CANNABIS TESTING

LC/GC/SFC/SPE/QuEChERS

Analytical Options For Your Laboratory Needs

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Your Testing Needs

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Search:

Sample Preparation

The key to successful and effective analysis is sample preparation. Sample matrix effects can result in an array of interferences which can lead to poor chromatography as well as instrumentation drawbacks.

- ✓ Simple Extraction
- ✓ Targeted Clean up
- ✓ Targeted Extraction

Choose your options:
pp.17-18

Gas Chromatography

Advancements in GC technology have provided more options to achieve the best separation and identification of a variety of pesticides, cannabinoids, terpenes and residual solvents for safer, higher quality cannabis products.

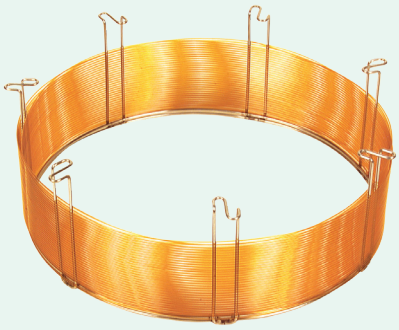
- ✓ Rugged and Versatile
- ✓ Dependable
- ✓ Support and Options

Choose your options:
p.19

strata X Polymeric SPE

roQ QuEChERS Kits

Zebron™ GC Columns



Liquid Chromatography

Improvements in particle morphologies and surface chemistries have increased analysis selectivity and productivity options.

- ✓ Speed
- ✓ Efficiency
- ✓ Polar Selectivity
- ✓ Portability (HPLC⟷UHPLC)
- ✓ Great Reproducibility

Choose your options:
pp. 20-21

SFC Columns

High efficiency and great loading capacity for cannabis extractions purfications

- ✓ Excellent Loadability
- ✓ Stable in:
  - Normal Phase
  - Reversed Phase
  - Polar Organic
  - SFC Conditions

Choose your options:
p. 22

KINETEX® Core-Shell Technology

explore LUNA® OMEGA

LUX® Chiral LC Columns

Your Tools for Success

Potency

HPLC/UHPLC

18 Cannabinoids for Potency Testing By LC-UV

Scott Krepich, Sean Orlowicz, Zeshan Aqeel, and Jeff Layne
Phenomenex, Inc., 411 Madrid Ave., Torrance, CA 90501 USA

Overview

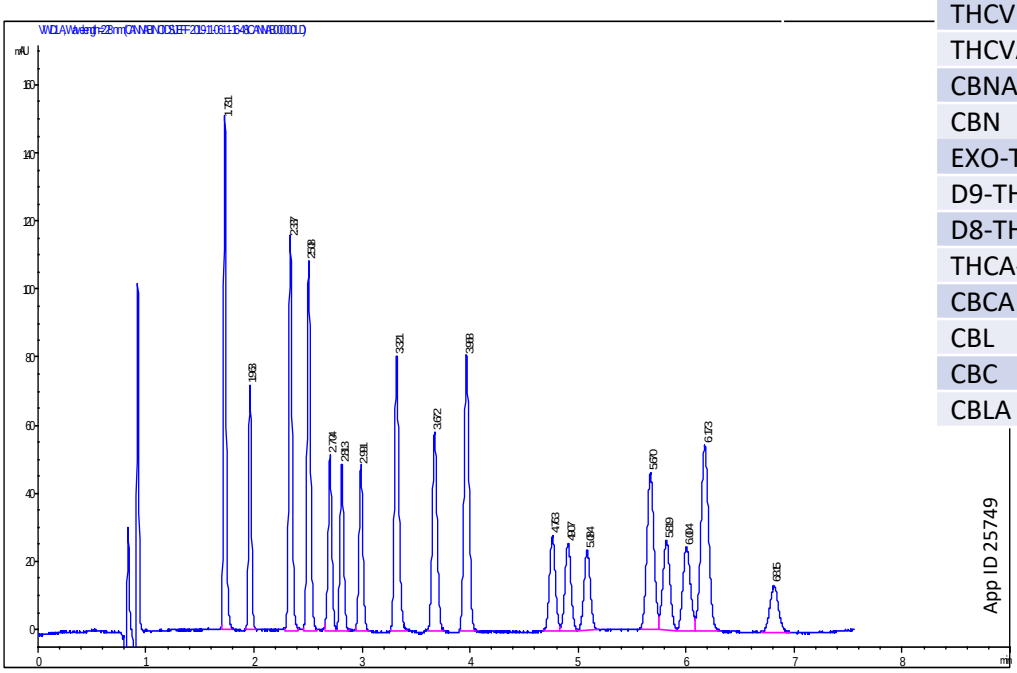
Legalization of medical and recreational marijuana and hemp have lead to an expansion of potency testing needs throughout the globe. Routine testing workflows are now benefiting from resolution of additional exotic cannabinoids to keep up with the diverse range of cultivars and formulations reaching the market.

Here we demonstrate a practical chromatographic separation of 18 cannabinoids with flexibility across HPLC and UHPLC platforms in a simple, isocratic workflow. While 5 primary cannabinoids, Δ9-THC, CBD, THCA, CBDA, and CBN are the most common and abundant, new indications are continuously being explored with dozens of other cannabinoids.

LC-UV Conditions

Column: Kinetex® 2.6 µm C18
Dimension: 150 x 4.6mm
Part No.: 00F-4462-E0
Mobile Phase: A: 20 mM Ammonium Formate, pH 2.9 with Formic Acid
B: Acetonitrile
Isocratic Isocratic 24:76 (A/B)
Flow Rate: 1.5 mL/min
Injection Volume: 2 µL
Back Pressure: ~260 bar
Temperature: 40 °C
Detection: UV @ 228 nm
Analytes: 18 Cannabinoids

Abbrev	Full Name
CBDVA	Cannabidivarinic acid
CBDV	Cannabidivarin
CBDA	Cannabidiolic acid
CBGA	Cannabigerolic acid
CBG	Cannabigerol
CBD	Cannabidiol
THCV	Tetrahydrocannabivarin
THCVA