acid
 6. Citric Acid
 7. Succinic Acid



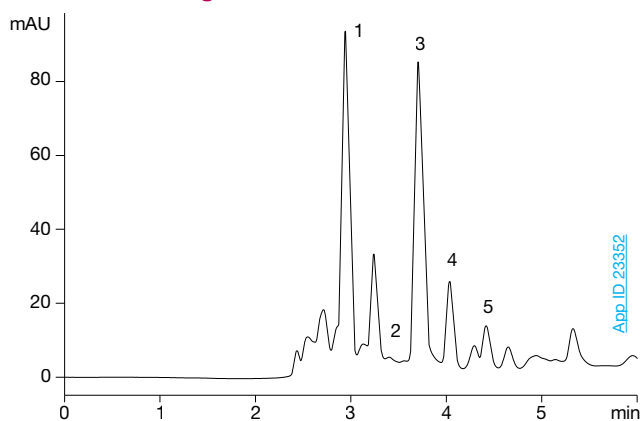
Mixed Red



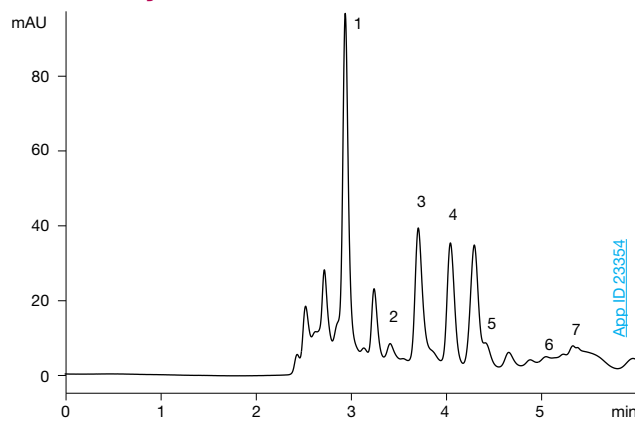
Sauvignon Blanc



Cabernet Sauvignon



Chardonnay



Essential Oils /Flavors

Great quality unadulterated oils that are suitable for flavoring are in high demand

Essential Oils/Flavors

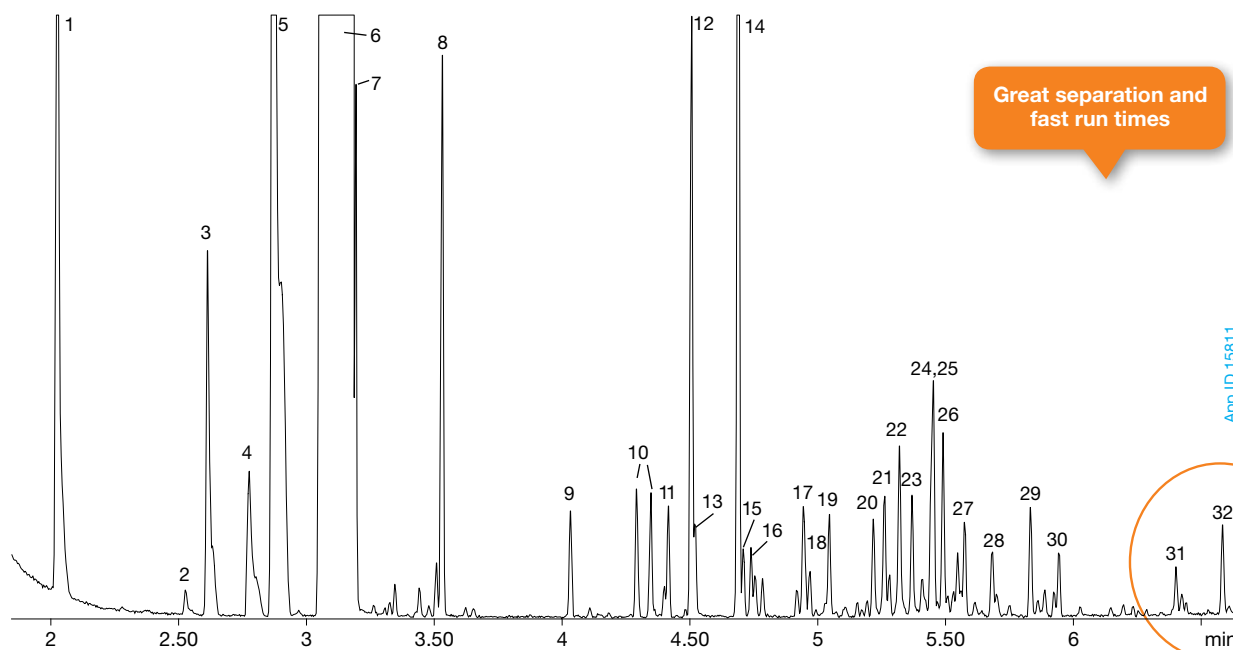
Essential Oils

by GC/MS

Cold-Pressed Orange Oil

Column: Zebron™ ZB-WAX_{PLUS}™
Dimensions: 10 meter x 0.10 mm x 0.10 µm
Part No.: ZCB-G013-02
Injection: Split 20:1 @ 220 °C, 0.2 µL
Recommended Liner: Zebron PLUS Straight Z-Liner™
Liner Part No.: AG2-0A00-05
Carrier Gas: Helium @ 0.3 mL/min (constant flow)
Oven Program: 35 °C for 1 min to 250 °C @ 30 °C/min for 5 min
Detector: MSD; 45-450 amu

1. α-Pinene	12. Decanal	23. Dodecanal
2. β-Pinene	13. α-Cubebene	24. Valencene
3. Sabinene	14. Linalool	25. Citral
4. 3-Carene	15. β-Cubebene	26. Carvone
5. β-Myrcene	16. Octanol	27. Cadinene
6. Limonene	17. Germacrene	28. Perillaldehyde
7. β-Phellandrene	18. Caryophyllene	29. trans-Carveol
8. Octanal	19. trans-p-Mentha-2,8-dienol	30. cis-Carveol
9. Nonanal	20. cis-p-Mentha-2,8-dienol	31. Perillol
10. Limonene Oxides	21. Geranial	32. Octanoic acid
11. Citronellal	22. α-Terpineol	

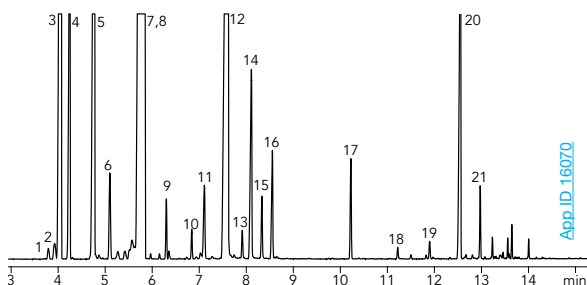


Rosemary Oil

Column: Zebtron™ ZB-1ms
Dimensions: 10 meter x 0.10 mm x 0.10 µm
Part No.: 7CB-G011-02
Injection: Split 120:1 @ 160 °C, 0.2 µL
Recommended Liner: Zebtron PLUS Straight Z-Liner™
Liner Part No.: AG2-0A00-05
Carrier Gas: Helium @ 0.4 mL/min (constant flow)
Oven Program: 45 °C for 2 min to 130 °C @ 8 °C/min to 200 °C @ 30 °C/min for 2 min
Detector: MSD; 18-400 amu

Sample: Analytes are 10 % in dichloromethane

- | | | |
|---------------|-----------------|---------------------|
| 1. Tricyclene | 8. Limonene | 15. 4-Terpineol |
| 2. α-Thujene | 9. γ-Terpinene | 16. Terpineol |
| 3. α-Pinene | 10. Terpinolene | 17. Bornyl Acetate |
| 4. Camphene | 11. Linalool | 18. Eugenol |
| 5. β-Pinene | 12. Camphor | 19. Copaene |
| 6. β-Myrcene | 13. Isoborneol | 20. Caryophyllene |
| 7. Eucalyptol | 14. Borneol | 21. α-Caryophyllene |

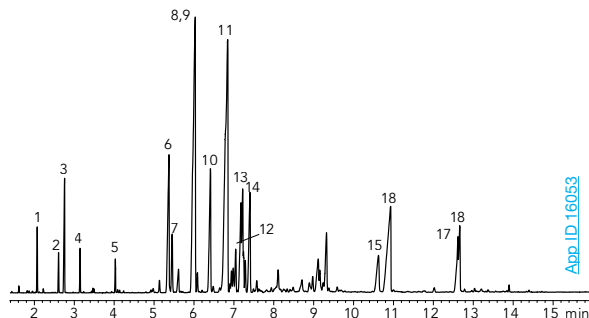


Ylang Ylang Oil

Column: Zebtron ZB-1ms
Dimensions: 10 meter x 0.10 mm x 0.10 µm
Part No.: 7CB-G011-02
Injection: Split 120:1 @ 160 °C, 0.2 µL
Recommended Liner: Zebtron PLUS Straight Z-Liner™
Liner Part No.: AG2-0A00-05
Carrier Gas: Helium @ 0.5 mL/min (constant flow)
Oven Program: 60 °C to 120 °C @ 15 °C/min to 160 °C @ 5 °C/min to 220 °C @ 20 °C/min
Detector: MSD; 18-400 amu

Sample: Analytes are 10 % in dichloromethane

- | | | |
|---------------------|---------------------|-----------------------|
| 1. p-Methyl anisole | 7. Copaene | 13. Farnasene |
| 2. Methyl benzoate | 8. β-Caryophyllene | 14. d-Cadinene |
| 3. Linalool | 9. Cinnamyl acetate | 15. Farnesol |
| 4. Benzyl acetate | 10. Humulene | 16. Benzyl benzoate |
| 5. Geraniol | 11. Germacrene | 17. Benzyl salicylate |
| 6. Geranyl acetate | 12. a-Amorphene | 18. Farnesyl acetate |

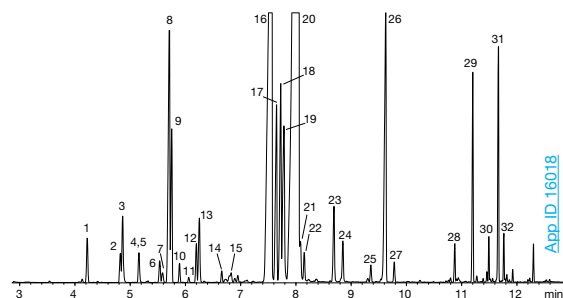


Peppermint Oil

Column: Zebtron ZB-1ms
Dimensions: 10 meter x 0.10 mm x 0.10 µm
Part No.: 7CB-G011-02
Injection: Split 120:1 @ 160 °C, 0.2 µL
Recommended Liner: Zebtron PLUS Straight Z-Liner™
Liner Part No.: AG2-0A00-05
Carrier Gas: Helium @ 0.3 mL/min (constant flow)
Oven Program: 45 °C for 2 min to 130 °C @ 10 °C/min to 280 °C @ 30 °C/min for 3 min
Detector: MSD

Sample: Analytes are 10 % in dichloromethane

- | | | |
|--------------------|--------------------------|------------------------|
| 1. α-Pinene | 12. γ-Terpinene | 23. Pulegone |
| 2. Sabinene | 13. cis-Sabinene hydrate | 24. Piperitone |
| 3. β-Pinene | 14. β-Terpinol | 25. Neomenthyl acetate |
| 4. β-Myrcene | 15. Linalool | 26. Menthyl acetate |
| 5. 3-Octanol | 16. Menthone | 27. Isomenthyl acetate |
| 6. α-Terpinene | 17. Isomenthone | 28. Bourbonene |
| 7. Cymene | 18. Menthofuran | 29. Caryophyllene |
| 8. Eucalyptol | 19. Neomenthol | 30. Farnesene |
| 9. d-Limonene | 20. Menthol | 31. Germacrene |
| 10. cis-Occimene | 21. Neoisomenthol | 32. Elemene |
| 11. trans-Occimene | 22. α-Terpinol | |

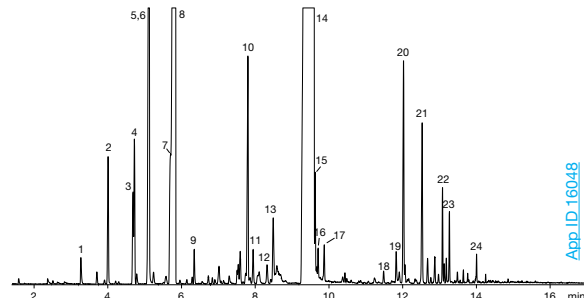


Spearmint Oil

Column: Zebtron ZB-1ms
Dimensions: 10 meter x 0.10 mm x 0.10 µm
Part No.: 7CB-G011-02
Injection: Split 120:1 @ 160 °C, 0.2 µL
Recommended Liner: Zebtron PLUS Straight Z-Liner™
Liner Part No.: AG2-0A00-05
Carrier Gas: Helium @ 0.4 mL/min (constant flow)
Oven Program: 45 °C for 2 min to 130 °C @ 8 °C/min to 200 °C @ 30 °C/min for 2 min
Detector: MSD; 18-400 amu

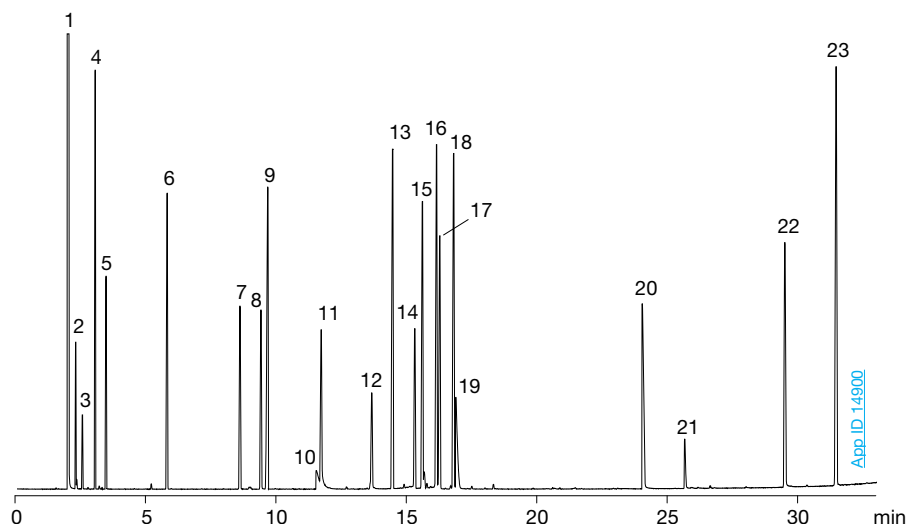
Sample: Analytes are 10 % in dichloromethane

- | | |
|-------------------------------|-------------------------|
| 1. 2,5-Diethyltetrahydrofuran | 13. Dihydrocarveol |
| 2. α-Pinene | 14. Carvone |
| 3. abinene | 15. Piperitenone |
| 4. β-Pinene | 16. trans-Carvone oxide |
| 5. β-Myrcene | 17. cis-Carvone oxide |
| 6. 3-Octanol | 18. Carvyl acetate |
| 7. Eucalyptol | 19. cis-Jasmone |
| 8. Limonene | 20. β-Bourbonene |
| 9. cis-Sabinene hydrate | 21. Caryophyllene |
| 10. Menthone | 22. β-Farnesene |
| 11. Isomenthone | 23. Germacrene D |
| 12. 4-Terpineol | 24. Caryophyllene oxide |



Flavor Screening

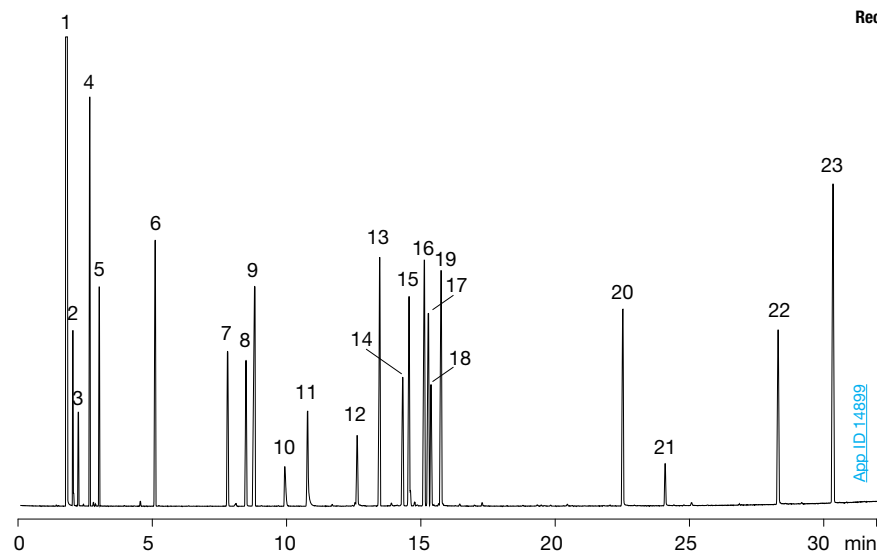
by GC/MS



Test mix courtesy of Frutarom (UK) Ltd., Flavour Chemistry Laboratory.



Column: Zebron™ ZB-WAX
Dimensions: 30 meter x 0.32 mm x 0.25 µm
Part No.: 7HG-G007-11
Injection: Split 100:1 @ 250 °C, 1.0 µL
Recommended Liner: Zebron PLUS Straight Z-Liner™
Liner Part No.: AG2-0A00-05
Carrier Gas: Helium @ 1 mL/min (constant flow)
Oven Program: 50 °C to 250 °C @ 6 °C/min for 3 min
Detector: MSD @ 275 °C
Sample: 1. Acetone
 2. Ethyl acetate
 3. Ethanol
 4. Decane
 5. Ethyl butyrate
 6. Limonene
 7. 2,3-Dimethylpyrazine
 8. (Z)-3-Hexenol
 9. Tetradecane
 10. Acetic acid
 11. Decanal
 12. Propylene glycol
 13. Ethyl decanoate
 14. Neral
 15. α-Terpineol
 16. Neryl Acetate
 17. Geranial
 18. Decanol
 19. Valeric acid
 20. Nonanoic acid
 21. Decanoic acid
 22. Vanillin
 23. Anthracene



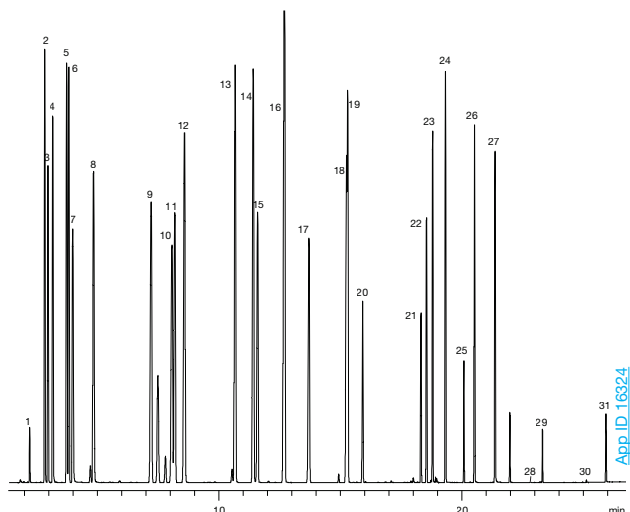
Column: Zebron ZB-FFAP
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: 7HG-G009-11
Injection: Split 100:1 @ 250 °C, 1 µL
Recommended Liner: Zebron PLUS Straight Z-Liner™
Liner Part No.: AG2-0A00-05
Carrier Gas: Helium @ 1 mL/min (constant flow)
Oven Program: 50 °C to 250 °C @ 6 °C/min for 3 min
Detector: MSD @ 270 °C
Sample: 1. Acetone
 2. Ethyl Acetate
 3. Ethanol
 4. Decane
 5. Ethyl Butyrate
 6. Limonene
 7. 2,3-Dimethylpyrazine
 8. (z)-3-Hexenol
 9. Tetradecane
 10. Acetic Acid
 11. Decanal
 12. Propylene Glycol
 13. Ethyl Decanoate
 14. Neral
 15. α-Terpineol
 16. Neryl Acetate
 17. Geranial
 18. Valeric Acid
 19. Decanol
 20. Nonanoic Acid
 21. Decanoic Acid
 22. Vanillin
 23. Anthracene

Distilled Spirits & Wines

by GC/FID

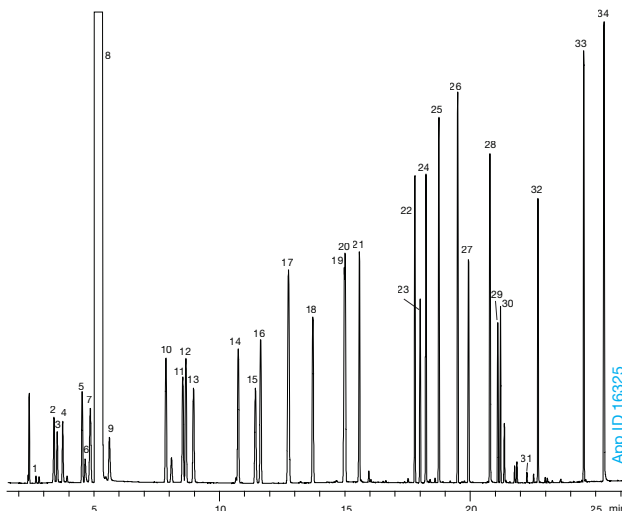
Distilled Alcohol Standard by Headspace

Column: Zebron™ ZB-WAX_{PLUS}™
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: [ZHM-G013-11](#)
Injection: Split 25:1 @ 210 °C, 1 µL
Recommended Liner: Zebron PLUS Single Taper
Liner Part No.: [AG2-0A10-05](#)
Carrier Gas: Hydrogen @ 1 mL/min (constant flow)
Oven Program: 35 °C for 7 min to 60 °C @ 5 °C/min for 2 min to 210 °C @ 10 °C/min
Detector: FID @ 230 °C
Note: Static headspace injection (80 °C for 20 min)



Distilled Alcohol Standard by Liquid Injection

Column: Zebron ZB-WAX_{PLUS}
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: [ZHG-G013-11](#)
Injection: Split 25:1 @ 210 °C, 1 µL
Recommended Liner: Zebron PLUS Single Taper
Liner Part No.: [AG2-0A10-05](#)
Carrier Gas: Hydrogen @ 1 mL/min (constant flow)
Oven Program: 35 °C for 6 min to 60 °C @ 5 °C/min for 2 min to 210 °C @ 10 °C/min
Detector: FID @ 230 °C
Sample: Analytes are 200 ppm standard in methylene chloride



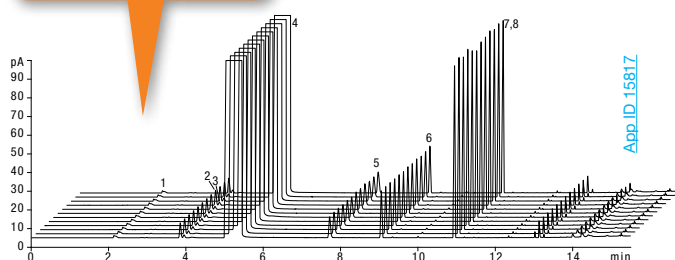
* For entire analyte list please visit: www.phenomenex.com/Search

16324 & 16325

Replicate Liquid Injections of Undiluted Scotch Whiskey

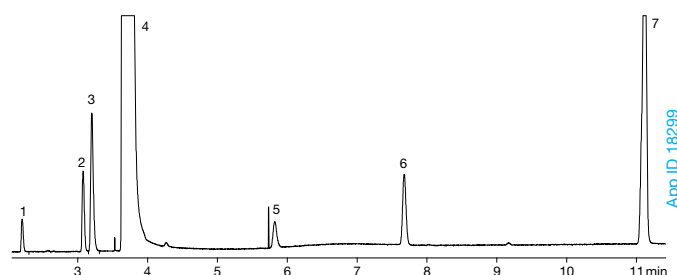
Column: Zebron ZB-WAX_{PLUS}
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: [ZHG-G013-11](#)
Injection: Split 30:1 @ 140 °C, 0.2 µL
Recommended Liner: Zebron PLUS Single Taper
Liner Part No.: [AG2-0A10-05](#)
Carrier Gas: Helium @ 1.4 mL/min (constant flow)
Oven Program: 35 °C for 5 min to 85 °C @ 10 °C/min to 200 °C @ 25 °C/min for 1 min
Detector: FID @ 200 °C
Sample: 1. Acetaldehyde 5. Propanol
 2. Ethyl acetate 6. Isobutanol
 3. Methanol 7. 2-Methylbutanol
 4. Ethanol 8. 3-Methylbutanol

Scottish Single Malt Whiskey 60% Aqueous!



Filtered Liquid Injection of Italian Wine

Column: Zebron ZB-WAX_{PLUS}
Dimensions: 30 meter x 0.32 mm x 0.25 µm
Part No.: [ZHM-G013-11](#)
Injection: Split 10:1 @ 150 °C, 0.2 µL
Recommended Liner: Zebron PLUS Single Taper
Liner Part No.: [AG2-0A10-05](#)
Carrier Gas: Helium @ 2.3 mL/min (constant flow)
Oven Program: 40 °C for 5 min to 150 °C @ 5 °C/min for 5 min to 220 °C @ 20 °C/min for 2 min
Detector: FID @ 280 °C
Accessories: Phenex™-RC Syringe Filter ([AF0-2203-52](#))
Sample: Wine has been filtered through 0.2 µm regenerated cellulose filter and directly injected
 1. Acetaldehyde 5. Propanol
 2. Ethyl acetate 6. Isobutanol
 3. Methanol 7. 3-Methyl-1-butanol
 4. Ethanol



Hop Acids in Beer

by SPE and LC/MS/MS

Sample Preparation

Solid Phase Extraction Conditions

Each beer sample was degassed by stirring for approximately 30 min at room temperature.

Cartridge: Strata[®]-X 200 mg/6 mL
Part No.: 8B-S100-FCH
Condition: 4 mL acidified methanol (1-2 mL/min)
Equilibrate: 4 mL water (1-2 mL/min)
 Note: Do not let sorbent run dry
Load: 5 mL of beer degassed (1 mL/min)
Wash: 4 mL of 40 % methanol in water
Dry: >10" Hg for 5 minutes to remove residual water
Elute: 2 mL of acidified methanol (1 mL/min)
Drydown: Nitrogen gas at 55 °C
Reconstitute: 500 µL of mobile phase

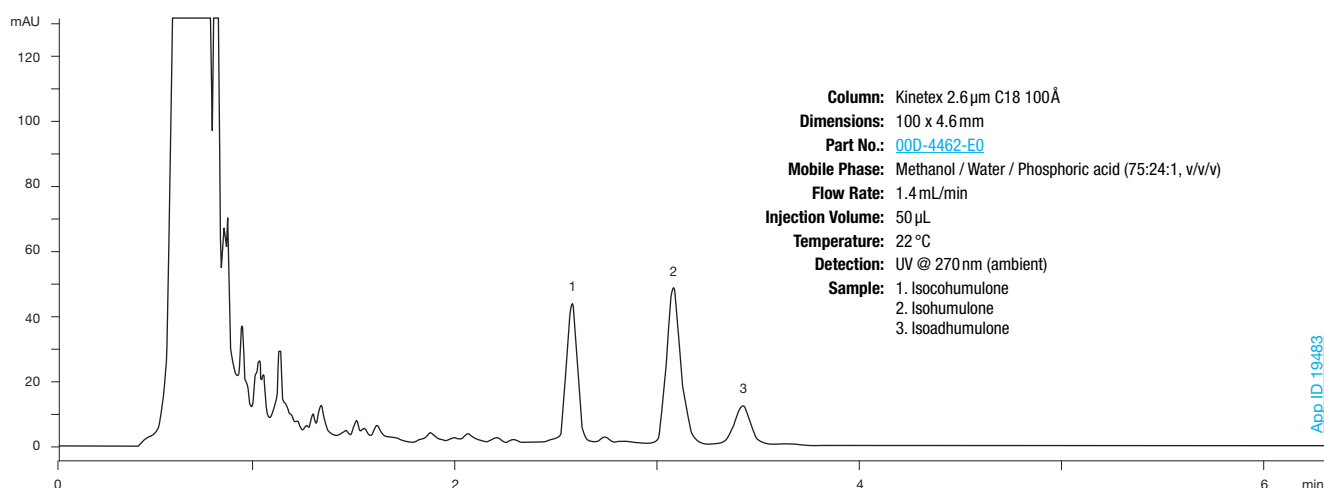


For complete technical note visit:
www.phenomenex.com/Search

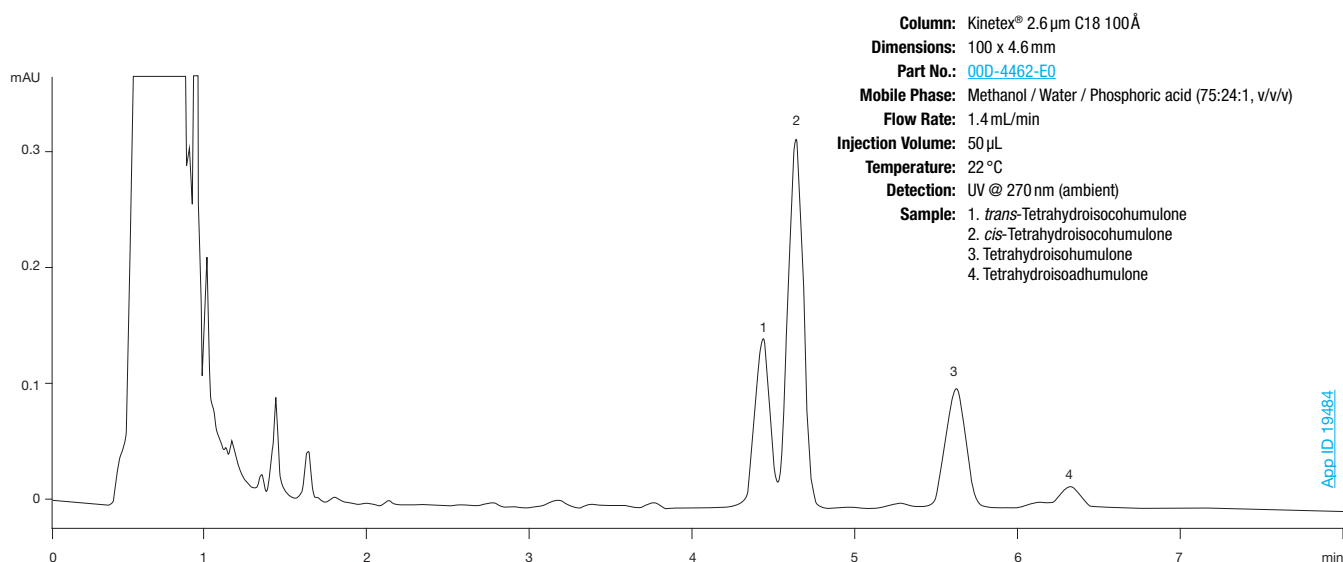
Search:



Iso-Alpha Acids from Red Stripe[®] Jamaican Lager



Tetrahydro-Iso-Alpha Acids from Miller[®] Genuine Draft



Capsaicinoids and Related Pungent Agents in Chili Peppers

by LC/MS/MS

Extraction Procedures

250 or 500 g of chili peppers (depending on pepper size) were blended for an extended period of time (approximately 5 mins or until all seeds were crushed) with Ethanol to contain approximately 60-70 % of alcohol. An aliquot of the puree was removed and filtered using a Phenex™ PTFE Membrane with pore size of 0.45 µm, 25 mm syringe filter, Part No. [AF0-1102-12](#) prior to analysis with LC/MS/MS. The rest of the puree was retained to prepare purified capsaicinoids by Prep Chromatography.

LC/MS/MS Conditions

Column: Kinetex® 5 µm C18

Dimensions: 100 x 2.1 mm

Part No.: [00D-4601-AN](#)

Mobile Phase: A: 0.1 % Formic acid in Water

B: 0.1 % Formic acid in methanol

Flow Rate: 0.6 mL/min

Gradient: Time (min) % B

0 30

7 90

9 90

9.1 30

12 30

Injection Volume: 2 µL

Temperature: Ambient

Detection: API 4000™ triple quadrupole LC/MS/MS (SCIEX)

Electrospray ionization (ESI) analyzed in positive mode

Reconstitute: Reconstitute in 500 µL of mobile phase

Sample: 1. Octanoic Acid vanillylamide isomers (280.2 m/z)

2. Nordihydrocapsaicin (294.2 m/z)

3. Capsaicin (306.2 m/z)

4. Dihydrocapsaicin (308.2 m/z)

5. Homocapsaicin (320.2 m/z)

6. Homodihydrocapsaicin (322.2 m/z)

Jalapeno



Habanero



Serrano



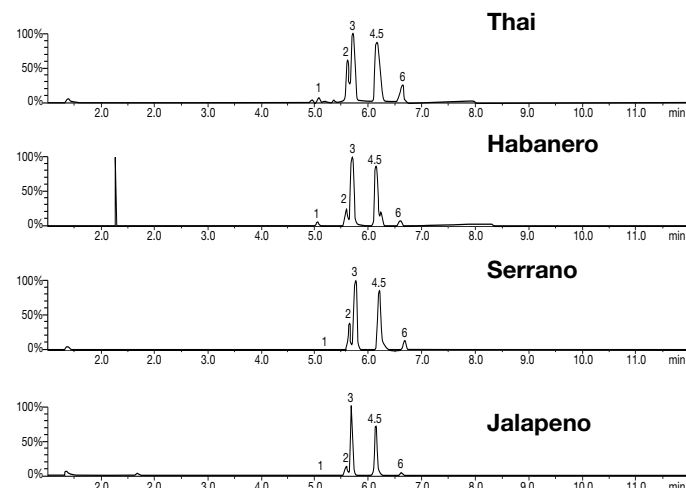
Thai Chili



For complete technical note visit:
www.phenomenex.com/Search

Search:

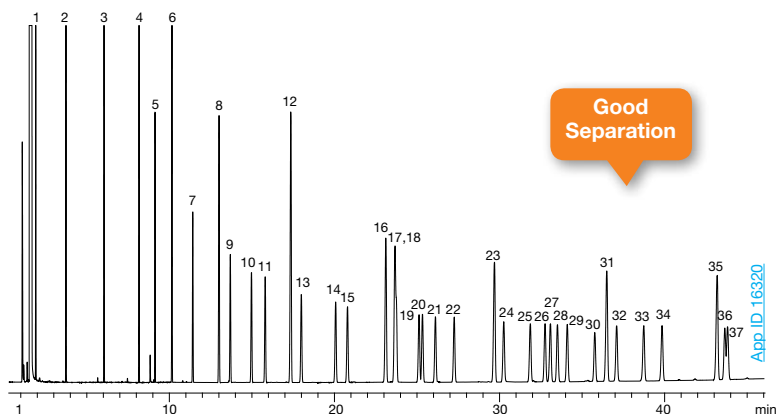
Characterization of Capsaicinoids in Various Peppers



Fatty Acids and FAMES

by GC/FID

Column: Zebron™ ZB-WAX
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: ZHG-G007-11
Injection: Split 5:1 @ 220 °C, 1 µL
Recommended Liner: Zebron PLUS Single Taper with Wool
Liner Part No.: AG2-0A11-05
Carrier Gas: Helium @ 3 mL/min (constant flow)
Oven Program: 60 °C for 2 min to 150 °C @ 13 °C/min to 240 °C @ 2 °C/min
Detector: FID @ 250 °C
Sample: 133-266 ppm in methylene chloride

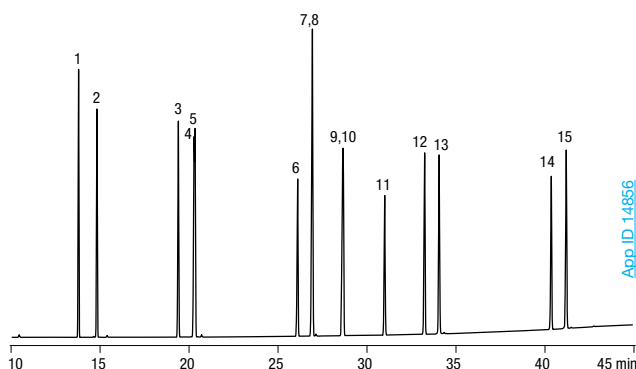


1. Methyl Butyrate (C4:0)
2. Methyl Hexanoate (C6:0)
3. Methyl Octanoate (C8:0)
4. Methyl Decanoate (C10:0)
5. Methyl Undecanoate (C11:0)
6. Methyl Laurate (C12:0)
7. Methyl Tridecanoate (C13:0)
8. Methyl Myristate (C14:0)
9. Myristoleic acid methyl ester (C14:1)
10. Methyl Pentadecanoate (C15:0)
11. cis-10-Pentadecenoic acid methyl ester (C15:1)
12. Methyl Palmitate (C16:0)
13. Palmitoleic acid methyl ester (C16:1)
14. Methyl Heptadecanoate (C17:0)
15. cis-10-Heptadecenoic acid methyl ester (C17:1)
16. Methyl Stearate (C18:0)
17. Oleic acid methyl ester (C18:1n9c)
18. Elaidic acid methyl ester (C18:1n9t)
19. Linoleic acid methyl ester (C18:2n6c)
20. Linolelaidic acid methyl ester (C18:2n6t)
21. g-Linolenic acid methyl ester (C18:3n6)
22. Linolenic acid methyl ester (C18:3n3)
23. Methyl Arachidate (C20:0)
24. cis-11-Eicosenoic acid methyl ester (C20:1)
25. cis-11-14-Eicosadienoic acid methyl ester (C20:2)
26. cis-8,11,14-Eicosatrienoic acid methyl ester (C20:3n6)
27. Methyl Heneicosanoate (C21:0)
28. Arachidonic acid methyl ester (C20:4n6)
29. cis-11,14,17-Eicosatrienoic acid methyl ester (C20:3n3)
30. cis-5,8,11,14,17-Eicosapentaenoic acid methyl ester (C20:5n3)
31. Methyl Behenate (C22:0)
32. Erucic acid methyl ester (C22:1)
33. cis-13,16-Docosadienoic acid methyl ester (C22:2)
34. Methyl Tricosanoate (C23:0)
35. Methyl Lignocerate (C24:0)
36. cis-4,7,10,13,16,19-Docosahexaenoic acid methyl ester (C22:6n3)
37. Nervonic acid methyl ester (C24:1)

Unsaturated Fatty Acids Methyl Esters (FAMES)

Column: Zebron ZB-FFAP
Dimensions: 60 meter x 0.25 mm x 0.25 µm
Part No.: ZKG-G009-11
Injection: Split 40:1 @ 220 °C, 0.2 µL
Recommended Liner: Zebron PLUS Single Taper with Wool
Liner Part No.: AG2-0A11-05
Carrier Gas: Helium @ 2.4 mL/min (constant flow)
Oven Program: 200 °C to 260 °C @ 2 °C/min for 30 min
Detector: FID @ 250 °C
Sample:

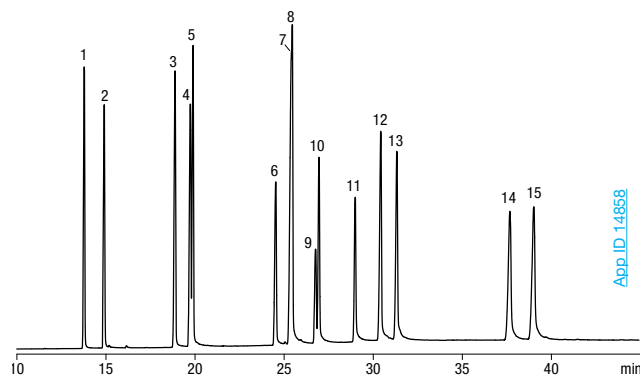
1. Methyl Myristate	10. Methyl Linelaidate
2. Methyl Myristoleate	11. Methyl Linolenate
3. Methyl Palmitate	12. Methyl Arachidate
4. Methyl Palmitelaidate	13. Methyl Gondonate
5. Methyl Palmitoleate	14. Methyl Behenate
6. Methyl Stearate	15. Methyl Erucate
7. Methyl Oleate	
8. Methyl Elaidate	
9. Methyl Linoleate	



Unsaturated Free Fatty Acids

Column: Zebron ZB-FFAP
Dimensions: 60 meter x 0.25 mm x 0.25 µm
Part No.: ZKG-G009-11
Injection: Split 40:1 @ 220 °C, 0.2 µL
Recommended Liner: Zebron PLUS Single Taper with Wool
Liner Part No.: AG2-0A11-05
Carrier Gas: Helium @ 2.4 mL/min (constant flow)
Oven Program: 200 °C to 260 °C @ 2 °C/min for 30 min
Detector: FID @ 250 °C
Sample:

1. Myristic Acid	10. Linoleic Acid
2. Myristoleic Acid	11. Linolenic Acid
3. Palmitic Acid	12. Arachidic Acid
4. Palmitelaidic Acid	13. Gondonic Acid (C15)
5. Palmitoleic Acid	14. Behenic Acid (C17)
6. Stearic Acid	15. Erucic Acid (C19)
7. Elaidic Acid	
8. Oleic Acid	
9. Linolelaidic Acid	



Fatty Acids from Cheese

by GC/FID



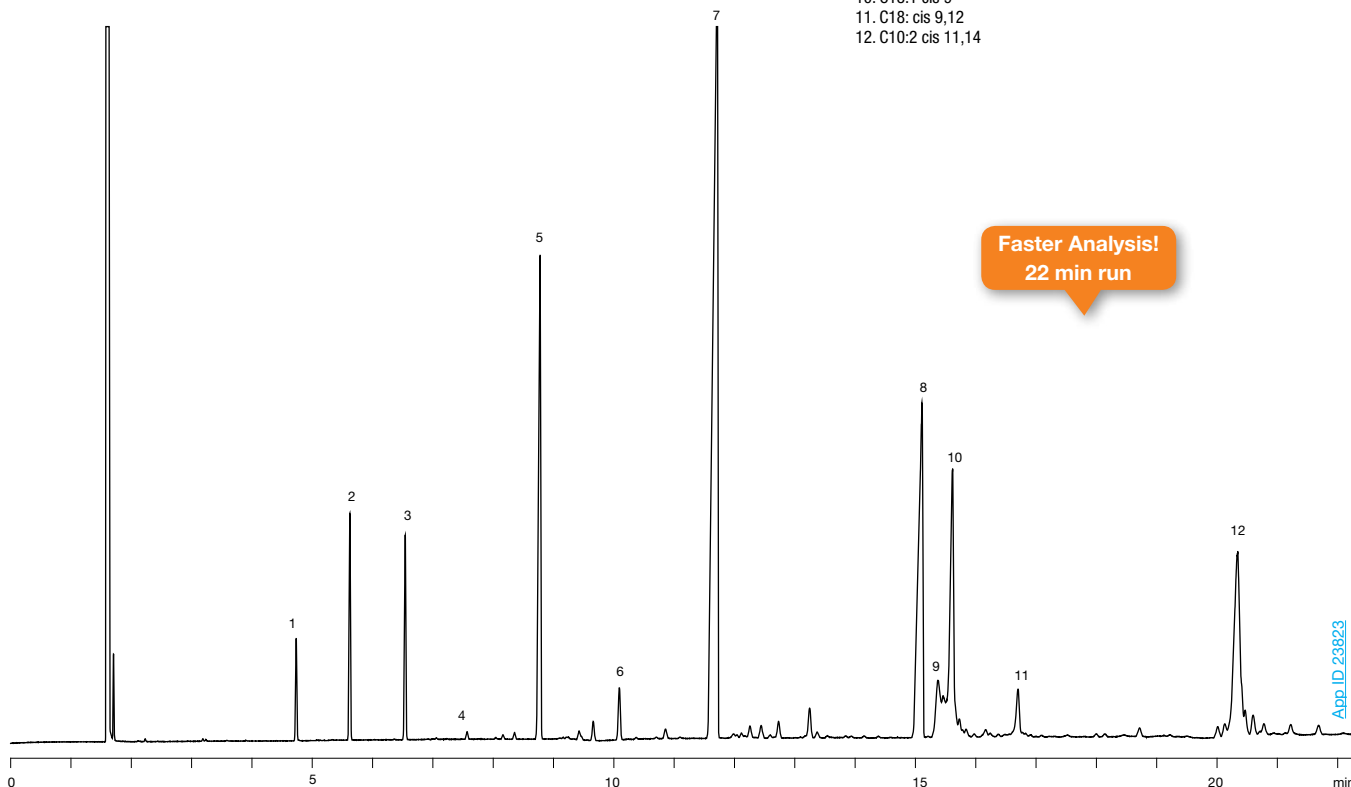
Extraction and Derivatization Protocol

- 1) Weigh out 100 to 200 mg of cheese and place it into a scintillation vial
- 2) Add 100 mg pyrogalllic Acid
- 3) Add 2 mL ethanol followed by 4 mL deionized water and 4 mL NH_4OH (concentrated)
- 4) Incubate at 70 °C for 20 min then add 10 mL HCl and incubate for additional 25 min
- 5) Extract FAMES using 2 mL diethyl ether and 2 mL chloroform
- 6) Blow down extraction liquid
- 7) Reconstitute in 1 mL toluene and 2 mL 8% boron trifluoride in methanol
- 8) Cap reaction mixture, hold at 100 °C for 45 min
- 9) After reaction, add 5 mL water, 1 mL hexane, and 1 g Na_2SO_4
- 10) Extract hexane layer (upper layer)
- 11) Inject at conditions specified

GC Conditions

Column: Zebron™ ZB-FAME
Dimensions: 30 meter x 0.25 mm x 0.20 μm
Part No.: 7HG-G033-10
Injection: Split 50:1 @ 240 °C, 1 μL
Recommended Liner: Zebron PLUS Single Taper with Wool
Liner Part No.: AG2-0A11-05
Carrier Gas: Helium @ 1.2 mL/min (constant flow)
Oven Program: 100 °C for 2 min to 140 °C @ 10 °C/min to 190 °C @ 3 °C/min to 260 °C @ 30 °C/min for 2 min
Detector: FID @ 260 °C
Sample:

1. C10:0
2. C11:0
3. C12:0
4. C13:0
5. C14:0
6. C15:0
7. C16:0
8. C18:0
9. C18:1 trans 9
10. C18:1 cis 9
11. C18: cis 9,12
12. C10:2 cis 11,14



App ID 23823

Fatty Acids In Powdered Infant Formula

by GC/FID



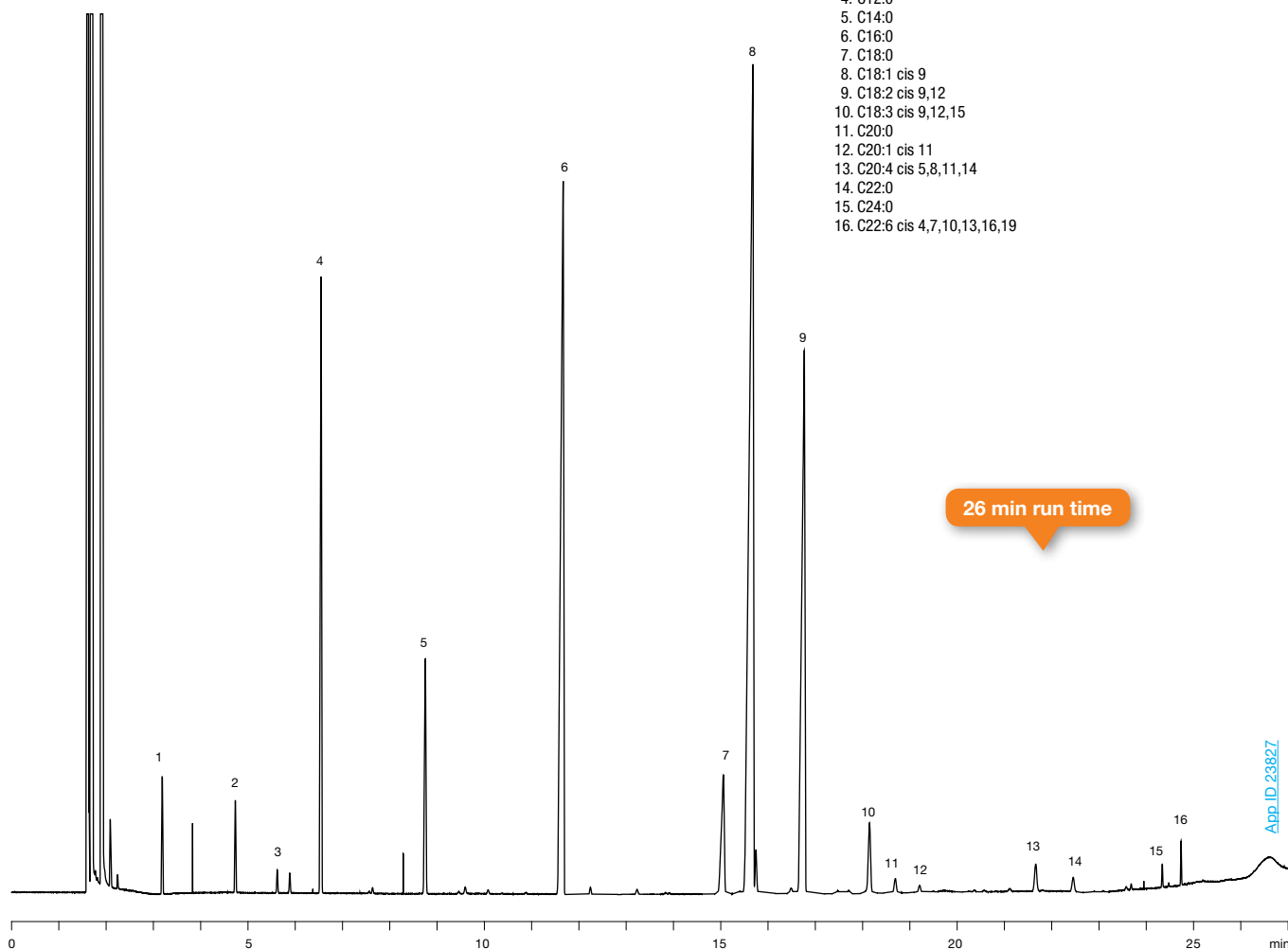
Extraction and Derivatization Protocol

1. Weigh out approximately 500 mg of infant formula into a scintillation vial
2. Dissolve (or dilute) sample in 5 mL toluene, then add 6 mL 10% acetyl chloride solution in methanol
3. Incubate @ 80 °C for 2 hours
4. After incubation add 10 mL 10% Na₂CO₃ solution and centrifuge at 5000 rpm for 5 min
5. Extract organic layer
6. Inject at conditions specified

GC Conditions

Column: Zebron™ ZB-FAME
Dimensions: 30 meter x 0.25 mm x 0.20 µm
Part No.: ZHG-G033-10
Injection: Split 50:1 @ 240 °C, 1 µL
Recommended Liner: Zebron PLUS Single Taper with Wool
Liner Part No.: AG2-0A11-05
Carrier Gas: Helium @ 1.2 mL/min (constant flow)
Oven Program: 100 °C for 2 min to 140 °C @ 10 °C/min to 190 °C @ 3 °C/min to 260 °C @ 30 °C/min for 2 min
Detector: FID @ 260 °C
Sample:

1. C8:0
2. C10:0
3. C11:0
4. C12:0
5. C14:0
6. C16:0
7. C18:0
8. C18:1 cis 9
9. C18:2 cis 9,12
10. C18:3 cis 9,12,15
11. C20:0
12. C20:1 cis 11
13. C20:4 cis 5,8,11,14
14. C22:0
15. C24:0
16. C22:6 cis 4,7,10,13,16,19



App ID 23827

Fatty Acids Olive Oil

by GC/FID

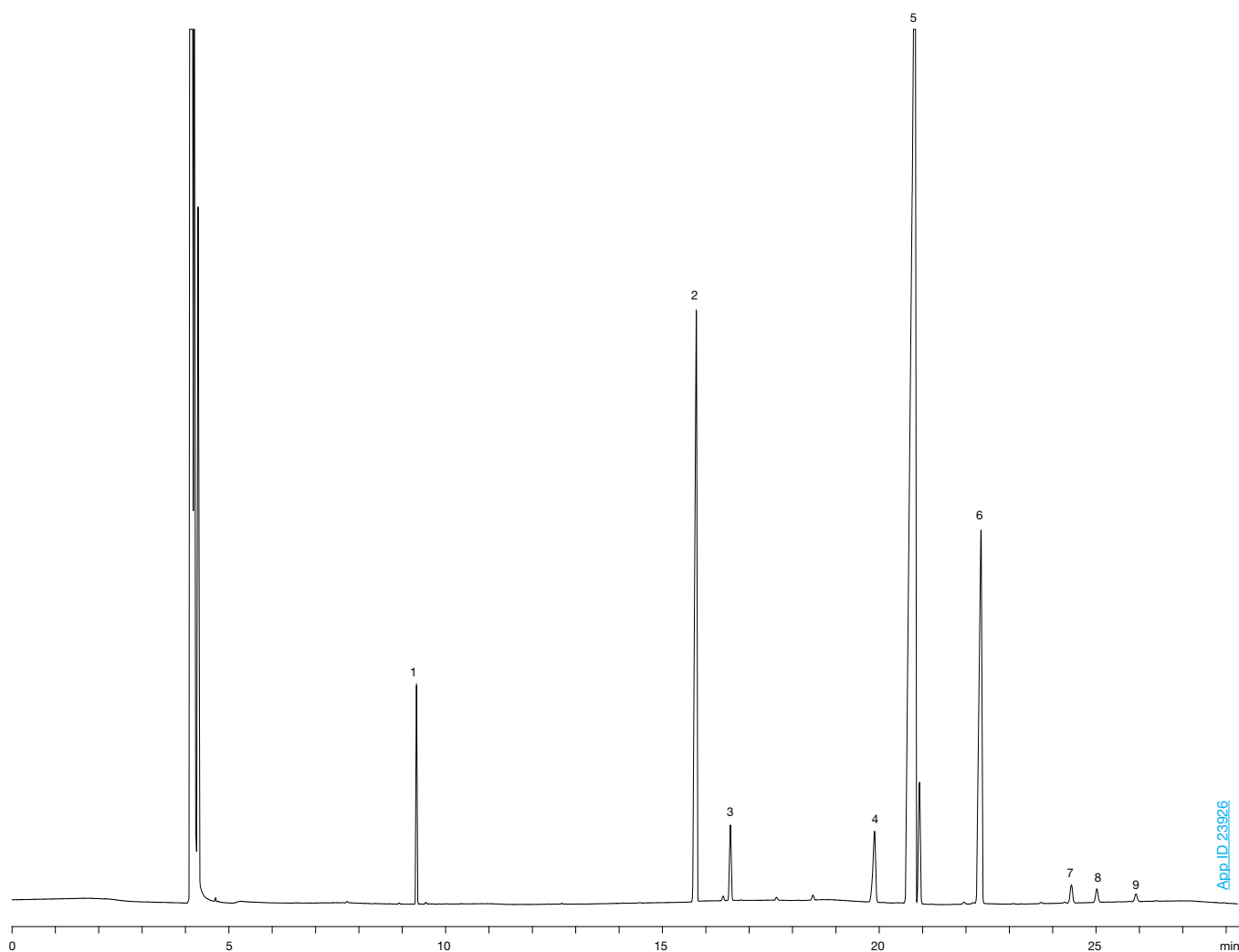


Extraction

1. Strata® Si-1 Tube, 1 g/6 mL (Part No.: [8B-S012-JCH](#)) on a vacuum or positive pressure manifold
2. Wash cartridge with 6 mL of hexane
3. Load oil solution (0.12 g of oil in 0.5 mL of hexane)
4. Elute with 10 mL of hexane/diethyl ether (87:13)
5. Evaporate eluate under a steady stream of nitrogen
6. Dissolve purified oil residue in 1 mL of heptane
7. Add 0.1 mL of 2N potassium hydroxide in methanol to purified oil solution
8. Cap tube and shake vigorously for 15 seconds
9. Leave to separate until upper layer becomes clear
10. Extract upper layer for GC analysis

GC Conditions

Column: Zebron™ ZB-FAME
Dimensions: 60 meter x 0.25 mm x 0.20 µm
Part No.: [ZKG-G033-10](#)
Injection: Split 50:1 @ 240 °C, 1 µL
Recommended Liner: Zebron PLUS Single Taper with Wool
Liner Part No.: [AG2-0A11-05](#)
Carrier Gas: Helium @ 1.2 mL/min (constant flow)
Oven Program: 100 °C for 2 min to 140 °C @ 10 °C/min to 190 °C @ 3 °C/min to 260 °C @ 30 °C/min for 2 min
Detector: FID @ 260 °C
Sample: 1. C11:0*
2. C16:0
3. C16:1 cis 9
4. C18:0
5. C18:1 cis 9
6. C18:2 cis 9,12
7. C18:3 cis 9,12,15
8. C20:0
9. C20:1 cis 11
*Internal standard



App ID 23926

Fatty Acids Soy Bean Oil

by GC/FID



Extraction

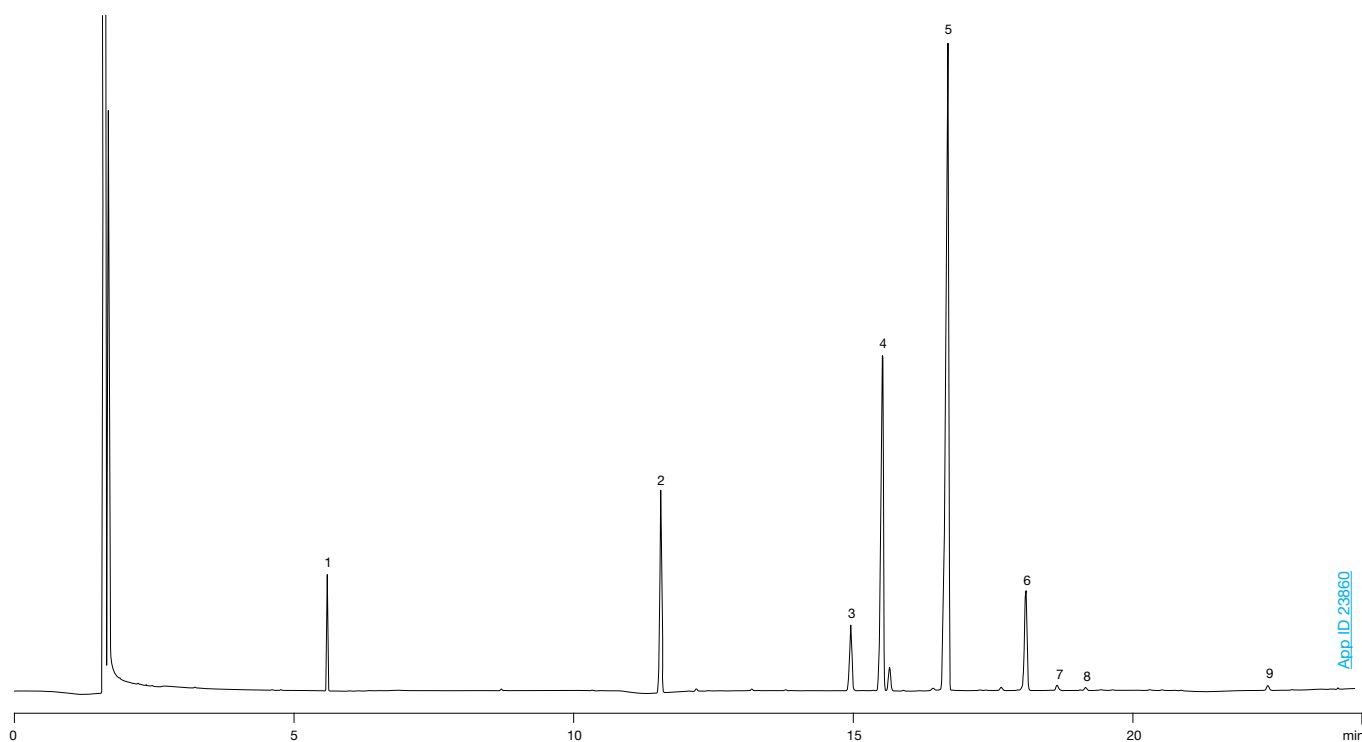
1. Strata® Si-1 Tube, 1 g/6 mL (Part No.: [8B-S012-JCH](#)) on a vacuum or positive pressure manifold
2. Wash cartridge with 6 mL of hexane
3. Load oil solution (0.12 g of oil in 0.5 mL of hexane)
4. Elute with 10 mL of hexane/diethyl ether (87:13)
5. Evaporate eluate under a steady stream of nitrogen
6. Dissolve purified oil residue in 1 mL of heptane
7. Add 0.1 mL of 2N potassium hydroxide in methanol to purified oil solution
8. Cap tube and shake vigorously for 15 seconds
9. Leave to separate until upper layer becomes clear
10. Extract upper layer for GC analysis

GC Conditions

Column: Zebron™ ZB-FAME
Dimensions: 30 meter x 0.25 mm x 0.20 µm
Part No.: [ZH-G033-10](#)
Injection: Split 50:1 @ 240 °C, 1 µL
Recommended Liner: Zebron PLUS Single Taper with Wool
Liner Part No.: [AG2-0A11-05](#)
Carrier Gas: Helium @ 1.2 mL/min (constant flow)
Oven Program: 100 °C for 2 min to 140 °C @ 10 °C/min to 190 °C @ 3 °C/min to 260 °C @ 30 °C/min for 2 min
Detector: FID @ 260 °C
Sample:

1. C11:0
2. C16:0
3. C18:0
4. C18:1 cis 9
5. C18:2 cis 9,12
6. C18:3 cis 9,12,15
7. C20:0
8. C20:1 cis 11
9. C22:0

Note: Analytes are diluted 5:1 in Heptane



App ID 23860

Fatty Acids from Peanut Butter

by GC/FID



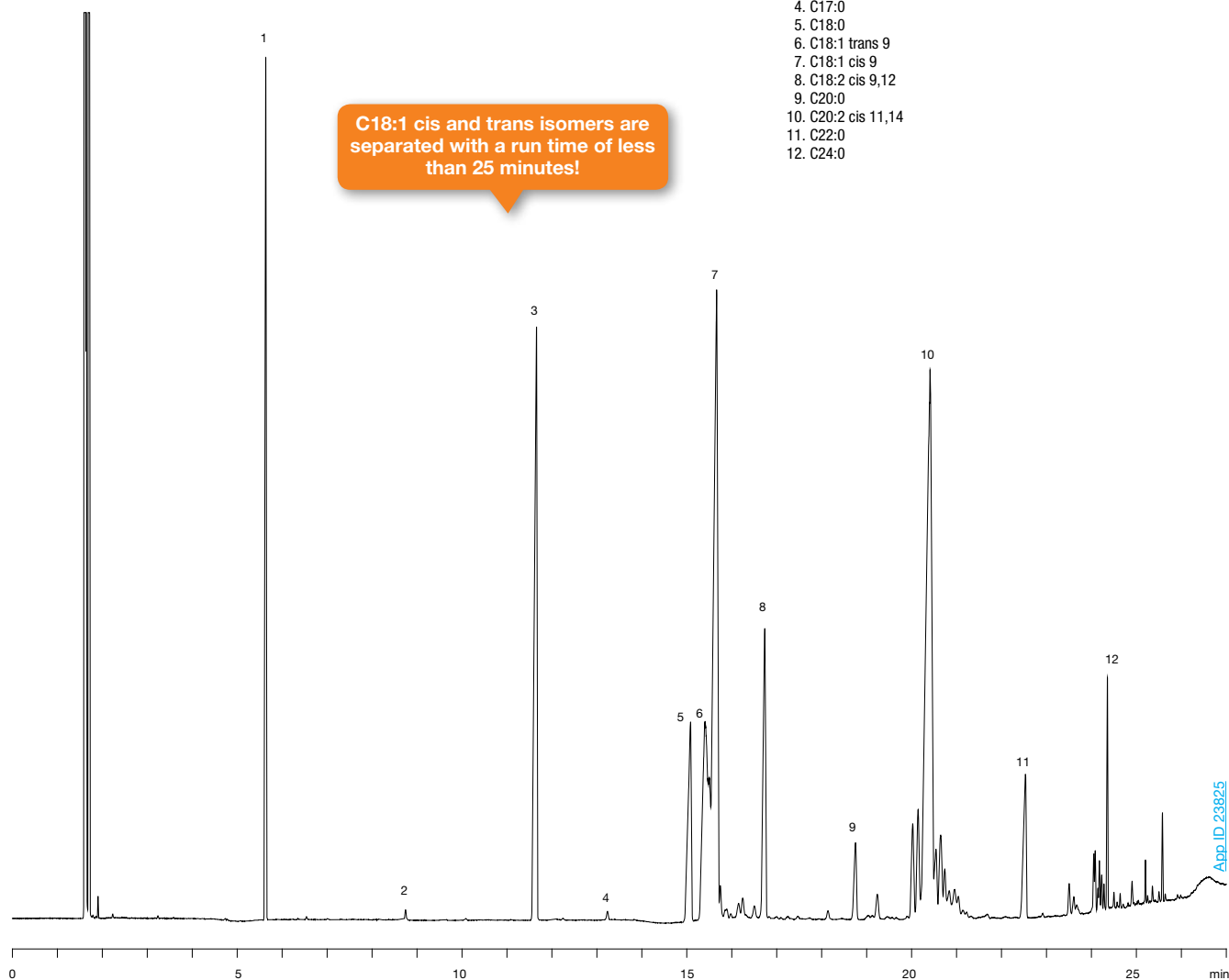
Extraction and Derivatization Protocol

1. Weigh out 100 to 200 mg of peanut butter and place it into a scintillation vial
2. Add 100 mg pyrogalllic acid
3. Add 2 mL ethanol followed by 10 mL 8.3 M HCl
4. Incubate at 70 °C for 45 min
5. Extract using 2 mL diethyl ether and 2 mL chloroform
6. Blow down extraction liquid
7. Reconstitute in 1 mL toluene and 2 mL 8 % boron trifluoride in methanol
8. Cap reaction mixture, hold @ 100 °C for 45 min
9. After reaction, add 5 mL water, 1 mL hexane, and 1 g Na₂SO₄
10. Extract hexane layer for GC analysis

GC Conditions

Column: Zebron™ ZB-FAME
Dimensions: 30 meter x 0.25 mm x 0.20 µm
Part No.: [ZHG-G033-10](#)
Injection: Split 50:1 @ 240 °C, 1 µL
Recommended Liner: Zebron PLUS Single Taper with Wool
Liner Part No.: [AG2-0A11-05](#)
Carrier Gas: Helium @ 1.2 mL/min (constant flow)
Oven Program: 100 °C for 2 min to 140 °C @ 10 °C/min to 190 °C
@ 3 °C/min to 260 °C @ 30 °C/min for 2 min
Detector: FID @ 260 °C

- Sample:**
1. C11:0
 2. C14:0
 3. C16:0
 4. C17:0
 5. C18:0
 6. C18:1 trans 9
 7. C18:1 cis 9
 8. C18:2 cis 9,12
 9. C20:0
 10. C20:2 cis 11,14
 11. C22:0
 12. C24:0



[App ID 23825](#)

Fatty Acids / Sterols

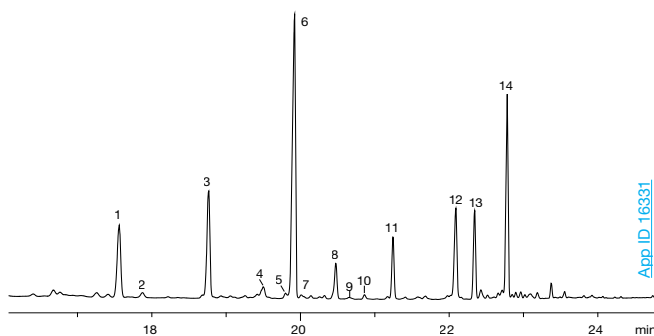
Sterols

by GC/FID

Vitamin E and Sterols

Column: Zebron™ ZB-5
Dimensions: 30 meter x 0.25 mm x 0.10 µm
Part No.: [7HG-G002-02](#)
Injection: Splitless @ 220 °C, 1 µL
Recommended Liner: Zebron PLUS Single Taper Z-Liner™
Liner Part No.: [AG2-0A13-05](#)
Carrier Gas: Helium @ 1.8 mL/min (constant flow)
Oven Program: 110 °C for 0.2 min to 140 °C @ 30 °C/min to 230 °C @ 10 °C/min for 6 min to 340 °C @ 10 °C/min for 15.8 min
Detector: FID @ 340 °C
Sample: Analytes derivatized via BSTFA:TMCS; 99:1 in pyridine

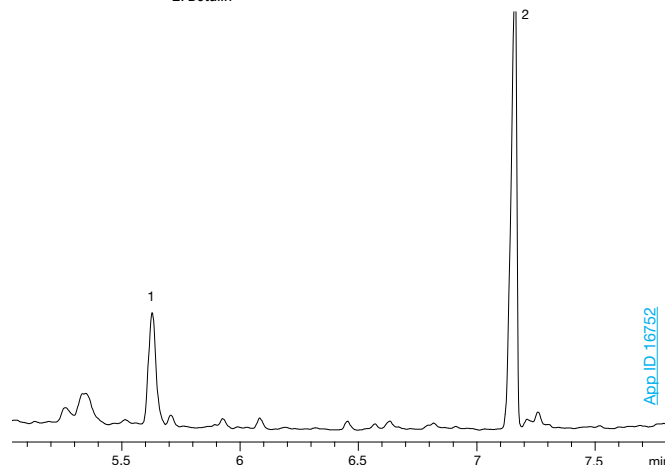
1. Squalene	8. γ-Tocomenol
2. Lignoceric acid	9. Stigmasta-3,5-diene
3. δ-Tocopherol	10. Cholesterol
4. δ-Tocomenol	11. α-Tocopherol
5. Campesta-3,5-diene	12. Campesterol
6. γ-Tocopherol	13. Stigmasterol
7. Stigmasta-3,5,22-triene	14. β-Sitosterol



Lard Sterols

Column: Zebron ZB-5HT Inferno™
Dimensions: 30 meter x 0.25 mm x 0.10 µm
Part No.: [7HG-G015-02](#)
Injection: Splitless @ 350 °C, 0.5 µL
Recommended Liner: Zebron PLUS Single Taper Z-Liner™
Liner Part No.: [AG2-0A13-05](#)
Carrier Gas: Helium @ 2 mL/min (constant flow)
Oven Program: 220 °C to 350 °C @ 15 °C/min
Detector: FID @ 350 °C
Sample: Prepared by saponification, solid phase extraction (SPE), and derivatization via BSTFA:TMCS; 99:1 in pyridine

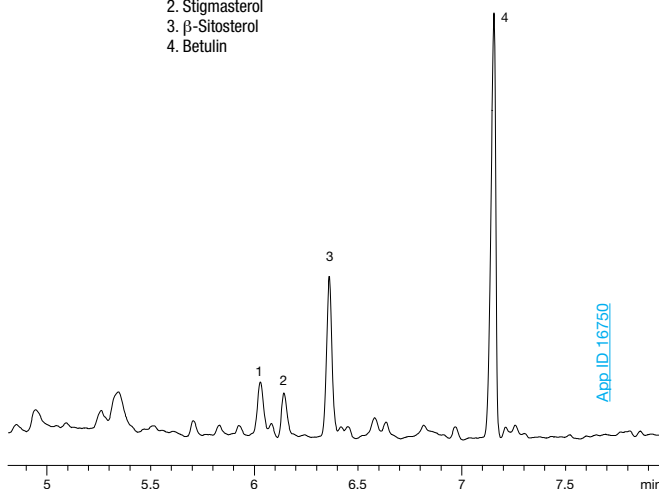
1. Cholesterol
2. Betulin



Margarine Sterols

Column: Zebron ZB-5HT Inferno
Dimensions: 30 meter x 0.25 mm x 0.10 µm
Part No.: [7HG-G015-02](#)
Injection: Splitless @ 350 °C, 0.5 µL
Recommended Liner: Zebron PLUS Single Taper Z-Liner™
Liner Part No.: [AG2-0A13-05](#)
Carrier Gas: Helium @ 2 mL/min (constant flow)
Oven Program: 220 °C to 350 °C @ 15 °C/min
Detector: FID @ 350 °C
Sample: Prepared by saponification, solid phase extraction (SPE), and derivatization via BSTFA: TMCS; 99:1 in pyridine

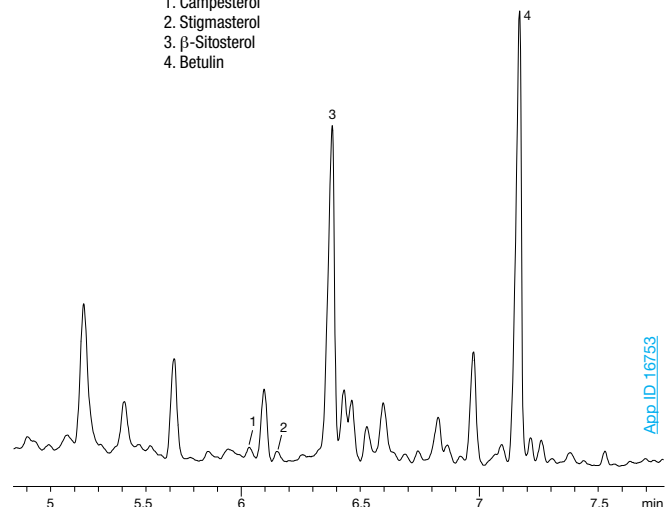
1. Campesterol
2. Stigmasterol
3. β-Sitosterol
4. Betulin



Olive Oil Sterols

Column: Zebron ZB-5HT Inferno
Dimensions: 30 meter x 0.25 mm x 0.10 µm
Part No.: [7HG-G015-02](#)
Injection: Splitless @ 350 °C, 0.5 µL
Recommended Liner: Zebron PLUS Single Taper Z-Liner™
Liner Part No.: [AG2-0A13-05](#)
Carrier Gas: Helium @ 2 mL/min (constant flow)
Oven Program: 220 °C to 350 °C @ 15 °C/min
Detector: FID @ 350 °C
Sample: Prepared by saponification, solid phase extraction (SPE), and derivatization via BSTFA:TMCS; 99:1 in pyridine

1. Campesterol
2. Stigmasterol
3. β-Sitosterol
4. Betulin

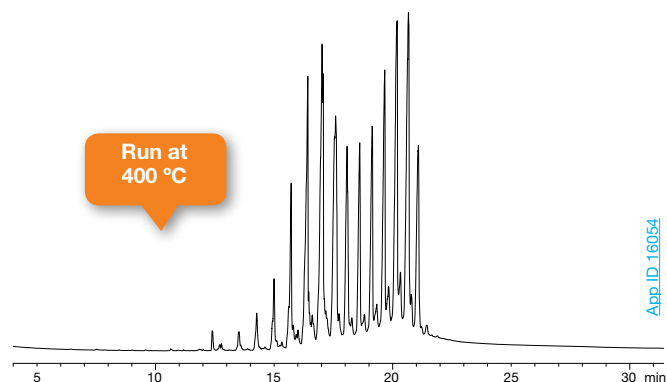


Triglycerides

by GC/FID

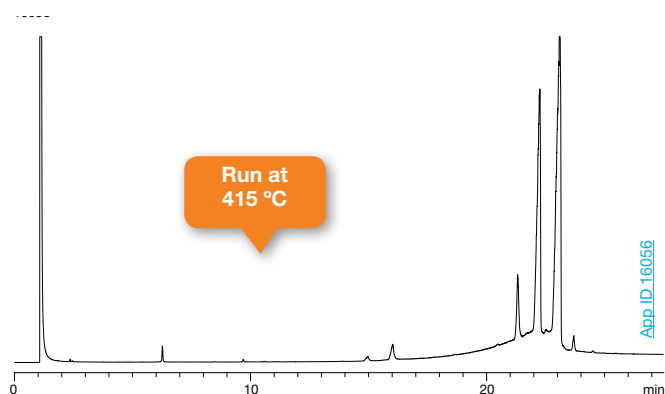
Butter

Column: Zebtron™ ZB-5HT Inferno™
Dimensions: 15 meter x 0.32 mm x 0.10 µm
Part No.: [7EM-G015-02](#)
Injection: On-Column @ 103 °C, 2 µL
Recommended Liner: Zebtron PLUS Direct Connect
Liner Part No.: [AG2-0A50-05](#)
Carrier Gas: Helium @ 1.8 mL/min (constant flow)
Oven Program: 100 °C to 400 °C @ 14 °C/min for 10 min
Detector: FID @ 400 °C
Sample: Butter



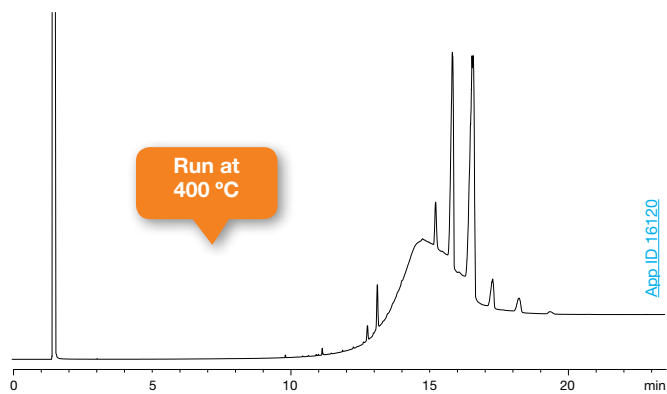
Olive Oil

Column: Zebtron ZB-5HT Inferno
Dimensions: 30 meter x 0.25 mm x 0.10 µm
Part No.: [7HG-G015-02](#)
Injection: On-Column @ 223 °C, 0.1 µL
Recommended Liner: Zebtron PLUS Direct Connect
Liner Part No.: [AG2-0A50-05](#)
Carrier Gas: Helium @ 1 mL/min (constant flow)
Oven Program: 220 °C for 1 min to 400 °C @ 8 °C/min for 4 min
Detector: FID @ 415 °C
Sample: Olive Oil



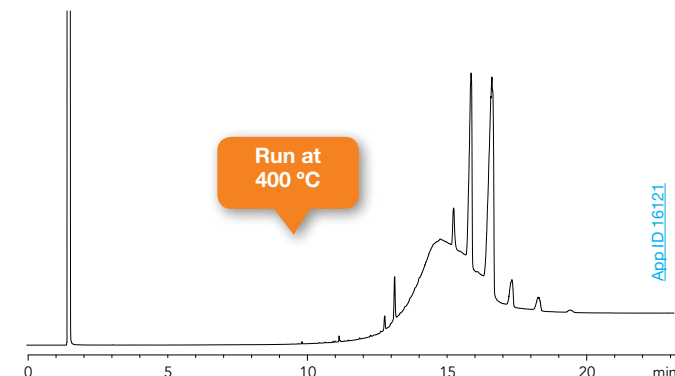
Peanut Oil

Column: Zebtron ZB-5HT Inferno
Dimensions: 30 meter x 0.25 mm x 0.10 µm
Part No.: [7HG-G015-02](#)
Injection: On-Column @ 63 °C, 0.1 µL
Recommended Liner: Zebtron PLUS Direct Connect
Liner Part No.: [AG2-0A50-05](#)
Carrier Gas: Helium @ 1.5 mL/min (constant flow)
Oven Program: 60 °C to 400 °C @ 25 °C/min for 10 min
Detector: FID @ 400 °C
Sample: Peanut Oil



Canola Oil

Column: Zebtron ZB-5HT Inferno
Dimensions: 30 meter x 0.25 mm x 0.10 µm
Part No.: [7HG-G015-02](#)
Injection: On-Column @ 63 °C, 0.1 µL
Recommended Liner: Zebtron PLUS Direct Connect
Liner Part No.: [AG2-0A50-05](#)
Carrier Gas: Helium @ 1.5 mL/min (constant flow)
Oven Program: 60 °C to 400 °C @ 25 °C/min for 10 min
Detector: FID @ 400 °C
Sample: Canola Oil



Additives and Preservatives

by GC/MS

Column: Zebron™ ZB-MultiResidue™-1
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: 7HG-G016-11
Injection: Splitless @ 270 °C (hold 0.66 sec), 1.0 µL
Recommended Liner: Zebron PLUS Single Taper
Liner Part No.: AG2-0A10-05
Carrier Gas: Helium @ 0.3 mL/min (constant flow)
Oven Program: 60 °C for 2 min to 270 °C @ 10 °C/min
Detector: MSD @ 230 °C, 45-450 amu
Note: Dilute Borneol in Methanol
Sample: 1. Isoborneol
2. Borneol



App ID 16360

GC Column Selection by Application



Food Safety

Compound Class	Analysis	Recommended Columns
Pesticides & Antimicrobials	Multi-Residue Pesticide Screening	ZB-MultiResidue™-1 and 2
	Organochlorine Pesticides in Water	ZB-MultiResidue-1 and 2
	Organochlorine Pesticides in Foods of Plant Origin	ZB-MultiResidue-1 and 2
	Organophosphorus Pesticides in Foods of Plant Origin	ZB-MultiResidue-1 and 2
	Triazine Pesticides in Water	ZB-50
	Triazine Pesticides in Foods of Plant Origin	ZB-50
	Chloramphenicol in Foods of Animal Origin	ZB-1ms
Environmental Contaminants	Polybrominated Diphenyl Ethers (PBDEs) in Food	ZB-SemiVolatiles or ZB-35
	Polychlorinated Biphenyls (PCBs) in Water	ZB-MultiResidue-1 or ZB-XLB-HT Inferno™
	Polychlorinated Dibenzo-dioxins (PCDDs) in Food	ZB-5MS _{PLUS} ™, ZB-SemiVolatiles
	Polychlorinated Dibenzo-furans (PCDFs) in Food	ZB-5MS _{PLUS} , ZB-SemiVolatiles
	Polycyclic Aromatic Hydrocarbons (PAHs) in Water	ZB-SemiVolatiles or ZB-35
Food Contact Materials	Food Packaging Volatiles	ZB-624
	Melamine in Food	ZB-XLB-HT Inferno
	Cyanuric Acid in Food	ZB-XLB-HT Inferno
	Phthalates in Food	ZB-5ms
	Residual Solvents in Food	ZB-624 or ZB-WAX _{PLUS} ™
	Bisphenol A & F (BPA/BPF) in Food	ZB-5ms
Additives & Preservatives	Parabens in Food	ZB-5ms
	Chloropropanols (3-MCPD) in Food	ZB-5ms
	Flavor Additives (Borneol)	ZB-MultiResidue-1
	Phenolic Antioxidants (BHA & BHT) in Food	ZB-50
	Tocopherols in Food	ZB-5MS _{PLUS}
Process Contaminants	Acrylamide in Foods	ZB-5HT Inferno
	Acrylamide, Acrylonitrile, and Acrolein in Water	ZB-624
	Benzene in Food	ZB-WAX _{PLUS}
	Glycols in Food	ZB-WAX _{PLUS}
Hormones	Steroid Hormones in Food	ZB-5ms or ZB-1ms



Food Quality

Compound Class	Analysis	Recommended Columns
Fatty Acids & FAMES	Cis/Trans FAMES	ZB-FAME
	Food Industry Fatty Acid Methyl Esters (FAMES)	ZB-FAME, ZB-WAX _{PLUS}
	Marine Oil Fatty Acid Methyl Esters (FAMES)	ZB-FAME, ZB-WAX _{PLUS}
	Saw Palmetto Fatty Acid Methyl Esters (FAMES)	ZB-FAME, ZB-WAX _{PLUS}
	Free Fatty Acids	ZB-FFAP
	Essential Fatty Acids (EFAs) Omega-3 and Omega-6	ZB-WAX _{PLUS} , ZB-23
Triglycerides	Butter Triglycerides	ZB-5HT Inferno
	Canola Oil Triglycerides	ZB-5HT Inferno
	Olive Oil Triglycerides	ZB-5HT Inferno
	Peanut Oil Triglycerides	ZB-5HT Inferno
Alcoholic Beverages	Cognac Compounds	ZB-WAX _{PLUS}
	Distilled Liquor Screen	ZB-FFAP
	Ethanol in Beer	ZB-Bioethanol
	Sulfur in Beer	ZB-1ms
	Whiskey Compounds	ZB-WAX _{PLUS}
	Wine Compounds	ZB-WAX or ZB-WAX _{PLUS}
Other Acids	Organic Acids	ZB-FFAP
	Amino Acids	ZB-50
Sterols	Sterols in Lard	ZB-5HT Inferno
	Sterols in Margarine	ZB-5HT Inferno
	Sterols in Olive Oil	ZB-5HT Inferno
	Sterols in Peanut Butter	ZB-5HT Inferno
Sugars	Alditol Acetates	ZB-5ms
	Trimethylsilyl (TMS) Sugars	ZB-MultiResidue-1



Flavors & Fragrances

Compound Class	Analysis	Recommended Columns
Essential Oils	Cold-Pressed Orange Oil	ZB-WAX _{PLUS}
	Ginkgo Biloba Oil	ZB-1ms
	Lavender Oil	ZB-1ms
	Peppermint Oil	ZB-WAX
	Rose Oil	ZB-XLB
	Spearmint Oil	ZB-5ms
	Ylang Ylang Oil	ZB-1ms
	Flavors Screening	ZB-FFAP
Flavors	Flavor Allergens	ZB-5ms
	Flavor Volatiles	ZB-1ms, ZB-WAX _{PLUS} , or ZB-624
	Alcoholic Beverage Profile	ZB-FFAP
	Honey Profile	ZB-WAX _{PLUS}
	Fragrance Screening	ZB-WAX _{PLUS} or ZB-624
Fragrances	Fragrance Allergens	ZB-1ms

Use the **NEW** GC Column Finder web app for easy column selection in under 1 minute!



Simply choose by part number, manufacturer, application, or official method to find the right GC column for your analysis.



Choose a category, choose your criteria, get a recommendation instantly. Simple as that.



Get applications and column overviews with your results – and save them for easy viewing.

www.phenomenex.com/FindGC

Sample Prep Products

Select the Appropriate Sample Prep Technique for Your Food Sample Requirements



	QuEChERS	Simplified Liquid Extraction	Solid Phase Extraction
Decrease LC/MS Down Time for Maintenance	•	•	•
Increase Column Lifetime	•	•	•
Remove Particulates		•	•
Remove Proteins	•	•	•
Remove Phospholipids	•	•	•
De-salt		•	•
Solvent Switching		•	•
Specifically Extract Target Analyte			•
Concentrate			•
Product Recommendation	roQ QuEChERS Kits	novum [™] simplified liquid extraction	strata [®] Solid Phase Extraction
Clean-up Time (min)	< 10	< 15	< 30
Degree of Cleanliness			

QuEChERS

A **Quicker** and **Easier** Sample Preparation Choice



1

What is QuEChERS?

QuEChERS is a Sample Preparation Technique for:

- Complex sample matrices
- Wide range of compounds (typically pesticides)
- Food and environmental samples

2

What does it stand for?

“Quick Easy Cheap Effective Rugged Safe” (QuEChERS)

3

How does it help me?

QuEChERS is a simplified 2 step sample preparation process that:

- Significantly reduces sample preparation time
- Is simple, inexpensive, and easy to use
- And is effective and rugged at extracting and cleaning samples for a wide range of compounds

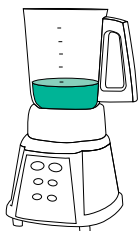
Watch how roQ QuEChERS work
www.phenomenex.com/roQ



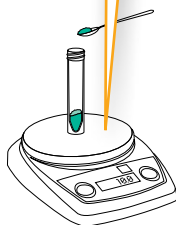
How Does roQ QuEChERS Work?

STEP 1

Extraction



Blend fruits or vegetables to be analyzed.



Easily Weigh Out Samples

Weigh blended sample.

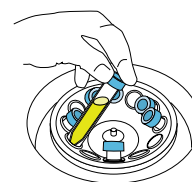


No Mess Salt Packets

Add salts and acetonitrile.



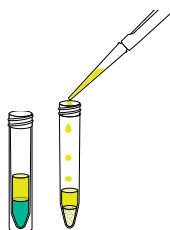
Shake tube for 1 minute.



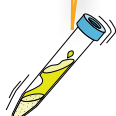
Centrifuge tube for 5 minutes.

STEP 2

Clean Up/dSPE

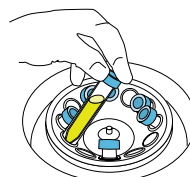


Add supernatant from extraction procedure into a roQ dSPE tube.



Shake dSPE tube for 30 seconds.

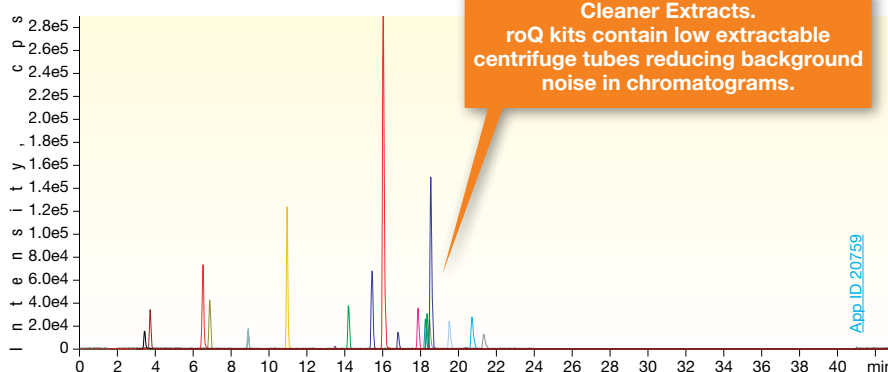
Avoid Leaky Tubes. Our tubes are designed to seal completely.



Centrifuge dSPE tube for 5 minutes.

STEP 3

Analysis by GC or HPLC



Salts and Sorbents used in roQ Kits

Extraction:

- Magnesium Sulfate (MgSO_4)
- Sodium Acetate (NaOAc)
- Sodium Chloride (NaCl)
- Sodium Citrate Tribasic Dihydrate (SCTD)
- Sodium Citrate Dibasic Sesquihydrate (SCDS)

Clean Up/dSPE:

- Magnesium Sulfate (MgSO_4)
- Primary/Secondary Amine (PSA)
- Endcapped C18 Sorbent (C18E)
- Graphitized Carbon Black (GCB)

Choose Your Kit

STEP 1

Extraction*

AOAC

AOAC 2007.01 Method
6.0 g MgSO_4 , 1.5 g NaOAc
[KS0-8911](#)

ORIGINAL

Non-Buffered Method
4.0 g MgSO_4 , 1.0 g NaCl
[KS0-8910](#)
6.0 g MgSO_4 , 1.5 g NaCl
[KS0-8912](#)

EN

EN 15662 Method
4.0 g MgSO_4 , 1.0 g NaCl,
1.0 g SCTD, 0.5 g SCDS
[KS0-8909](#)

STEP 2

Clean Up/dSPE**

	AOAC 2007.01		EN 15662	
	1 mL	8 mL	1 mL	6 mL
General				
	150 mg MgSO_4 50 mg PSA KS0-8920	1200 mg MgSO_4 400 mg PSA KS0-8928	150 mg MgSO_4 25 mg PSA KS0-8916	900 mg MgSO_4 150 mg PSA KS0-8924
Fats and Waxes				
	150 mg MgSO_4 50 mg PSA 50 mg C18E KS0-8918	1200 mg MgSO_4 400 mg PSA 400 mg C18E KS0-8926	150 mg MgSO_4 25 mg PSA 25 mg C18E KS0-8913	900 mg MgSO_4 150 mg PSA 150 mg C18E KS0-8921
Pigmented				
	150 mg MgSO_4 50 mg PSA 50 mg GCB KS0-8919	1200 mg MgSO_4 400 mg PSA 400 mg GCB KS0-8927	150 mg MgSO_4 25 mg PSA 2.5 mg GCB KS0-8914	900 mg MgSO_4 150 mg PSA 15 mg GCB KS0-8922
Highly Pigmented				
	—	—	150 mg MgSO_4 25 mg PSA 7.5 mg GCB KS0-8915	900 mg MgSO_4 150 mg PSA 45 mg GCB KS0-8923
Pigments and Fats				
	150 mg MgSO_4 50 mg PSA 50 mg GCB 50 mg C18E KS0-8917	1200 mg MgSO_4 400 mg PSA 400 mg GCB 400 mg C18E KS0-8925	—	—

GC



LC



*All roQ Extraction kits contain fifty easy-pour salt packets and fifty 50 mL stand-alone centrifuge tubes.

**All roQ dSPE kits contain pre-weighed sorbents/salts inside 2 mL or 15 mL centrifuge tubes.

roQ Ordering Information



roQ Extraction Kits

Extraction kits contain fifty easy-pour salt packets and fifty 50 mL stand-alone centrifuge tubes

Description	Unit	Part No.
AOAC 2007.01 Method Extraction Kits		
6.0 g MgSO ₄ , 1.5 g NaOAc	50/pk	KS0-8911*
EN 15662 Method Extraction Kits		
4.0 g MgSO ₄ , 1.0 g NaCl, 1.0 g SCTD, 0.5 g SCDS	50/pk	KS0-8909*
Original Non-buffered Method Extraction Kits		
4.0 g MgSO ₄ , 1.0 g NaCl	50/pk	KS0-8910
6.0 g MgSO ₄ , 1.5 g NaCl	50/pk	KS0-8912

*AOAC and EN Extraction Kits also available in traditional non-collared 50 mL centrifuge tubes, Part No.: [KS0-8911-NC](#) and [KS0-8909-NC](#)

roQ dSPE Kits

dSPE kits contain pre-weighed sorbents/salts inside 2 mL or 15 mL centrifuge tubes

Description	Unit	Part No.
2 mL dSPE Kits		
150 mg MgSO ₄ , 25 mg PSA, 25 mg C18E	100/pk	KS0-8913
150 mg MgSO ₄ , 25 mg PSA, 2.5 mg GCB	100/pk	KS0-8914
150 mg, MgSO ₄ , 25 mg PSA, 7.5 mg GCB	100/pk	KS0-8915
150 mg MgSO ₄ , 25 mg PSA	100/pk	KS0-8916
150 mg MgSO ₄ , 50 mg PSA, 50 mg C18E, 50 mg GCB	100/pk	KS0-8917
150 mg MgSO ₄ , 50 mg PSA, 50 mg C18E	100/pk	KS0-8918
150 mg MgSO ₄ , 50 mg PSA, 50 mg GCB	100/pk	KS0-8919
150 mg MgSO ₄ , 50 mg PSA	100/pk	KS0-8920
15 mL dSPE Kits		
900 mg MgSO ₄ , 150 mg PSA, 150 mg C18E	50/pk	KS0-8921
900 mg MgSO ₄ , 150 mg PSA, 15 mg GCB	50/pk	KS0-8922
900 mg MgSO ₄ , 150 mg PSA, 45 mg GCB	50/pk	KS0-8923
900 mg MgSO ₄ , 150 mg PSA	50/pk	KS0-8924
1200 mg MgSO ₄ , 400 mg PSA, 400 mg C18E, 400 mg GCB	50/pk	KS0-8925
1200 mg MgSO ₄ , 400 mg PSA, 400 mg C18E	50/pk	KS0-8926
1200 mg MgSO ₄ , 400 mg PSA, 400 mg GCB	50/pk	KS0-8927
1200 mg MgSO ₄ , 400 mg PSA	50/pk	KS0-8928

roQ Extraction Salt Packets

Salt packets only. Centrifuge tubes not included.

Description	Unit	Part No.
AOAC 2007.01 Method Extraction Packets		
6.0 g MgSO ₄ , 1.5 g NaOAc	50/pk	AH0-9043
EN 15662 Method Extraction Packets		
4.0 g MgSO ₄ , 1.0 g NaCl, 1.0 g SCTD, 0.5 g SCDS	50/pk	AH0-9041
Original Non-Buffered Method Extraction Packets		
4.0 g MgSO ₄ , 1.0 g NaCl	50/pk	AH0-9042
6.0 g MgSO ₄ , 1.5 g NaCl	50/pk	AH0-9044

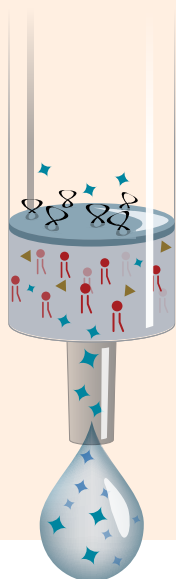
Bulk roQ QuEChERS Sorbents

Phase	10 g	100 g
C18-E	—	04G-4348
GCB (Graphitized Carbon Black)	04D-4615	04G-4615
PSA	—	04G-4610



For more details visit:
www.phenomenex.com/roQ

A Simplified Liquid-Liquid Extraction

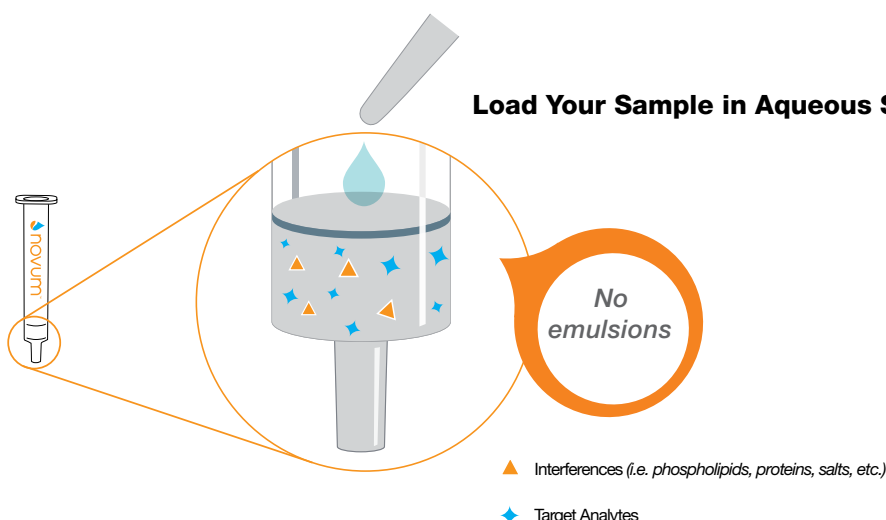


Simplified Liquid Extraction (SLE) is a FASTER, EASIER, and MORE RELIABLE way to perform liquid-liquid extractions

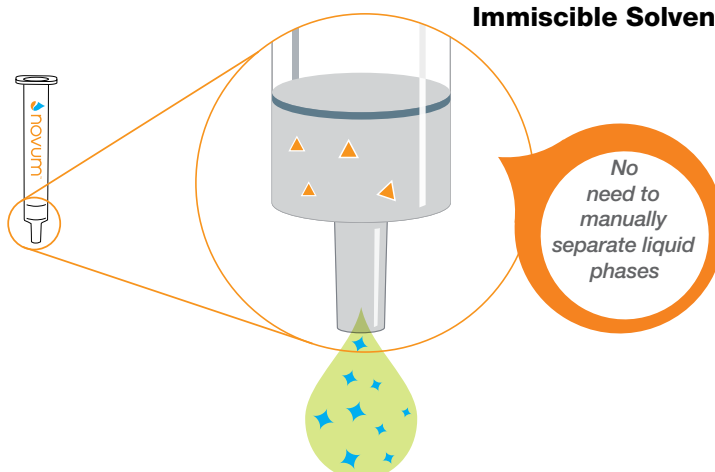
- Eliminates interferences from your analysis
- Remove unwanted interferences such as proteins and phospholipids without performing extensive method development
- Provides consistent, reliable results from lot-to-lot

An Easy, Automatable Procedure

Load Your Sample in Aqueous Solvent



Collect Your Target Analytes in Water Immiscible Solvent



Novum Simplified Liquid Extraction (SLE) Ordering Information



PATENT PENDING

Process samples as small as 100 µL or as large as 1 mL using Novum SLE tubes.

				
Novum SLE Tubes	1 cc	3 cc	6 cc	12 cc
Maximum Sample Volume (before dilution)	100 µL	200 µL	500 µL	1 mL
Recommended Elution Volume	1.2 mL	1.8 mL	5 mL	10 mL
Part No.	8B-S138-FAK	8B-S138-5BJ	8B-S138-JCH	8B-S138-KDG
Unit	100/pk	50/pk	30/pk	20/pk



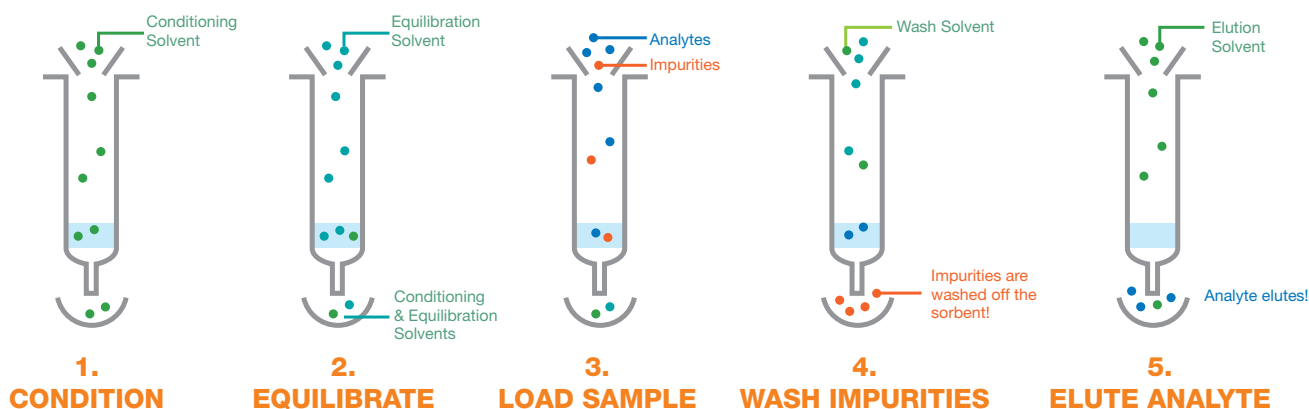
Solid Phase Extraction (SPE)

strata[®]X
Polymeric SPE

Solid Phase Extraction (SPE) is a very targeted form of sample preparation that allows you to isolate your analyte of interest while removing any interfering compounds that may be in your sample.

- Targeted analyte extraction for cleaner analysis
- Concentration of samples for better chromatographic results
- Solvent switching for GC or LC compatibility

Solid Phase Extraction General Protocol



A Choice for Every Analyte

OPTION 01



Acidic Compounds

Strong Acids ($pK_a < 2$)	Weak Acids (pK_a 2-4)
<i>Strata-X-AW</i>	<i>Strata-X-A</i>

OPTION 02



Neutral Compounds

Neutral Compounds
<i>Strata-X</i>

OPTION 03



Basic Compounds

Weak Bases (pK_a 8-10)	Strong Bases ($pK_a > 10$)
<i>Strata-X-C</i>	<i>Strata-X-CW</i>

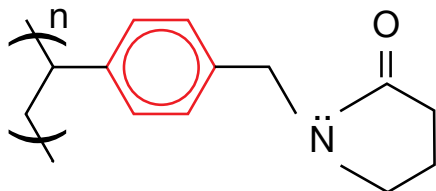
www.phenomenex.com/SPE

Strata-X

U.S. Patent No. 7,119,145

A reversed phase functionalized polymeric sorbent that gives strong retention of neutral, acidic, or basic compounds under aggressive, high organic wash conditions.

3 Mechanisms of Retention



- π - π Bonding
- Hydrogen Bonding Dipole-Dipole Interactions
- Hydrophobic Interaction

General Extraction Protocol

Strata-X, 30 mg/1 mL tube

Condition: 1 mL Methanol followed by 1 mL D.I. Water

Load: Recommended volume of sample (pH 6-7)

Wash: 1 mL 5-60 % Methanol in D.I. Water.

Elute: 2x 500 μ L 2 % Formic acid in Methanol or Acetonitrile

Ordering Information

Format	Sorbent Mass	Part Number	Unit
Tube			
	30 mg	8B-S100-TAK**	1 mL (100/box)
	30 mg	8B-S100-TBJ	3 mL (50/box)
	60 mg	8B-S100-UBJ**	3 mL (50/box)
	100 mg	8B-S100-EBJ	3 mL (50/box)
	100 mg	8B-S100-ECH	6 mL (30/box)
	200 mg	8B-S100-FBJ	3 mL (50/box)
	200 mg	8B-S100-FCH	6 mL (30/box)
	500 mg	8B-S100-HBJ	3 mL (50/box)
	500 mg	8B-S100-HCH	6 mL (30/box)
Giga™ Tube			
	500 mg	8B-S100-HDG	12 mL (20/box)
	1 g	8B-S100-JDG	12 mL (20/box)
	1 g	8B-S100-JEG	20 mL (20/box)
	2 g	8B-S100-KEG	20 mL (20/box)
	5 g	8B-S100-LFF	60 mL (16/box)
Teflon® Tube			
	200 mg	8B-S100-FBJ-T	3 mL (50/box)
	200 mg	8B-S100-FDG-T	12 mL (20/box)

**Tabless tube available. Contact Phenomenex for details
Additional sizes, formats and sorbent masses available.



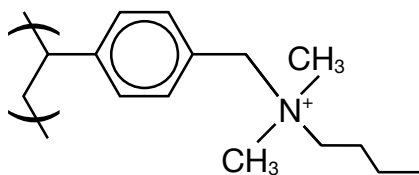
Watch how SPE works:
www.phenomenex.com/SPE

Strata-X-A

A strong anion-exchange functionalized polymeric sorbent that allows for complete retention of weakly acidic compounds with pK_a greater than 2, making 100 % organic wash conditions possible.

strata[®]
Polymeric SPE

3 Mechanisms of Retention



- Strong Anion-Exchange
- π - π Bonding
- Hydrophobic Interaction

General Extraction Protocol

Strata-X-A, 30 mg/1 mL tube

Condition: 1 mL Methanol followed by 1 mL D.I. Water

Load: Recommended volume of sample (pH 6-7)

Wash: 1 mL 25 mM Ammonium acetate (pH 6-7) followed by 1 mL Methanol

Elute: 2x 500 μ L 5 % Formic acid in Methanol or Acetonitrile

Ordering Information

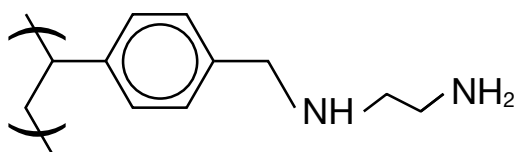
Format	Sorbent Mass	Part Number	Unit
Tube			
	30 mg	8B-S123-TAK**	1 mL (100/box)
	30 mg	8B-S123-TBJ	3 mL (50/box)
	60 mg	8B-S123-UBJ	3 mL (50/box)
	100 mg	8B-S123-EBJ	3 mL (50/box)
	100 mg	8B-S123-ECH	6 mL (30/box)
	200 mg	8B-S123-FBJ	3 mL (50/box)
	200 mg	8B-S123-FCH	6 mL (30/box)
	500 mg	8B-S123-HBJ	3 mL (50/box)
	500 mg	8B-S123-HCH	6 mL (30/box)
Giga[™] Tube			
	500 mg	8B-S123-HDG	12 mL (20/box)
	1 g	8B-S123-JDG	12 mL (20/box)
	1 g	8B-S123-JEG	20 mL (20/box)
	2 g	8B-S123-KEG	20 mL (20/box)
	5 g	8B-S123-LFF	60 mL (16/box)

**Tablets tube available. Contact Phenomenex for details
Additional sizes, formats and sorbent masses available.

Strata-X-AW

A weak anion-exchange functionalized polymeric sorbent that allows for complete retention of acidic compounds with pK_a less than 5, making 100 % organic wash conditions possible.

3 Mechanisms of Retention



- Weak Anion-Exchange
- π - π Bonding
- Hydrophobic Interaction

General Extraction Protocol

Strata-X-AW, 30 mg/1 mL tube

Condition: 1 mL Methanol followed by 1 mL D.I. Water

Load: Recommended volume of sample (pH 6-7)

Wash: 1 mL 25 mM Ammonium acetate (pH 6-7) followed by 1 mL Methanol

Elute: 2x 500 μ L 5 % Ammonium hydroxide in Methanol or Acetonitrile

Ordering Information

Format	Sorbent Mass	Part Number	Unit
Tube			
	30 mg	8B-S038-TAK**	1 mL (100/box)
	30 mg	8B-S038-TBJ	3 mL (50/box)
	60 mg	8B-S038-UBJ	3 mL (50/box)
	100 mg	8B-S038-EBJ	3 mL (50/box)
	100 mg	8B-S038-ECH	6 mL (30/box)
	200 mg	8B-S038-FBJ	3 mL (50/box)
	200 mg	8B-S038-FCH	6 mL (30/box)
	500 mg	8B-S038-HBJ	3 mL (50/box)
	500 mg	8B-S038-HCH	6 mL (30/box)
Giga[™] Tube			
	500 mg	8B-S038-HDG	12 mL (20/box)
	1 g	8B-S038-JDG	12 mL (20/box)
	1 g	8B-S038-JEG	20 mL (20/box)
	5 g	8B-S038-LFF	60 mL (16/box)

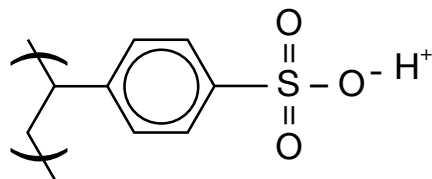
**Tablets tube available. Contact Phenomenex for details
Additional sizes, formats and sorbent masses available.

Strata-X-C

A strong cation-exchange functionalized polymeric sorbent that allows for complete retention of basic compounds with a pK_a less than 10.5, making 100 % organic wash conditions possible.



3 Mechanisms of Retention



- Strong Cation-Exchange
- π - π Bonding
- Hydrophobic Interaction

General Extraction Protocol

Strata-X-C, 30 mg/1 mL tube

Condition: 1 mL Methanol followed by 1 mL D.I. Water

Load: Recommended volume of sample (pH 6-7)

Wash: 1 mL 0.1 N Hydrochloric acid in D.I. Water followed by 1 mL 0.1 N Hydrochloric acid in Methanol

Elute: 2x 500 μ L 5 % Ammonium hydroxide in Methanol or Acetonitrile

Ordering Information

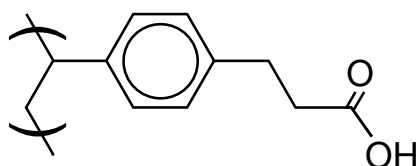
Format	Sorbent Mass	Part Number	Unit
Tube			
	30 mg	8B-S029-TAK**	1 mL (100/box)
	30 mg	8B-S029-TBJ	3 mL (50/box)
	60 mg	8B-S029-UBJ**	3 mL (50/box)
	100 mg	8B-S029-EBJ	3 mL (50/box)
	100 mg	8B-S029-ECH	6 mL (30/box)
	200 mg	8B-S029-FBJ	3 mL (50/box)
	200 mg	8B-S029-FCH	6 mL (30/box)
	500 mg	8B-S029-HBJ	3 mL (50/box)
	500 mg	8B-S029-HCH	6 mL (30/box)
Giga™ Tube			
	500 mg	8B-S029-HDG	12 mL (20/box)
	1 g	8B-S029-JDG	12 mL (20/box)
	1 g	8B-S029-JEG	20 mL (20/box)
	2 g	8B-S029-KEG	20 mL (20/box)
	5 g	8B-S029-LFF	60 mL (16/box)

**Tablets tube available. Contact Phenomenex for details
Additional sizes, formats and sorbent masses available.

Strata-X-CW

A weak cation-exchange functionalized polymeric sorbent that allows for complete retention of basic compounds with a pK_a greater than 8, including quaternary amines, making 100 % organic wash conditions possible.

3 Mechanisms of Retention



- Weak Cation-Exchange
- π - π Bonding
- Hydrophobic Interaction

General Extraction Protocol

Strata-X-CW, 30 mg/1 mL tube

Condition: 1 mL Methanol followed by 1 mL D.I. Water

Load: Recommended volume of sample (pH 6-7)

Wash: 1 mL D.I. Water followed by 1 mL Methanol

Elute: 2x 500 μ L 5 % Formic acid in Methanol or Acetonitrile

Ordering Information

Format	Sorbent Mass	Part Number	Unit
Tube			
	30 mg	8B-S035-TAK**	1 mL (100/box)
	30 mg	8B-S035-TBJ	3 mL (50/box)
	60 mg	8B-S035-UBJ**	3 mL (50/box)
	100 mg	8B-S035-ECH	6 mL (30/box)
	200 mg	8B-S035-FBJ	3 mL (50/box)
	200 mg	8B-S035-FCH	6 mL (30/box)
	500 mg	8B-S035-HBJ	3 mL (50/box)
	500 mg	8B-S035-HCH	6 mL (30/box)
Giga™ Tube			
	1 g	8B-S035-JDG	12 mL (20/box)
	1 g	8B-S035-JEG	20 mL (20/box)
	2 g	8B-S035-KEG	20 mL (20/box)
	5 g	8B-S035-LFF	60 mL (16/box)

**Tablets tube available. Contact Phenomenex for details
Additional sizes, formats and sorbent masses available.

Sample Prep Accessories

SPE Tube Vacuum Manifold

- Process up to 12 or 24 samples at one time
- Process up to 10 large volume samples at one time
- Female Luer inlets fit all male Luer tipped SPE tubes and cartridges

Ordering Information

Part No.	Description	Unit
24-Position Vacuum Manifold		
AH0-6024	SPE 24-Position Vacuum Manifold Set, complete assembly	ea
24-Position Vacuum Manifold Replacement Parts		
AH0-6026	SPE Glass Chamber	ea
AH0-6028	SPE Cover, Gasket and 24 Stopcocks	ea
AH0-6030	SPE Gaskets	2/pk
AH0-6038	SPE Collection Rack Assembly, including plates, legs and clips	ea
AH0-6049	SPE Luer Stopcocks	24/pk
12-Position Vacuum Manifold		
AH0-6023	SPE 12-Position Vacuum Manifold Set, complete assembly	ea
12-Position Vacuum Manifold Replacement Parts		
AH0-6025	SPE 12-Position Glass Chamber	ea
AH0-6027	SPE Cover, Gasket and 12 Stopcocks	ea
AH0-6029	SPE Gaskets	2/pk
AH0-6037	SPE Collection Rack Assembly, including plates, legs and clips	ea
AH0-6052	SPE 12-Position Vacuum Waste Container, polypropylene	10/pk
AH0-6049	SPE Luer Stopcocks	24/pk
10-Position Tall-Boy™ Vacuum Manifold		
AH0-7502	SPE 10-Position Tall-Boy Vacuum Manifold, complete assembly	ea
10-Position Tall-Boy™ Vacuum Manifold Replacement Parts		
AH0-7503	SPE 10-Position Tall-Boy Vacuum Manifold, Glass Chamber	ea
AH0-7504	SPE 10-Position Tall-Boy Vacuum Manifold, Cover, Gasket and 10 Stopcocks	ea
AH0-6049	SPE Luer Stopcocks	24/pk

For additional vacuum manifold information, contact Phenomenex.

Sample Processing Guidelines for Strata-X Sorbents

Vacuum Manifolds for Tubes

- Maximize throughput with simple, cost effective batch processing of up to 96 samples per hour. (24 samples per 15 minutes)
- Fits 13 mm and 16 mm test tubes up to 125 mm in height.
- “Slow is Safe” for loading and elution. A flow rate of 1–3 drops per second (1–3 mL/min) is recommended during the loading and elution steps for typical small volume samples (< 5 mL). At these critical steps the analytes are chemically interacting with the sorbent.
- Large volume samples (> 100 mL) in large cartridges (>1 gram) may be processed at flow rates between 5–10 mL/minute.
- Conditioning and Wash steps are generally not flow critical.
- Flow rate is easily adjusted via master vacuum controller or individual stopcocks if necessary.
- Individual stopcocks are typically not needed when using the Strata-X family of sorbents (Strata-X, X-C, X-CW, X-A, X-AW, XL, XL-C, XL-CW, XL-A, XL-AW). They are very forgiving of improper flow rates and are truly resistant to deconditioning effects caused by excessive drying during the method.
- Reversed phase methods are more forgiving of fast flow rates than ion-exchange or normal phase.

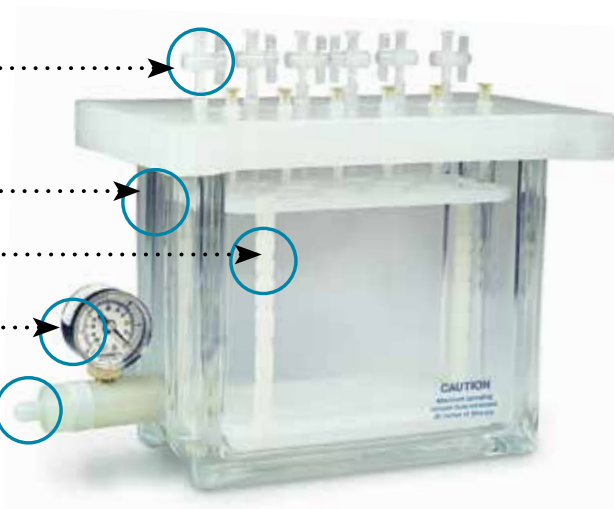
Stopcock.....

Glass Chamber.....

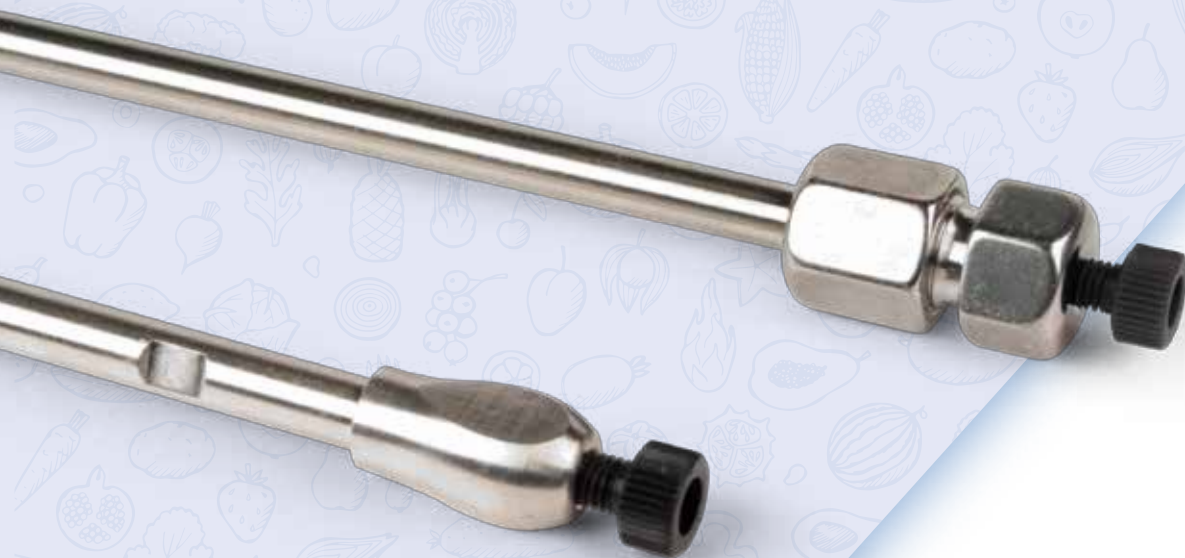
Collection Rack.....

Vacuum Gauge.....

Valve Assembly.....



LC Products



HPLC/UHPLC Columns and Accessories

Luna

explore

LUNA®

- Exceptionally rugged USP phases
- Easy method scalability with 1.6 µm, 2.5 µm, 3 µm, 5 µm, 10 µm and PREP Media
- Extensive batch traceability and reproducibility data supplied with every column

Ordering Information

3 µm Minibore Columns (mm)					SecurityGuard™ Cartridges (mm)
Phases	30 x 2.0	50 x 2.0	100 x 2.0	150 x 2.0	4 x 2.0*
Silica(2)	00A-4162-B0	00B-4162-B0	00D-4162-B0	00F-4162-B0	AJ0-4347
C8(2)	00A-4248-B0	00B-4248-B0	00D-4248-B0	00F-4248-B0	AJ0-4289
C18(2)	00A-4251-B0	00B-4251-B0	00D-4251-B0	00F-4251-B0	AJ0-4286
CN	00A-4254-B0	00B-4254-B0	00D-4254-B0	00F-4254-B0	AJ0-4304
Phenyl-Hexyl	00A-4256-B0	00B-4256-B0	00D-4256-B0	00F-4256-B0	AJ0-4350
NH ₂	00A-4377-B0	00B-4377-B0	00D-4377-B0	00F-4377-B0	AJ0-4301
HILIC	00A-4449-B0	00B-4449-B0	00D-4449-B0	00F-4449-B0	AJ0-8328
PFP(2)	00A-4447-B0	00B-4447-B0	00D-4447-B0	00F-4447-B0	AJ0-8326

for ID: 2.0-3.0 mm

3 µm MidBore™ and Analytical Columns (mm)									SecurityGuard Cartridges (mm)	
Phases	30 x 3.0	50 x 3.0	150 x 3.0	30 x 4.6	50 x 4.6	75 x 4.6	100 x 4.6	150 x 4.6	4 x 2.0*	4 x 3.0*
Silica(2)	—	00B-4162-Y0	00F-4162-Y0	00A-4162-E0	00B-4162-E0	00C-4162-E0	00D-4162-E0	00F-4162-E0	AJ0-4347	AJ0-4348
C8(2)	00A-4248-Y0	00B-4248-Y0	00F-4248-Y0	00A-4248-E0	00B-4248-E0	00C-4248-E0	00D-4248-E0	00F-4248-E0	AJ0-4289	AJ0-4290
C18(2)	00A-4251-Y0	00B-4251-Y0	00F-4251-Y0	00A-4251-E0	00B-4251-E0	00C-4251-E0	00D-4251-E0	00F-4251-E0	AJ0-4286	AJ0-4287
CN	—	00B-4254-Y0	00F-4254-Y0	00A-4254-E0	00B-4254-E0	00C-4254-E0	00D-4254-E0	00F-4254-E0	AJ0-4304	AJ0-4305
Phenyl-Hexyl	—	00B-4256-Y0	00F-4256-Y0	00A-4256-E0	00B-4256-E0	00C-4256-E0	00D-4256-E0	00F-4256-E0	AJ0-4350	AJ0-4351
NH ₂	—	00B-4377-Y0	00F-4377-Y0	—	00B-4377-E0	—	00D-4377-E0	00F-4377-E0	AJ0-4301	AJ0-4302
HILIC	—	00B-4449-Y0	00F-4449-Y0	—	—	—	00D-4449-E0	00F-4449-E0	AJ0-8328	AJ0-8329
PFP(2)	—	00B-4447-Y0	00F-4447-Y0	—	00B-4447-E0	—	00D-4447-E0	00F-4447-E0	AJ0-8326	AJ0-8327

for ID: 2.0-3.0 mm 3.2-8.0 mm

5 µm Minibore Columns (mm)			SecurityGuard™ Cartridges (mm)
Phases	150 x 2.0	250 x 2.0	4 x 2.0*
Silica(2)	00F-4274-B0	00G-4274-B0	AJ0-4347
C8(2)	00F-4249-B0	00G-4249-B0	AJ0-4289
C18(2)	00F-4252-B0	00G-4252-B0	AJ0-4286
CN	00F-4255-B0	—	AJ0-4304
Phenyl-Hexyl	00F-4257-B0	00G-4257-B0	AJ0-4350
NH ₂	00F-4378-B0	00G-4378-B0	AJ0-4301
PFP(2)	00F-4448-B0	—	AJ0-8326

for ID: 2.0-3.0 mm

5 µm MidBore and Analytical Columns (mm)								SecurityGuard Cartridges (mm)	
Phases	30 x 3.0	50 x 3.0	150 x 3.0	250 x 3.0	30 x 4.6	50 x 4.6	75 x 4.6	4 x 2.0*	4 x 3.0*
C8(2)	00A-4252-Y0	00B-4249-Y0	00F-4249-Y0	00G-4249-Y0	00A-4249-E0	00B-4249-E0	00C-4249-E0	AJ0-4289	AJ0-4290
C18(2)	00A-4252-Y0	00B-4252-Y0	00F-4252-Y0	00G-4252-Y0	00A-4252-E0	00B-4252-E0	00C-4252-E0	AJ0-4286	AJ0-4287
CN	—	00B-4255-Y0	00F-4255-Y0	00G-4255-Y0	00A-4255-E0	00B-4255-E0	00C-4255-E0	AJ0-4304	AJ0-4305
Phenyl-Hexyl	—	00B-4257-Y0	00F-4257-Y0	00G-4257-Y0	00A-4257-E0	00B-4257-E0	—	AJ0-4350	AJ0-4351
NH ₂	—	00B-4378-Y0	00F-4378-Y0	00G-4378-Y0	00A-4378-E0	00B-4378-E0	—	AJ0-4301	AJ0-4302
SCX	—	—	00F-4398-Y0	—	—	00B-4398-E0	—	AJ0-4307	AJ0-4308
HILIC	—	—	00F-4450-Y0	—	—	—	—	AJ0-8328	AJ0-8329
PFP(2)	—	00B-4448-Y0	00F-4448-Y0	—	00A-4448-E0	00B-4448-E0	—	AJ0-8326	AJ0-8327

for ID: 2.0-3.0 mm 3.2-8.0 mm

5 µm Analytical Columns (mm)				SecurityGuard Cartridges (mm)
Phases	100 x 4.6	150 x 4.6	250 x 4.6	4 x 3.0*
Silica(2)	00D-4274-E0	00F-4274-E0	00G-4274-E0	AJ0-4348
C8(2)	00D-4249-E0	00F-4249-E0	00G-4249-E0	AJ0-4290
C18(2)	00D-4252-E0	00F-4252-E0	00G-4252-E0	AJ0-4287
CN	00D-4255-E0	00F-4255-E0	00G-4255-E0	AJ0-4305
Phenyl-Hexyl	00D-4257-E0	00F-4257-E0	00G-4257-E0	AJ0-4351
NH ₂	00D-4378-E0	00F-4378-E0	00G-4378-E0	AJ0-4302
SCX	00D-4398-E0	00F-4398-E0	00G-4398-E0	AJ0-4308
HILIC	00D-4450-E0	00F-4450-E0	00G-4450-E0	AJ0-8329
PFP(2)	00D-4448-E0	00F-4448-E0	00G-4448-E0	AJ0-8327

for ID: 3.2-8.0 mm

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
Luna Omega Polar C18	00A-4748-AN	00B-4748-AN	00D-4748-AN	00F-4748-AN	AJ0-9505
Luna Omega PS C18	00A-4752-AN	00B-4752-AN	00D-4752-AN	00F-4752-AN	AJ0-9508
Luna Omega C18	00A-4742-AN	00B-4742-AN	00D-4742-AN	00F-4742-AN	AJ0-9502

for 2.1 mm ID

* SecurityGuard ULTRA Cartridges require holder, Part No.: [AJ0-9000](#)* SecurityGuard Analytical Cartridges require holder, Part No.: [KJ0-4282](#)

Additional dimensions available.
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Specialist for more information or
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Full range selectivity for reversed phase separation

- 4 unique phases to optimize even the most challenging separations
- Available in 2.5 µm and 4 µm particles for high efficiency

Ordering Information

Fast LC Solutions

2.5 µm High Speed Technology (HST) Columns (mm)						
Phases	30 x 2.0	50 x 2.0	100 x 2.0	50 x 3.0	100 x 3.0	50 x 4.6
Max-RP	00A-4372-B0	00B-4372-B0	00D-4372-B0	00B-4372-Y0	00D-4372-Y0	00D-4372-E0
Hydro-RP	00A-4387-B0	00B-4387-B0	00D-4387-B0	00B-4387-Y0	00D-4387-Y0	00D-4387-E0
Polar-RP	00A-4371-B0	00B-4371-B0	00D-4371-B0	00B-4371-Y0	00D-4371-Y0	00D-4371-E0
Fusion-RP	00A-4423-B0	00B-4423-B0	00D-4423-B0	00B-4423-Y0	00D-4423-Y0	00D-4423-E0

2.5 µm MercuryMS [™] LC/MS Cartridges (mm)				Columns (mm)	
Phases	10 x 2.0	10 x 4.0	20 x 2.0	20 x 4.0	
Max-RP	00N-4372-B0-CE	—	00M-4372-B0-CE	00M-4372-D0-CE	—
Hydro-RP	00N-4387-B0-CE	00N-4387-D0-CE	00M-4387-B0-CE	—	—
Polar-RP	00N-4371-B0-CE	00N-4371-D0-CE	00M-4371-B0-CE	—	00M-4371-B0
Fusion-RP	00N-4423-B0-CE	—	00M-4423-B0-CE	00M-4423-D0-CE	00M-4423-D0

For 10 mm cartridge holder: [CH0-7187](#)

For 20 mm cartridge holder: [CH0-7188](#)

Capillary Columns

4 µm Synergi Capillary Columns (mm)					Guard Columns (mm)
Phases	50 x 0.30	150 x 0.30	150 x 0.50	250 x 0.50	20 x 0.30
Max-RP	00B-4337-AC	—	—	—	03M-4337-AC
Hydro-RP	00B-4375-AC	00F-4375-AC	—	00G-4375-AF	03M-4375-AC
Fusion-RP	00B-4424-AC	00F-4424-AC	00F-4424-AF	—	03M-4424-AC



Analytical Columns

4 µm Microbore and Minibore Columns (mm)								SecurityGuard [™] Cartridges (mm)
Phases	50 x 1.0	150 x 1.0	30 x 2.0	50 x 2.0	75 x 2.0	150 x 2.0	250 x 2.0	4 x 2.0*
Max-RP	00B-4337-A0	00F-4337-A0	00A-4337-B0	00B-4337-B0	00C-4337-B0	00F-4337-B0	00G-4337-B0	AJ0-6073
Hydro-RP	00B-4375-A0	00F-4375-A0	00A-4375-B0	00B-4375-B0	00C-4375-B0	00F-4375-B0	00G-4375-B0	AJ0-7510
Polar-RP	00B-4336-A0	00F-4336-A0	00A-4336-B0	00B-4336-B0	00C-4336-B0	00F-4336-B0	00G-4336-B0	AJ0-6075
Fusion-RP	00B-4424-A0	00F-4424-A0	00A-4424-B0	00B-4424-B0	00C-4424-B0	00F-4424-B0	00G-4424-B0	AJ0-7556

for ID: 2.0-3.0 mm

4 µm MidBore [™] Columns (mm)					SecurityGuard Cartridges (mm)
Phases	30 x 3.0	50 x 3.0	150 x 3.0	250 x 3.0	4 x 2.0*
Max-RP	—	00B-4337-Y0	00F-4337-Y0	00G-4337-Y0	AJ0-6073
Hydro-RP	—	00B-4375-Y0	00F-4375-Y0	00G-4375-Y0	AJ0-7510
Polar-RP	00A-4336-Y0	00B-4336-Y0	00F-4336-Y0	00G-4336-Y0	AJ0-6075
Fusion-RP	—	00B-4424-Y0	00F-4424-Y0	00G-4424-Y0	AJ0-7556

for ID: 2.0-3.0 mm

4 µm Analytical Columns (mm)						SecurityGuard Cartridges (mm)
Phases	30 x 4.6	50 x 4.6	75 x 4.6	150 x 4.6	250 x 4.6	4 x 3.0*
Max-RP	00A-4337-E0	00B-4337-E0	00C-4337-E0	00F-4337-E0	00G-4337-E0	AJ0-6074
Hydro-RP	00A-4375-E0	00B-4375-E0	00C-4375-E0	00F-4375-E0	00G-4375-E0	AJ0-7511
Polar-RP	00A-4336-E0	00B-4336-E0	00C-4336-E0	00F-4336-E0	00G-4336-E0	AJ0-6076
Fusion-RP	—	00B-4424-E0	00C-4424-E0	00F-4424-E0	00G-4424-E0	AJ0-7557

for ID: 3.2-8.0 mm

*SecurityGuard[™] Analytical Cartridges require holder, Part No.: [KJ0-4282](#)

*Additional dimensions available.
Contact your Phenomenex HPLC
Specialist for more information or
visit www.phenomenex.com/synergi*

Gemini

U.S. Patent Nos. 7, 563, 367 and 8,658,038 and foreign counterparts



Rugged reversed phase HPLC columns that offer extended lifetime at extreme pH conditions and excellent stability for reproducible, high efficiency separations.

- Take full advantage of high and low pH conditions (pH 1-12) to manipulate selectivity
- Expect longer column lifetime
- For analytical and preparative separations of basic and acidic compounds

Ordering Information

3 μ m Microbore, Minibore and MidBore™ Columns (mm)										SecurityGuard™ Cartridges (mm)
Phases	50 x 1.0	20 x 2.0	30 x 2.0	50 x 2.0	100 x 2.0	150 x 2.0	50 x 3.0	100 x 3.0	150 x 3.0	4 x 2.0*
C18	00B-4439-A0	00M-4439-B0	00A-4439-B0	00B-4439-B0	00D-4439-B0	00F-4439-B0	00B-4439-Y0	00D-4439-Y0	00F-4439-Y0	AJ0-7596
C6-Phenyl	00B-4443-A0	—	00A-4443-B0	00B-4443-B0	00D-4443-B0	00F-4443-B0	00B-4443-Y0	00D-4443-Y0	00F-4443-Y0	AJ0-7914
NX-C18	00B-4453-A0	00M-4453-B0	00A-4453-B0	00B-4453-B0	00D-4453-B0	00F-4453-B0	00B-4453-Y0	00D-4453-Y0	00F-4453-Y0	AJ0-8367

for ID: 2.0-3.0 mm

3 μ m Analytical Columns (mm)						SecurityGuard Cartridges (mm)
Phases	30 x 4.6	50 x 4.6	100 x 4.6	150 x 4.6	250 x 4.6	4 x 3.0*
C18	00A-4439-E0	00B-4439-E0	00D-4439-E0	00F-4439-E0	00G-4439-E0	AJ0-7597
C6-Phenyl	00A-4443-E0	00B-4443-E0	00D-4443-E0	00F-4443-E0	00G-4443-E0	AJ0-7915
NX-C18	—	00B-4453-E0	00D-4453-E0	00F-4453-E0	00G-4453-E0	AJ0-8368

for ID: 3.2-8.0 mm

5 μ m Minibore and MidBore Columns (mm)									SecurityGuard Cartridges (mm)
Phases	30 x 2.0	50 x 2.0	150 x 2.0	250 x 2.0	50 x 3.0	100 x 3.0	150 x 3.0	250 x 3.0	4 x 2.0*
C18	00A-4435-B0	00B-4435-B0	00F-4435-B0	00G-4435-B0	00B-4435-Y0	00D-4435-Y0	00F-4435-Y0	00G-4435-Y0	AJ0-7596
C6-Phenyl	—	00B-4444-B0	00F-4444-B0	—	00B-4444-Y0	—	00F-4444-Y0	00G-4444-Y0	AJ0-7914
NX-C18	00A-4454-B0	00B-4454-B0	00F-4454-B0	—	00B-4454-Y0	00D-4454-Y0	00F-4454-Y0	00G-4454-Y0	AJ0-8367

for ID: 2.0-3.0 mm

5 μ m Analytical Columns (mm)						SecurityGuard Cartridges (mm)
Phases	30 x 4.6	50 x 4.6	100 x 4.6	150 x 4.6	250 x 4.6	4 x 3.0*
C18	00A-4435-E0	00B-4435-E0	00D-4435-E0	00F-4435-E0	00G-4435-E0	AJ0-7597
C6-Phenyl	—	00B-4444-E0	00D-4444-E0	00F-4444-E0	00G-4444-E0	AJ0-7915
NX-C18	—	00B-4454-E0	00D-4454-E0	00F-4454-E0	00G-4454-E0	AJ0-8368

for ID: 3.2-8.0 mm

5 μ m Semi-Prep Columns (mm)			SecurityGuard Cartridges (mm)
Phases	150 x 10	250 x 10	10 x 10*
C18	00F-4435-N0	00G-4435-N0	AJ0-7598
C6-Phenyl	—	00G-4444-N0	AJ0-7314
NX-C18	00F-4454-N0	00G-4454-N0	AJ0-8369

for ID: 9-16 mm



Additional dimensions available. Contact your Phenomenex HPLC Specialist for more information or visit www.phenomenex.com/gemini

*SecurityGuard™ Analytical Cartridges require holder, Part No.: [KJ0-4282](#)

*SemiPrep SecurityGuard™ Cartridges require holder, Part No.: [AJ0-9281](#)

- Substitute 3 µm and 5 µm columns for 2-3x higher efficiency
- Obtain higher throughput without sacrificing resolution
- Reduce solvent consumption with faster analysis
- Reach lower levels of detection and quantitation



Ordering Information

2.6 µm Minibore Columns (mm)						SecurityGuard™ ULTRA Cartridges [‡]
Phases	30 x 2.1	50 x 2.1	75 x 2.1	100 x 2.1	150 x 2.1	3/pk
EVO C18	00A-4725-AN	00B-4725-AN	—	00D-4725-AN	00F-4725-AN	AJ0-9298
F5	00A-4723-AN	00B-4723-AN	—	00D-4723-AN	00F-4723-AN	AJ0-9322
Biphenyl	00A-4622-AN	00B-4622-AN	—	00D-4622-AN	00F-4622-AN	AJ0-9209
XB-C18	00A-4496-AN	00B-4496-AN	00C-4496-AN	00D-4496-AN	00F-4496-AN	AJ0-8782
C18	00A-4462-AN	00B-4462-AN	00C-4462-AN	00D-4462-AN	00F-4462-AN	AJ0-8782
C8	00A-4497-AN	00B-4497-AN	00C-4497-AN	00D-4497-AN	00F-4497-AN	AJ0-8784
HILIC	00A-4461-AN	00B-4461-AN	00C-4461-AN	00D-4461-AN	00F-4461-AN	AJ0-8786
Phenyl-Hexyl	00A-4495-AN	00B-4495-AN	00C-4495-AN	00D-4495-AN	00F-4495-AN	AJ0-8788

for 2.1 mm ID

2.6 µm MidBore™ Columns (mm)						SecurityGuard ULTRA Cartridges [‡]
Phases	30 x 3.0	50 x 3.0	75 x 3.0	100 x 3.0	150 x 3.0	3/pk
EVO C18	—	00B-4725-Y0	—	00D-4725-Y0	00F-4725-Y0	AJ0-9297
F5	—	00B-4723-Y0	—	00D-4723-Y0	00F-4723-Y0	AJ0-9321
Biphenyl	—	00B-4622-Y0	—	00D-4622-Y0	00F-4622-Y0	AJ0-9208
XB-C18	00A-4496-Y0	00B-4496-Y0	00C-4496-Y0	00D-4496-Y0	00F-4496-Y0	AJ0-8775
C18	00A-4462-Y0	00B-4462-Y0	00C-4462-Y0	00D-4462-Y0	00F-4462-Y0	AJ0-8775
C8	00A-4497-Y0	00B-4497-Y0	00C-4497-Y0	00D-4497-Y0	00F-4497-Y0	AJ0-8777
HILIC	00A-4461-Y0	—	—	—	00F-4461-Y0	AJ0-8779
Phenyl-Hexyl	—	00B-4495-Y0	—	00D-4495-Y0	00F-4495-Y0	AJ0-8781

for 3.0 mm ID

2.6 µm Analytical Columns (mm)						SecurityGuard ULTRA Cartridges [‡]
Phases	30 x 4.6	50 x 4.6	75 x 4.6	100 x 4.6	150 x 4.6	3/pk
EVO C18	—	00B-4725-E0	—	00D-4725-E0	00F-4725-E0	AJ0-9296
F5	—	00B-4723-E0	—	00D-4723-E0	00F-4723-E0	AJ0-9320
Biphenyl	—	00B-4622-E0	—	00D-4622-E0	00F-4622-E0	AJ0-9207
XB-C18	—	00B-4496-E0	00C-4496-E0	00D-4496-E0	00F-4496-E0	AJ0-8768
C18	00A-4462-E0	00B-4462-E0	00C-4462-E0	00D-4462-E0	00F-4462-E0	AJ0-8768
C8	—	00B-4497-E0	00C-4497-E0	00D-4497-E0	00F-4497-E0	AJ0-8770
HILIC	—	00B-4461-E0	00C-4461-E0	00D-4461-E0	00F-4461-E0	AJ0-8772
Phenyl-Hexyl	—	00B-4495-E0	00C-4495-E0	00D-4495-E0	00F-4495-E0	AJ0-8774

for 4.6 mm ID

5 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
EVO C18	00A-4633-AN	00B-4633-AN	00D-4633-AN	00F-4633-AN	AJ0-9298
Biphenyl	00A-4627-AN	00B-4627-AN	00D-4627-AN	—	AJ0-9209
XB-C18	00A-4605-AN	00B-4605-AN	00D-4605-AN	—	AJ0-8782
C18	00A-4601-AN	00B-4601-AN	00D-4601-AN	00F-4601-AN	AJ0-8782
C8	—	00B-4608-AN	00D-4608-AN	—	AJ0-8784
Phenyl-Hexyl	—	00B-4603-AN	00D-4603-AN	—	AJ0-8788

for 2.1 mm ID

5 µm MidBore Columns (mm)				SecurityGuard ULTRA Cartridges [‡]
Phases	50 x 3.0	100 x 3.0	150 x 3.0	3/pk
EVO C18	00B-4633-Y0	00D-4633-Y0	00F-4633-Y0	AJ0-9297
Biphenyl	00B-4627-Y0	00D-4627-Y0	00F-4627-Y0	AJ0-9208
XB-C18	00B-4605-Y0	00D-4605-Y0	00F-4605-Y0	AJ0-8775
C18	00B-4601-Y0	00D-4601-Y0	00F-4601-Y0	AJ0-8775
C8	00B-4608-Y0	00D-4608-Y0	—	AJ0-8777
Phenyl-Hexyl	00B-4603-Y0	00D-4603-Y0	—	AJ0-8781

for 3.0 mm ID

5 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
EVO C18	00B-4633-E0	00D-4633-E0	00F-4633-E0	00G-4633-E0	AJ0-9296
Biphenyl	00B-4627-E0	00D-4627-E0	00F-4627-E0	00G-4627-E0	AJ0-9207
XB-C18	00B-4605-E0	00D-4605-E0	00F-4605-E0	00G-4605-E0	AJ0-8768
C18	00B-4601-E0	00D-4601-E0	00F-4601-E0	00G-4601-E0	AJ0-8768
C8	00B-4608-E0	00D-4608-E0	00F-4608-E0	00G-4608-E0	AJ0-8770
Phenyl-Hexyl	00B-4603-E0	00D-4603-E0	00F-4603-E0	00G-4603-E0	AJ0-8774

for 4.6 mm ID



Available in sub-2 µm particle sizes. Additional dimensions available. Contact your Phenomenex HPLC Specialist for more information or visit www.phenomenex.com/kinetex

[‡] SecurityGuard ULTRA Cartridges require holder, Part No.: [AJ0-9000](#)

Rezex™

Ion Exclusion LC Columns for Organic Acids and Carbohydrates

- Excellent resolution and column-to-column reproducibility
- Easy, accurate quantitation from sharper peak shapes
- Longer column lifetimes and faster run time capability from lower backpressures
- Baseline separation of critical sample components due to higher efficiencies

Rezex ion-exclusion HPLC columns achieve reproducible, accurate separations based on multiple modes of interaction. Available in 4 % and 8 % cross-linked sulfonated styrene-divinylbenzene (SDVB) and multiple ionic forms (calcium, sodium, hydrogen, potassium, lead, and silver) for a wide range of selectivities. USP L17, L19, L22, L34, and L58 packings available.

Find the Column for Your Application

Phases Available	Description	Applications	Additional Notes
RCM-Monosaccharide (L19 packing)*	8 % cross-linked resin CALCIUM ionic form	Monosaccharides and sugar alcohols from sweeteners and corn and cane sugars Di, tri, and tetra saccharides	• Our most commonly used column type • Easy regeneration with calcium nitrate solutions
RHM-Monosaccharide (L17 packing)*	8 % cross-linked resin HYDROGEN ionic form	Monosaccharides in combination with organic acids, fatty acids, alcohols, ketones, neutral compounds, or inorganic salts	• Versatile column, generally run with a mobile phase of deionized water
RAM-Carbohydrate	8 % cross-linked resin SILVER ionic form	Selectivity complimentary to other Rezex column types	
RSO-Oligosaccharide	4 % cross-linked resin SILVER ionic form	High resolution of oligosaccharides up to 18 degrees of polymerization (dp)	• Guard column is recommended to protect the ionic integrity of the matrix
RNO-Oligosaccharide	4 % cross-linked resin SODIUM ionic form	High resolution of oligosaccharides	
RPM-Monosaccharide (L34 packing)*	8 % cross-linked resin LEAD ionic form	Monosaccharides and sugar alcohol analysis. Cellobiose, glucose, xylose, arabinose, and mannose & other cellulose products	
RNM-Carbohydrate (L54 packing)*	8 % cross-linked resin SODIUM ionic form	For matrices which contain high concentration of inorganic sodium, i.e. molasses	• Easily regenerated to the original ionic strength
ROA-Organic Acid (L22 packing)*	8 % cross-linked resin HYDROGEN ionic form	Organic acids alone or in combination with carbohydrates, alcohols, fatty acids, or neutral compounds; Amino sugars; ethanol, acetic acid, glycerol, and standard alcohol mixtures	• Selectivity can be altered by changing the pH as well as the type of dilute mineral acid used as the mobile phase
RFQ-Fast Acid	8 % cross-linked resin HYDROGEN ionic form	Rapid screening of fruit quality; ethanol, acetic acid, glycerol, and standard alcohol mixtures	• Analytes are routinely chromatographed under 5 minutes
RKP-Potassium	8 % cross-linked resin POTASSIUM ionic form	Analysis of glyphosate	
RCU-USP Sugar Alcohols (L19 packing)*	8 % cross-linked resin CALCIUM ionic form	For sugar analysis according to the USP procedures	• Sorbitol and mannitol can be resolved using simple isocratic conditions

* United States Pharmacopeia



Find more applications and details, visit:

www.phenomenex.com/Rezex



Retention Times for Some Carbohydrates and Sugar Alcohols

Counter Ion Analyte	RAM Ag ⁺	RCM Ca ⁺²	RNM Na ⁺	RHM H ⁺	RPM Pb ⁺²
Adonitol (Ribitol)	11.54	14.93	11.10	11.11	20.15
D-Altrose	11.95	12.71	11.45	10.21	15.82
D-(-)-Arabinose	13.01	13.56	12.65	11.24	16.47
D-(+)-Cellobiose	8.86	8.60	8.49	8.02	11.00
D-(+)-Digitoxose	11.90	13.82	11.39	12.59	15.32
Dulcitol	11.64	21.61	11.10	10.71	33.25
Meso-Erythritol	12.31	15.49	11.78	12.14	19.82
D-(-)-Fructose	12.05	13.65	11.76	10.31	17.71
L-(-)-Fucose	12.75	13.19	12.30	11.65	16.19
D-(+)-Galactose	11.87	11.73	11.47	10.19	14.94
Gentiobiose	8.70	8.40	8.40	7.87	10.53
D-(+)-Glucose	11.04	10.37	10.71	9.62	12.92
Inositol	12.59	13.35	12.14	9.98	18.87
Isomaltose	9.11	8.74	8.76	8.02	11.28
Lactose	9.27	9.03	8.78	8.32	11.89
Lactulose	9.75	10.32	9.23	8.57	13.95
D- Lyxose	12.41	14.06	11.98	10.68	16.66
D- Maltose	9.16	8.81	8.75	8.18	11.59
Maltotriose	8.27	8.10	7.94	7.51	11.02
Maltulose	9.25	9.47	8.82	8.27	12.40
D- Mannitol	11.36	17.82	10.80	10.59	24.90
D-(+)-Mannose	12.04	12.04	11.54	10.16	16.39
Melibiose	9.26	9.04	8.82	8.14	11.97
D-(+)-Melezitose	8.00	7.93	7.66	7.54*	9.94
D-(+)-Raffinose	8.10	8.16	7.76	7.88*	10.28
L-(+)-Rhamnose	11.50	12.18	11.00	10.90	14.47
D-(-)-Ribose	14.59	23.38	14.34	11.42	33.48
Salicin	18.51	18.58	17.36	14.98	26.81
D-Sorbitol	11.91	22.45	11.39	10.83	35.97
Stachyose	7.60	7.59	7.30	7.27	9.72
Sucrose	9.03	8.71	8.65	9.24*	11.00
Trehalose	8.91	8.72	8.49	8.32	11.01
Xylitol	12.69	22.01	12.16	11.78	32.38
D-(+)-Xylose	12.06	11.62	11.68	10.24	13.84

* Partial hydrolysis results.

Conditions:
Dimensions: 300 x 7.8 mm
Mobile Phase: Water (degassed)
Flow Rate: 0.6 mL/min
Temperature: 80 °C
Detector: RI @ 40 °C

REZEX™
 Ion Exclusion LC

Column Cross Reference Chart

Phenomenex Rezex	Bio-Rad® Aminex®	Supelco® SUPELCOGEL™	Waters® Sugar-Pak™
RCM-Monosaccharide	HPX-87C 125-0095	Supelcogel Ca	Sugar-Pak 1
RHM-Monosaccharide	HPX-87H 125-0140	Supelcogel C-610H & H	N/A
RPM-Monosaccharide	HPX-87P 125-0098	Supelcogel Pb	N/A
RNM-Carbohydrate	HPX-87N 125-0143	N/A	N/A
RSO-Oligosaccharide	HPX-42A 125-0097	Supelcogel Ag1 & Ag2	N/A
ROA-Organic Acid	HPX-87H 125-0140	Supelcogel C-610H & H	N/A
RFQ-Fast Acid	Fast Acid 125-0100	N/A	N/A
RKP-Potassium	HPX-87K 125-0142	Supelcogel K	N/A
RCU-USP Sugar Alcohols	Sugar Alcohols 125-0094	N/A	N/A

guarantee

If you are not completely satisfied with the performance of any Rezex column, as compared to a competing product of the same size and phase, simply return the Rezex column with your comparative data within 45 days for a FULL REFUND.

Rezex Ordering Information

Columns					Guards		SecurityGuard™ Cartridges (mm)
Description	Part No.	Cross Linkage	Ionic Form	Size (mm)	Part No.	Size (mm)	4 x 3.0* 10/pk
RCM-Monosaccharide	00D-0130-K0	8%	Calcium	100 x 7.8	03B-0130-K0	50 x 7.8	AJ0-4493
RCM-Monosaccharide	00F-0130-K0	8%	Calcium	150 x 7.8	03B-0130-K0	50 x 7.8	AJ0-4493
RCM-Monosaccharide	00H-0130-K0	8%	Calcium	300 x 7.8	03B-0130-K0	50 x 7.8	AJ0-4493
RHM-Monosaccharide	00H-0132-K0	8%	Hydrogen	300 x 7.8	03B-0132-K0	50 x 7.8	AJ0-4490
RAM-Carbohydrate	00H-0131-K0	8%	Silver	300 x 7.8	—	—	AJ0-4491
RSO-Oligosaccharide	00P-0133-N0	4%	Silver	200 x 10.0	03R-0133-N0	60 x 10.0	—
RNO-Oligosaccharide	00P-0137-N0	4%	Sodium	200 x 10.0	03R-0137-N0	60 x 10.0	—
RPM-Monosaccharide (for USP procedure)	00H-0135-K0	8%	Lead	300 x 7.8	03B-0135-K0	50 x 7.8	AJ0-4492
	00D-0135-K0	8%	Lead	100 x 7.8	03B-0135-K0	50 x 7.8	AJ0-4492
RNM-Carbohydrate	00H-0136-K0	8%	Sodium	300 x 7.8	03B-0136-K0	50 x 7.8	—
ROA-Organic Acid	00F-0138-E0	8%	Hydrogen	150 x 4.6	—	—	AJ0-4490
ROA-Organic Acid	00G-0138-E0	8%	Hydrogen	250 x 4.6	—	—	AJ0-4490
ROA-Organic Acid	00F-0138-K0	8%	Hydrogen	150 x 7.8	03B-0138-K0	50 x 7.8	AJ0-4490
ROA-Organic Acid	00H-0138-K0	8%	Hydrogen	300 x 7.8	03B-0138-K0	50 x 7.8	AJ0-4490
RKP-Potassium	00H-3252-K0	8%	Potassium	300 x 7.8	—	—	—
RFQ-Fast Acid	00D-0223-K0	8%	Hydrogen	100 x 7.8	03B-0223-K0	50 x 7.8	AJ0-4490
RCU-USP Sugar Alcohols	00G-0130-D0	8%	Calcium	250 x 4.0	—	—	AJ0-4493

for ID: 3.2-8.0 mm

*SecurityGuard Analytical Cartridges require universal holder Part No.: [KJ0-4282](#)

Lux



- High efficiency and loading capacity
- Stable in normal phase, polar organic, SFC, and reversed phase conditions
- 3 μ m and 5 μ m packed columns for separation and speed preferences

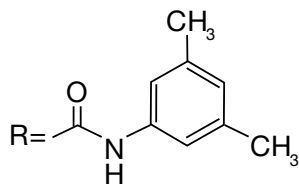
Ordering Information

5 μ m Minibore and Analytical Columns (mm)						SecurityGuard Cartridges (mm)	
Phases	50 x 2.0	50 x 4.6	100 x 4.6	150 x 4.6	250 x 4.6	4 x 2.0*	4 x 3.0*
i-Cellulose-5	—	00B-4756-E0	00D-4756-E0	00F-4756-E0	00G-4756-E0	AJ0-8631	AJ0-8632
Cellulose-1	00B-4459-B0	00B-4459-E0	00D-4459-E0	00F-4459-E0	00G-4459-E0	AJ0-8402	AJ0-8403
Cellulose-2	00B-4457-B0	00B-4457-E0	00D-4457-E0	00F-4457-E0	00G-4457-E0	AJ0-8398	AJ0-8366
Cellulose-3	00B-4493-B0	00B-4493-E0	00D-4493-E0	00F-4493-E0	00G-4493-E0	AJ0-8621	AJ0-8622
Cellulose-4	00B-4491-B0	00B-4491-E0	00D-4491-E0	00F-4491-E0	00G-4491-E0	AJ0-8626	AJ0-8627
Amylose-1	00B-4732-B0	00B-4732-E0	00D-4732-E0	00F-4732-E0	00G-4732-E0	AJ0-9337	AJ0-9336
Amylose-2	00B-4472-B0	00B-4472-E0	00D-4472-E0	00F-4472-E0	00G-4472-E0	AJ0-8471	AJ0-8470
for ID:						2.0–3.0 mm	3.2–8.0 mm

*SecurityGuard Analytical Cartridges require holder, Part No.: [KJ0-4282](#)

Lux Amylose-1

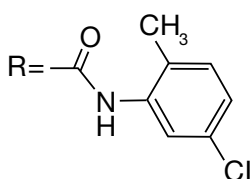
Amylose tris(3,5-dimethylphenyl-carbamate)



Amylose-O-R

Lux Amylose-2

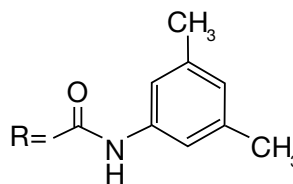
Amylose tris(5-chloro-2-methylphenyl-carbamate)



Amylose-O-R

Lux Cellulose-1

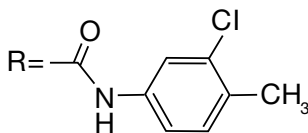
Cellulose tris(3,5-dimethylphenyl-carbamate)



Cellulose-O-R

Lux Cellulose-2

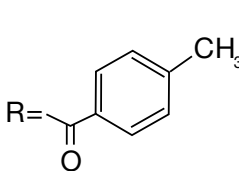
Cellulose tris(3-chloro-4-methylphenyl-carbamate)



Cellulose-O-R

Lux Cellulose-3

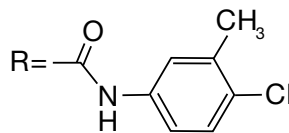
Cellulose tris(4-methylbenzoate)



Cellulose-O-R

Lux Cellulose-4

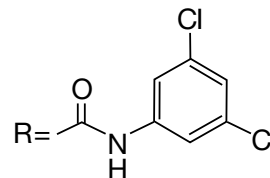
Cellulose tris(4-chloro-3-methylphenyl-carbamate)



Cellulose-O-R

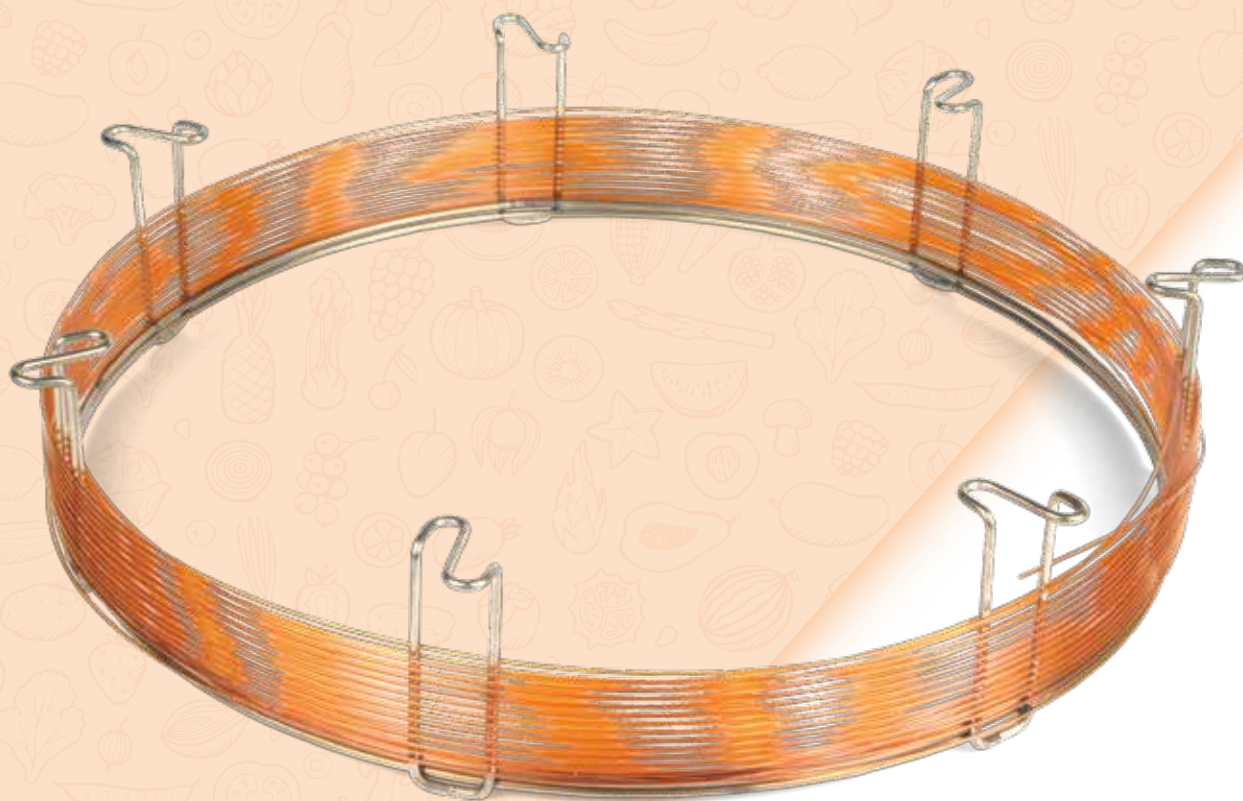
Lux i-Cellulose-5

Cellulose tris(3,5-dichlorophenyl-carbamate)



Cellulose-O-R

GC Products



Zebron GC Columns

Zebron GC Columns are engineered by expert Phenomenex GC scientists that created J&W technologies. Our inventive philosophy and expertise in GC column manufacturing allow us to continuously develop award-winning column chemistries. We provide the best-in-class technologies and support to make your analysis easier – let the Zebron experience put you first.

ZB-5

- Rugged, versatile low polarity column for general lab purpose
- Resilient to dirty samples—long column life
- Low bleed (MS Certified) especially suited to high sensitivity work using GC/MS
- Great column for unknown samples
- Temperature Limits: -60 to 360/370 °C (Isothermal/TPGC)*

Alternative to Any 5%-Phenyl-95%-Dimethylpolysiloxane Phase:

DB®-5	MDN-5	007-5	BP5	HP-5 Trace
HP-5	Equity®-5	AT-5	Ultra 2	Analysis
Rtx®-5	SPB®-5	BPX5	EC-5	CP-SIL 8 CB
HP-PAS-5	OV-5	SE-54		

Ordering Information

Zebron ZB-5 GC Columns

ID(mm)	df(μm)	Temp. Limits °C	Part No.
15-Meter			
0.25	0.10	-60 to 360/370	7EG-G002-02
0.25	0.25	-60 to 360/370	7EG-G002-11
0.25	0.50	-60 to 360/370	7EG-G002-17
0.25	1.00	-60 to 340/360	7EG-G002-22
0.32	0.10	-60 to 360/370	7EM-G002-02
0.32	0.25	-60 to 360/370	7EM-G002-11
0.32	1.00	-60 to 340/360	7EM-G002-22
0.53	0.50	-60 to 360/370	7EK-G002-17
0.53	1.50	-60 to 340/360	7EK-G002-28
0.53	3.00	-60 to 340/360	7EK-G002-36
20-Meter			
0.18	0.18	-60 to 360/370	7FD-G002-08
30-Meter			
0.25	0.10	-60 to 360/370	7HG-G002-02
0.25	0.25	-60 to 360/370	7HG-G002-11
0.25	0.50	-60 to 360/370	7HG-G002-17
0.25	1.00	-60 to 340/360	7HG-G002-22
0.32	0.10	-60 to 360/370	7HM-G002-02
0.32	0.25	-60 to 360/370	7HM-G002-11
0.32	0.50	-60 to 360/370	7HM-G002-17
0.32	1.00	-60 to 340/360	7HM-G002-22
0.53	0.50	-60 to 360/370	7HK-G002-17
0.53	1.50	-60 to 340/360	7HK-G002-28
0.53	3.00	-60 to 340/360	7HK-G002-36
0.53	5.00	-60 to 340/360	7HK-G002-39
60-Meter			
0.25	0.10	-60 to 360/370	7KG-G002-02
0.25	0.25	-60 to 360/370	7KG-G002-11
0.25	0.50	-60 to 360/370	7KG-G002-17
0.25	1.00	-60 to 340/360	7KG-G002-22
0.32	0.25	-60 to 360/370	7KM-G002-11
0.32	1.00	-60 to 340/360	7KM-G002-22
0.53	1.50	-60 to 340/360	7KK-G002-28

*Thicker films ($\geq 1.0 \mu\text{m}$ df) are rated to 340/360 °C (isothermal/TPGC)

Note: If you need a 5 in. cage, simply add a (-B) after the part number, e.g., [7HG-G002-11-B](#). Some exceptions may apply. Agilent 6850 and some SRI and process GC systems use only 5 in. cages

ZB-5ms

- A popular and rugged GC column for general use
- Arylene Matrix Technology™ (AMT) provides a highly stable arylene phase
- Low bleed (MS Certified) especially suited to high sensitivity work using GC/MS
- Fully conditioned within 35 minutes
- High response for acids and bases
- Enhanced resolution of Polyaromatic Hydrocarbons (PAHs) and other multi-ring aromatic compounds
- Temperature Limits: -60 to 325/350 °C (Isothermal/TPGC)

Alternative to Any MS-Certified 5%-Phenyl-Arylene-95%-Dimethylpolysiloxane Phase:

DB-5ms	CP-Sil 8 CB MS	Rxi®-5Sil MS
DB-5ms EVDX	DB-5.625	
VF-5ms	Rtx-5Sil MS	

Ordering Information

Zebron ZB-5ms GC Columns

ID(mm)	df(μm)	Temp. Limits °C	Part No.
10-Meter			
0.10	0.10	-60 to 325/350	7CB-G010-02
0.18	0.10	-60 to 325/350	7CD-G010-08
12-Meter			
0.20	0.33	-60 to 325/350	7DE-G010-14
15-Meter			
0.25	0.25	-60 to 325/350	7EG-G010-11
20-Meter			
0.18	0.18	-60 to 325/350	7FD-G010-08
0.18	0.32	-60 to 325/350	7FD-G010-51
0.18	0.36	-60 to 325/350	7FD-G010-53
25-Meter			
0.20	0.33	-60 to 325/350	7GE-G010-14
30-Meter			
0.25	0.25	-60 to 325/350	7HG-G010-11
0.25	0.50	-60 to 325/350	7HG-G010-17
0.25	1.00	-60 to 325/350	7HG-G010-22
0.32	0.25	-60 to 325/350	7HM-G010-11
0.32	0.50	-60 to 325/350	7HM-G010-17
0.32	1.00	-60 to 325/350	7HM-G010-22
60-Meter			
0.25	0.25	-60 to 325/350	7KG-G010-11
0.32	0.25	-60 to 325/350	7KM-G010-11

Note: If you need a 5 in. cage, simply add a (-B) after the part number, e.g., [7HG-G010-11-B](#). Some exceptions may apply. Agilent 6850 and some SRI and process GC systems use only 5 in. cages



ZB-5HT Inferno™

- First non-metal columns stable to 430 °C
- Robust column for high temperature bake outs and analysis, such as biodiesel, long-chain hydrocarbons, polymers, and high molecular weight compounds
- Longer lifetime with rugged high temperature, polyimide coated, fused silica tubing
- Low activity, provides good peak shape for acidic and basic samples
- Individually tested for low bleed, MS certified
- Temperature Limits: -60 to 400/430 °C (Isothermal/TPGC)*

Alternative to Any 5 %-Phenyl-95 % Dimethylpolysiloxane High Temperature Phase:

DB®-5ht Rxi®-5HT VF-5ht HT-5 Stx®-5HT XTl®-5HT

ZB-35

- Intermediate polarity column with temperature limits up to 360 °C allows high molecular weight analysis
- Excellent inertness to minimize analyte adsorption, improve efficiency, and reproducibility
- More rugged (longer column life) than other polar phases
- Excellent for trace analysis with bleed-sensitive detectors (MS, FID, ECD, NPD)
- Temperature Limits: 40 to 340/360 °C (Isothermal/TPGC)

Alternative to Any 35 %-Phenyl-65 %-Dimethylpolysiloxane Phase:

DB-35ms OV-11 HP-35ms 007-11 DB-35 Rtx-35
SPB®-35 SPB-608 HP-35 Sup-Herb EC-35 BPX35
AT-35 Rtx®-35MS MDN-35 BPX608

Ordering Information

Zebron ZB-5HT Inferno GC Columns

ID(mm)	df(μm)	Temp. Limits °C	Part No.
10-Meter with 2-Meter Spliced Guard (0.53 mm ID)			
0.32	0.10	-60 to 400/430	7CM-G015-02-GST
15-Meter			
0.25	0.10	-60 to 400/430	7EG-G015-02
0.25	0.25	-60 to 400/430	7EG-G015-11
0.32	0.10	-60 to 400/430	7EM-G015-02
0.32	0.25	-60 to 400/430	7EM-G015-11
0.53*	0.15	-60 to 400	7EK-G015-05
15-Meter with 2-Meter Spliced Guard (0.53 mm ID)			
0.32	0.10	-60 to 400/430	7EM-G015-02-GST
20-Meter			
0.18	0.18	-60 to 400/430	7FD-G015-08
30-Meter			
0.25	0.10	-60 to 400/430	7HG-G015-02
0.25	0.25	-60 to 400/430	7HG-G015-11
0.32	0.10	-60 to 400/430	7HM-G015-02
0.32	0.25	-60 to 400/430	7HM-G015-11
0.53*	0.15	-60 to 400	7HK-G015-05
60-Meter			
0.25	0.25	-60 to 400/430	7KG-G015-11

*0.53 mm ID columns are rated to 400 °C max operational temperature

Note: If you need a 5 in. cage, simply add a (-B) after the part number, e.g., [7HG-G015-11-B](#). Some exceptions may apply. Agilent 6850 and some SRI and process GC systems use only 5 in. cages.

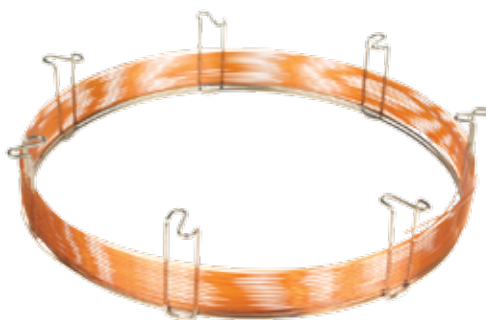


Ordering Information

Zebron ZB-35 GC Columns

ID(mm)	df(μm)	Temp. Limits °C	Part No.
10-Meter			
0.10	0.10	40 to 340/360	7GB-G003-02
15-Meter			
0.25	0.25	40 to 340/360	7EG-G003-11
0.25	0.50	40 to 340/360	7EG-G003-17
0.53	1.00	40 to 340/360	7EK-G003-22
30-Meter			
0.25	0.25	40 to 340/360	7HG-G003-11
0.25	0.50	40 to 340/360	7HG-G003-17
0.32	0.25	40 to 340/360	7HM-G003-11
0.32	0.50	40 to 340/360	7HM-G003-17
0.53	0.50	40 to 340/360	7HK-G003-17
0.53	1.00	40 to 340/360	7HK-G003-22
60-Meter			
0.25	0.25	40 to 340/360	7KG-G003-11
0.32	0.25	40 to 340/360	7KM-G003-11

Note: If you need a 5 in. cage, simply add a (-B) after the part number, e.g., [7HG-G003-11-B](#). Some exceptions may apply. Agilent 6850 and some SRI and process GC systems use only 5 in. cages.



Zebron GC Columns

ZB-50

- High polarity column with temperature limits up to 340 °C allows high temperature bake out to remove contaminants
- Excellent inertness to minimize analyte adsorption, improve efficiency, and reproducibility
- More rugged (longer column life) than other polar phases
- Excellent for trace analysis with bleed-sensitive detectors
- Temperature Limits: 40 to 320/340 °C (Isothermal/TPGC)

Alternative to Any 50 %-Phenyl-50 %-Dimethylpolysiloxane Phase:

DB®-17	CP-Sil 24 CB	SPB-17	SP-2250	007-17
Rtx®-50	AT-50	HP-50+	BPX50	DB-17 EVDX
SPB®-50	DB-17ms	DB-17ht		

ZB-624

- Widely used phase to separate volatile organic flavor and fragrance additives and residual solvents in industrial or pharmaceutical products (OVIs)
- Popular choice for residual solvent testing
- Specifically designed for the separation of volatile organic compounds (VOCs)
- Increased temperature limit speeds run times and re-equilibration
- Temperature Limits: -20 to 260 °C

Alternative to Any 6 %-Cyanopropylphenyl-94 %-Dimethylpolysiloxane Phase:

DB-624	CP-1301	HP-VOC	CP-Select 624 CB
AT-624	Rtx-624	007-624	SPB-624
DB-VRX	BP624	DB-1301	Rtx-VMS
Rtx-1301	007-502	SPB-1301	

Ordering Information

Zebron ZB-50 GC Columns

ID(mm)	df(μm)	Temp. Limits °C	Part No.
10-Meter			
0.10	0.10	40 to 320/340	7CB-G004-02
0.53	2.00	40 to 320/340	7CK-G004-32
15-Meter			
0.25	0.15	40 to 320/340	7EG-G004-05
0.25	0.25	40 to 320/340	7EG-G004-11
0.32	0.25	40 to 320/340	7EM-G004-11
0.32	0.50	40 to 320/340	7EM-G004-17
0.53	1.00	40 to 320/340	7EK-G004-22
30-Meter			
0.25	0.25	40 to 320/340	7HG-G004-11
0.25	0.50	40 to 320/340	7HG-G004-17
0.32	0.25	40 to 320/340	7HM-G004-11
0.32	0.50	40 to 320/340	7HM-G004-17
0.53	1.00	40 to 320/340	7HK-G004-22
60-Meter			
0.25	0.25	40 to 320/340	7KG-G004-11
0.25	0.50	40 to 320/340	7KG-G004-17

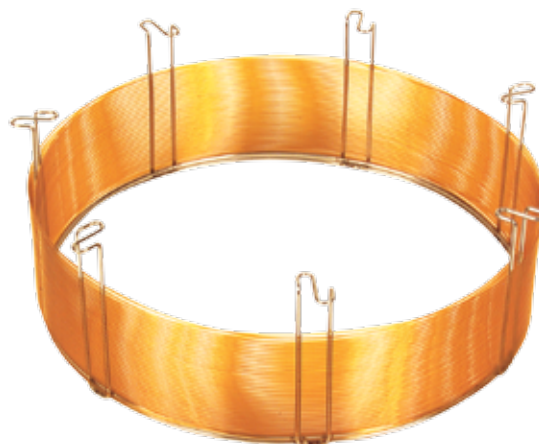
Note: If you need a 5 in. cage, simply add a (-B) after the part number, e.g., [7HG-G004-11-B](#). Some exceptions may apply. Agilent 6850 and some SRI and process GC systems use only 5 in. cages.

Ordering Information

Zebron ZB-624 GC Columns

ID(mm)	df(μm)	Temp. Limits °C	Part No.
20-Meter			
0.18	1.00	-20 to 260	7FD-G005-22
30-Meter			
0.25	1.40	-20 to 260	7HG-G005-27
0.32	1.80	-20 to 260	7HM-G005-31
0.53	3.00	-20 to 260	7HK-G005-36
60-Meter			
0.25	1.40	-20 to 260	7KG-G005-27
0.32	1.80	-20 to 260	7KM-G005-31
0.53	3.00	-20 to 260	7KK-G005-36
75-Meter			
0.53	3.00	-20 to 260	7LK-G005-36
105-Meter			
0.53	3.00	-20 to 260	7NK-G005-36

Note: If you need a 5 in. cage, simply add a (-B) after the part number, e.g., [7HG-G005-27-B](#). Some exceptions may apply. Agilent 6850 and some SRI and process GC systems use only 5 in. cages.



ZB-WAX

- High polarity column with low bleed (MS certified) for improved results
- Highly stable, long lifetime
- Low activity for amines
- Bonded, solvent rinsible
- Excellent chromatography of polar complex mixtures
- Widely used for profiling and “fingerprinting”
- Temperature Limits: 40 to 250/260 °C (Isothermal/TPGC)

Alternative to Any Polyethylene Glycol Phase:

HP-INNOWax	EC-Wax	DB®-WAXetr
Rtx®-WAX	Stabilwax®-DB	Met-Wax
CP-Wax 57 CB	Sol.Gel-WAX™	Omegawax
007-CW	FAMEWAX	

Ordering Information

Zebron ZB-WAX GC Columns

ID(mm)	df(μm)	Temp. Limits °C	Part No.
10-Meter			
0.10	0.10	40 to 250/260	7CB-G007-02
15-Meter			
0.25	0.25	40 to 250/260	7EG-G007-11
0.32	0.25	40 to 250/260	7EM-G007-11
0.32	0.50	40 to 250/260	7EM-G007-17
0.53	1.00	40 to 250/260	7EK-G007-22
20-Meter			
0.18	0.18	40 to 250/260	7FD-G007-08
30-Meter			
0.25	0.15	40 to 250/260	7HG-G007-05
0.25	0.25	40 to 250/260	7HG-G007-11
0.25	0.50	40 to 250/260	7HG-G007-17
0.25	1.00	40 to 250/260	7HG-G007-22
0.32	0.15	40 to 250/260	7HM-G007-05
0.32	0.25	40 to 250/260	7HM-G007-11
0.32	0.50	40 to 250/260	7HM-G007-17
0.53	0.50	40 to 250/260	7HK-G007-17
0.53	1.00	40 to 250/260	7HK-G007-22
60-Meter			
0.25	0.15	40 to 250/260	7KG-G007-05
0.25	0.25	40 to 250/260	7KG-G007-11
0.25	0.50	40 to 250/260	7KG-G007-17
0.32	0.25	40 to 250/260	7KM-G007-11
0.32	0.50	40 to 250/260	7KM-G007-17
0.53	1.00	40 to 250/260	7KK-G007-22

Note: If you need a 5 in. cage, simply add a (-B) after the part number, e.g., [7HG-G007-11-B](#). Some exceptions may apply. Agilent 6850 and some SRI and process GC systems use only 5 in. cages.

ZB-XLB-HT Inferno™

- Rugged, non-metal si-arylene GC column stable to 400 °C
- Robust column for high temperature bake outs and analysis, such as high molecular weight compounds
- Provides unique selectivity for conformational analyses
- Longer lifetime with high temperature, polyimide coated, fused silica tubing
- Low activity, provides good peak shape for acidic and basic samples
- Good tool for general screening to identify unknown samples
- Individually tested for low bleed, MS certified
- Temperature Limits: 30 to 400 °C (Isothermal/TPGC)

Similar* to:

MDN-12	Rtx-XLB
DB-XLB	

*not exact equivalent, selectivity might be different

Ordering Information

Zebron ZB-XLB-HT Inferno GC Columns

ID(mm)	df(μm)	Temp. Limits °C	Part No.
15-Meter			
0.25	0.10	30 to 400	7EG-G024-02
0.25	0.25	30 to 400	7EG-G024-11
0.32	0.10	30 to 400	7EM-G024-02
20-Meter			
0.18	0.18	30 to 400	7FD-G024-08
30-Meter			
0.25	0.10	30 to 400	7HG-G024-02
0.25	0.25	30 to 400	7HG-G024-11
0.32	0.25	30 to 400	7HM-G024-11
60-Meter			
0.25	0.25	30 to 400	7KG-G024-11

Note: If you need a 5 in. cage, simply add a (-B) after the part number, e.g., [7HG-G024-11-B](#). Some exceptions may apply. Agilent 6850 and some SRI and process GC systems use only 5 in. cages.



Zebron GC Columns

ZB-MultiResidue™ -1 and -2

- Proprietary phases specially designed for the separation of all types of pesticides, herbicides, and insecticides
- Low activity, decreased breakdown of sensitive pesticides such as DDT
- Provides robust column performance for high temperature bake outs
- MS Certified phases provide low bleed performance for pesticide confirmation by MS
- Temperature Limits: -60 to 320/340 °C (Isothermal/TPGC)

Similar* to:

Rtx®-CLPesticides	Rtx-CLPesticides2
Stx®-CLPesticides	Stx-CLPesticides2

*not exact equivalent, selectivity might be different

Ordering Information

Zebron ZB-MultiResidue-1 GC Columns

ID(mm)	df(μm)	Temp. Limits °C	Part No.
20-Meter			
0.18	0.18	-60 to 320/340	7FD-G016-08
30-Meter			
0.25	0.25	-60 to 320/340	7HG-G016-11
0.32	0.25	-60 to 320/340	7HM-G016-11
0.32	0.50	-60 to 320/340	7HM-G016-17
0.53	0.50	-60 to 320/340	7HK-G016-17

Zebron ZB-MultiResidue-2 GC Columns

ID(mm)	df(μm)	Temp. Limits °C	Part No.
30-Meter			
0.25	0.20	-60 to 320/340	7HG-G017-10
0.32	0.25	-60 to 320/340	7HM-G017-11
0.53	0.50	-60 to 320/340	7HK-G017-17

Note: If you need a 5 in. cage, simply add a (-B) after the part number, e.g., [7HG-G016-11-B](#) or [7HG-G017-10-B](#). Some exceptions may apply. Agilent 6850 and some SRI and process GC systems use only 5 in. cages.



ZB-SemiVolatiles

- Enviro-Inert™ Technology provides a rugged 5 %-Phenyl-Arylene phase – improve inertness without compromising selectivity
- Low bleed (MS Certified) especially suited to high sensitivity work using GC/MS
- Our column of choice for PAH analysis
- Temperature limits: -60 ° to 325/350 °C

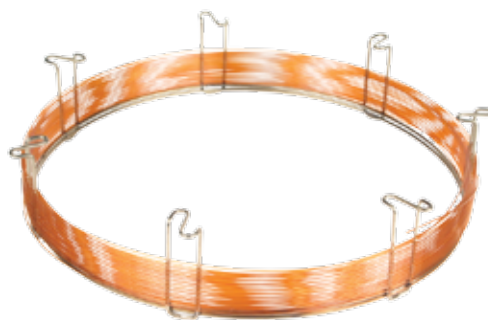
Upgrade from Any 5 %-Phenyl or 5 %-Phenyl -Arylene-95 %-Dimethylpolysiloxane Phase:

DB®-5ms	HP-5ms	Rxi®-5ms
DB-5ms Ultra Inert	HP-5ms Ultra Inert	Rxi-5Sil MS
DB-5.625	VF-5ms	CP-Sil 8 CB MS

Ordering Information

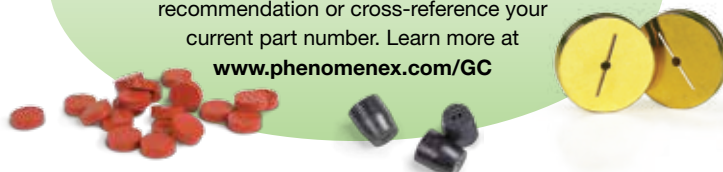
Zebron ZB-SemiVolatiles GC Columns

ID (mm)	df (μm)	Temperature Limits (°C)	Part No.
20-Meter			
0.18	0.18	-60 to 325/350	7FD-G027-08
0.18	0.36	-60 to 325/350	7FD-G027-53
30-Meter			
0.25	0.25	-60 to 325/350	7HG-G027-11
0.25	0.50	-60 to 325/350	7HG-G027-17
30-Meter with 5-Meter Guardian™ Integrated Guard			
0.25	0.25	-60 to 325/350	7HG-G027-11-GGA
30-Meter with 10-Meter Guardian Integrated Guard			
0.25	0.25	-60 to 325/350	7HG-G027-11-GGC
60-Meter			
0.25	0.25	-60 to 325/350	7KG-G027-11



GC Accessories

Need liners, septa, or ferrules? Contact a Phenomenex GC Specialist and we'll make a recommendation or cross-reference your current part number. Learn more at www.phenomenex.com/GC



Zebtron GC Columns

ZB-FAME

- Targeted high-cyano Selectivity—Improve selectivity for regulated methods
- Suitable with AOAC, AOCS, and IOC methods
- Baseline Separation of Common Isomers
- Temperature limits: -20 to 280 °C

Similar* to:

SP-2560	BPX 70	Rt-2560
SP-2330	BPX 90	
CP-Sil 88	Rtx-2330	

*not exact equivalent, selectivity might be different

Ordering Information

Zebtron ZB-FAME

ID (mm)	df (µm)	Temperature Limits (°C)	Part No.
20-Meter			
0.18	0.15	-60 to 280	7FD-G033-05
30-Meter			
0.25	0.20	-60 to 280	7HG-G033-10
60-Meter			
0.25	0.20	-60 to 280	7KG-G033-10

Zebtron PLUS GC Liners

Description	Application	Inlet Style	Dimensions ID x L (mm)	Deactivation	Part No.	Unit
For Agilent® and Thermo Scientific® GC Systems						
Direct Connect 	Trace analysis, Splitless injections	S/SL	4 x 78.5	PLUS Inert	AG2-0A50-01 AG2-0A50-05 AG2-0A50-25	Ea 5/pk 25/pk
Single Taper 	Pesticides	S/SL	4 x 78.5	PLUS Inert	AG2-0A10-01 AG2-0A10-05 AG2-0A10-25	Ea 5/pk 25/pk
Single Taper Z-Liner™ 	Semi-volatiles, Dirty samples	S/SL	4 x 78.5	PLUS Inert	AG2-0A13-01 AG2-0A13-05 AG2-0A13-25	Ea 5/pk 25/pk
Single Taper with Wool 	Semi-volatiles	S/SL	4 x 78.5	PLUS Inert	AG2-0A11-01 AG2-0A11-05 AG2-0A11-25	Ea 5/pk 25/pk
Straight 	Volatiles	S/SL	4 x 78.5	PLUS Inert	AG2-0A00-01 AG2-0A00-05 AG2-0A00-25	Ea 5/pk 25/pk
Straight Z-Liner 	Dirty samples, Volatiles, High initial oven temperatures	S/SL	4 x 78.5	PLUS Inert	AG2-0A03-01 AG2-0A03-05 AG2-0A03-25	Ea 5/pk 25/pk
Straight Single Baffle 	Semi-volatiles, Pesticides	S/SL	1.8 x 71	PLUS Inert	AG2-1F06-01 AG2-1F06-05 AG2-1F06-25	Ea 5/pk 25/pk
For Shimadzu® 17A, 2014 and 2025 Models						
Single Taper Z-Liner™ 	Pesticides	S/SL	3.4 x 95	PLUS Inert	AG2-3B13-01 AG2-3B13-05 AG2-3B13-25	Ea 5/pk 25/pk
Straight Z-Liner 	Volatiles, Dirty samples, High initial oven temperatures	S/SL	3.4 x 95	PLUS Inert	AG2-3B03-01 AG2-3B03-05 AG2-3B03-25	Ea 5/pk 25/pk
For Shimadzu 2010 Models						
Single Taper 	Volatiles, Dirty samples, High initial oven temperatures	S/SL	3.4 x 95	PLUS Inert	AG2-4B10-01 AG2-4B10-05 AG2-4B10-25	Ea 5/pk 25/pk
Single Taper Z-Liner 	Pesticides	S/SL	3.4 x 95	PLUS Inert	AG2-4B13-01 AG2-4B13-05 AG2-4B13-25	Ea 5/pk 25/pk
Straight 	Volatiles	S/SL	3.4 x 95	PLUS Inert	AG2-4B00-01 AG2-4B00-05 AG2-4B00-25	Ea 5/pk 25/pk
Straight Z-Liner 	Volatiles, Dirty samples, High initial oven temperatures	S/SL	3.4 x 95	PLUS Inert	AG2-4B03-01 AG2-4B03-05 AG2-4B03-25	Ea 5/pk 25/pk
For PerkinElmer® GC Systems						
Single Taper 	Pesticides	S/SL	4 x 92	PLUS Inert	AG2-2A10-01 AG2-2A10-05 AG2-2A10-25	Ea 5/pk 25/pk
Single Taper Z-Liner™ 	Semi-volatiles, Dirty samples	S/SL	4 x 92	PLUS Inert	AG2-2A13-01 AG2-2A13-05 AG2-2A13-25	Ea 5/pk 25/pk
Straight 	Volatiles	S/SL	4 x 92	PLUS Inert	AG2-2A00-01 AG2-2A00-05 AG2-2A00-25	Ea 5/pk 25/pk
Straight Z-Liner 	Volatiles, Dirty samples	PSS	2 x 86.2	PLUS Inert	AG2-2E03-01 AG2-2E03-05 AG2-2E03-25	Ea 5/pk 25/pk
Straight Z-Liner 	High initial oven temperatures	S/SL	4 x 92	PLUS Inert	AG2-2A03-01 AG2-2A03-05 AG2-2A03-25	Ea 5/pk 25/pk

Phenex

Syringe Filters



Particulates from food matrices can damage expensive equipment, valves, columns and pumps. They can also lead to erratic analytical results. Prefiltering samples prior to analysis is critical in preventing column and frit blockage, undue wear on valve seals, and abnormally high operating pressures.

- Increase column lifetime (save money!)
- Ensure more accurate, consistent results
- Eliminate damaging microparticulates



Syringe Filter Applications and Recommended Membranes

Application / Sample	Recommended Filter	First Alternative	Second Alternative
HPLC and GC Sample Prep	RC	PTFE	PES
Aggressive or Pure Organic Solvents	PTFE	RC	NY
Protein Analysis / Biological Samples	PES	RC	GF/CA
High Particulate Loads	GF/NY	GF + RC	PTFE
Environmental Methods	GF/NY	RC	PTFE
Food and Beverage	GF/NY	RC	PTFE
Clinical / Toxicology	RC	PES	NY
Dissolution Testing	GF/NY	RC	PTFE
Ion Chromatography	RC	PES	PTFE
Trace Metals (ICP-MS, AAS)	RC	PES	NY
Capillary Electrophoresis (CE)	RC	PES	NY
Tissue Cultures, Media, Buffers	GF/CA	PES	RC

For high load and particulate-laden samples you may consider placing a Glass Fiber (GF) pre-filter, either integrated with the membrane as one unit (Phenex-GF/NY or -GF/CA) or in series with the membrane syringe filter of your choice

Phenex Ordering Information¹

Phenex Syringe Filters	4 mm Diameter for ≤ 2 mL sample volumes		15 mm Diameter for 2 – 10 mL sample volumes		25 - 28 mm Diameter for 10 – 100 mL sample volumes	
Membrane Type/Size	Part No.	Unit	Part No.	Unit	Part No.	Unit
0.20 µm						
Phenex-RC (Regenerated Cellulose)	AF0-3203-52	500/pk	AF0-2203-52	500/pk	AF0-8203-52 ⁵	500/pk
Phenex-PES ³ (Polyethersulfone)	—	—	—	—	AF0-8208-52 ⁷	500/pk
Phenex-PTFE ⁶ (Polytetrafluoroethylene)	AF0-3202-52	500/pk	AF0-2202-52	500/pk	AF0-1202-52	500/pk
Phenex-NY (Nylon)	AF3-3207-52	500/pk	AF0-2207-52	500/pk	AF0-1207-52	500/pk
Phenex-GF/NY ² (Glass Fiber/Nylon)	An integrated syringe filter unit containing an inert borosilicate glass fiber prefilter and a Nylon (NY) membrane. Excellent for filtration of particle-laden samples, such as foods and beverages, environmental, biofuels, and dissolution samples. Use less hand pressure to filter even the most difficult samples. Outlet connection is luer lock.				AF0-1A47-52 ⁷	500/pk
Phenex-GF/CA ^{2,3,4} (Glass Fiber/Cellulose Acetate)	An integrated syringe filter unit containing an inert borosilicate glass fiber prefilter and a CA membrane. Excellent for filtration of tissue culture media, general biological sample filtration and clarification. Outlet connection is luer lock.				AF0-8A09-52 ⁷	500/pk
0.45 µm						
Phenex-RC (Regenerated Cellulose)	AF0-3103-52	500/pk	AF0-2103-52	500/pk	AF0-8103-52 ⁵	500/pk
Phenex-PES ³ (Polyethersulfone)	—	—	—	—	AF0-8108-52 ⁷	500/pk
Phenex-PTFE ⁶ (Polytetrafluoroethylene)	AF0-3102-52	500/pk	AF0-2102-52	500/pk	AF0-1102-52	500/pk
Phenex-NY (Nylon)	AF3-3107-52	500/pk	AF0-2107-52	500/pk	AF0-1107-52	500/pk
Phenex-GF/NY ² (Glass Fiber/Nylon)	An integrated syringe filter unit containing an inert borosilicate glass fiber prefilter and a Nylon (NY) membrane. Excellent for filtration of particle-laden samples, such as foods and beverages, environmental, biofuels, and dissolution samples. Use less hand pressure to filter even the most difficult samples. Outlet connection is luer lock.				AF0-1B47-52 ⁷	500/pk
Phenex-GF/CA ^{2,3,4} (Glass Fiber/Cellulose Acetate)	An integrated syringe filter unit containing an inert borosilicate glass fiber prefilter and a CA membrane. Excellent for filtration of tissue culture media, general biological sample filtration and clarification. Outlet connection is luer lock.				AF0-8B09-52 ⁷	500/pk
1.20 µm						
Phenex-GF ^{2,3} (Glass Fiber)	Prefiltration of heavily contaminated or highly viscous samples. When used in-series preceding a membrane filter, clogging of the membrane filter is prevented and sample clean up is optimized. Outlet connection is luer lock.				AF0-8515-52 ⁷	500/pk

1. Larger quantity purchases at significant savings are available.
2. Glass fiber filters are 28 mm diameter and made of borosilicate. They will remove 90 % of all particles >1.2 µm.
3. Housing material is methacrylate butadiene styrene (MBS) polymerisate. Also known as Cyrolite®.
4. Cellulose acetate is surfactant-free.
5. 26 mm diameter.

6. Hydrophobic membrane. Can be made hydrophilic by pre-wetting with IPA.
 7. 28 mm diameter.
 8. Additional dimensions and membrane types are available. Please contact your local Phenomenex technical consultant or distributor for availability or assistance.
- Above syringe filters are non-sterile. Housing is made of medical-grade polypropylene (PP), and offer luer lock inlet/slip outlet connections, unless otherwise indicated.

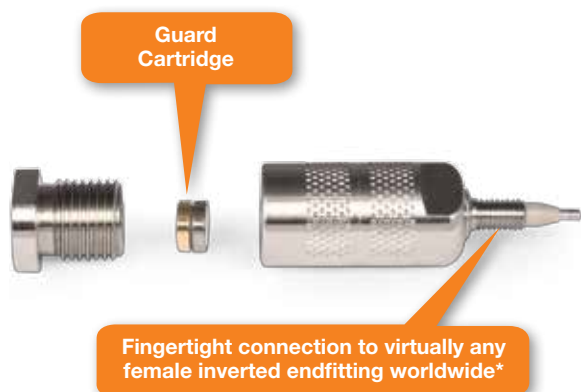
HPLC/UHPLC Column Protection

U.S. Patent No. 6, 162, 362

SecurityGuard

Column Protection for UHPLC, HPLC to PREP

- Protect HPLC columns and extend lifetime
- Virtually no change in chromatography
- Available in analytical, semi-prep, and preparative sizes
- Simple to use



*Feature applies to traditional analytical-sized guard system only, and does not apply to SemiPrep or PREP guard cartridges.



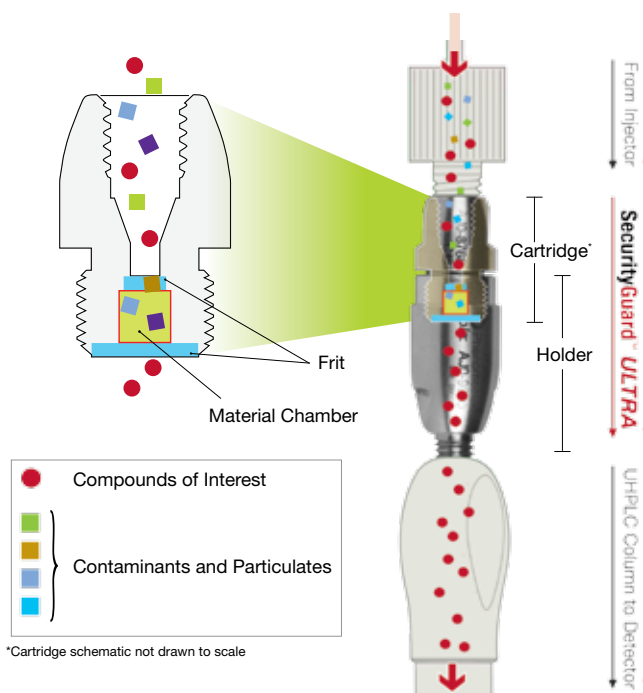
See it in action:
www.phenomenex.com/SecurityGuardInstallation



SecurityGuard ULTRA

UHPLC Column Protection System for Core-Shell and Sub-2 μ m Columns

- Increases column lifetime of virtually all manufacturers' UHPLC, sub-2 μ m, and core-shell columns
- Offers more reproducible chromatography
- For pressures up to 20000 psi (1378 bar)



*Cartridge schematic not drawn to scale

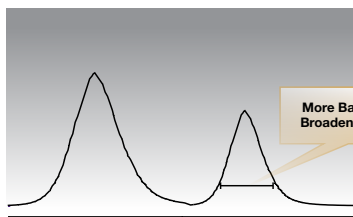
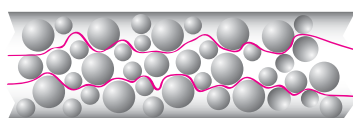
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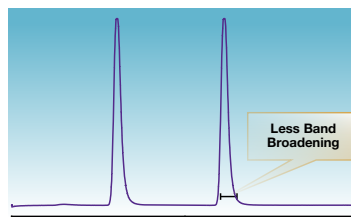
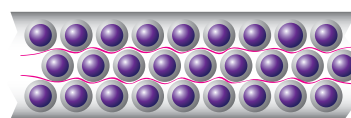


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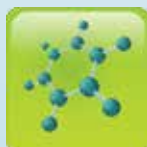
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Gemini and Kinetex EVO are patented by Phenomenex. U.S. Patent Nos. 7,563,367 and 8,658,038 and foreign counterparts.

Strata-X is patented by Phenomenex. U.S. Patent No. 7,119,145.

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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Australia

t: +61 (0)2-9428-6444
f: +61 (0)2-9428-6445
auinfo@phenomenex.com

Austria

t: +43 (0)1-319-1301
f: +43 (0)1-319-1300
anfrage@phenomenex.com

Belgium

t: +32 (0)2 503 4015 (French)
t: +32 (0)2 511 8666 (Dutch)
f: +31 (0)30-2383749
beinfo@phenomenex.com

Canada

t: +1 (800) 543-3681
f: +1 (310) 328-7768
info@phenomenex.com

China

t: +86 400-606-8099
f: +86 (0)22 2532-1033
phen@agela.com

Denmark

t: +45 4824 8048
f: +45 4810 6265
nordicinfo@phenomenex.com

Finland

t: +358 (0)9 4789 0063
f: +45 4810 6265
nordicinfo@phenomenex.com

France

t: +33 (0)1 30 09 21 10
f: +33 (0)1 30 09 21 11
franceinfo@phenomenex.com

Germany

t: +49 (0)6021-58830-0
f: +49 (0)6021-58830-11
anfrage@phenomenex.com

India

t: +91 (0)40-3012 2400
f: +91 (0)40-3012 2411
indiainfo@phenomenex.com

Ireland

t: +353 (0)1 247 5405
f: +44 1625-501796
eireinfo@phenomenex.com

Italy

t: +39 051 6327511
f: +39 051 6327555
italiainfo@phenomenex.com

Luxembourg

t: +31 (0)30-2418700
f: +31 (0)30-2383749
nlinfo@phenomenex.com

Mexico

t: 01-800-844-5226
f: 001-310-328-7768
tecnicomx@phenomenex.com

The Netherlands

t: +31 (0)30-2418700
f: +31 (0)30-2383749
nlinfo@phenomenex.com

New Zealand

t: +64 (0)9-4780951
f: +64 (0)9-4780952
nzinfo@phenomenex.com

Norway

t: +47 810 02 005
f: +45 4810 6265
nordicinfo@phenomenex.com

Puerto Rico

t: +1 (800) 541-HPLC
f: +1 (310) 328-7768
info@phenomenex.com

Spain

t: +34 91-413-8613
f: +34 91-413-2290
espinfo@phenomenex.com

Sweden

t: +46 (0)8 611 6950
f: +45 4810 6265
nordicinfo@phenomenex.com

United Kingdom

t: +44 (0)1625-501367
f: +44 (0)1625-501796
ukinfo@phenomenex.com

USA

t: +1 (310) 212-0555
f: +1 (310) 328-7768
info@phenomenex.com

All other countries Corporate Office USA

t: +1 (310) 212-0555
f: +1 (310) 328-7768
info@phenomenex.com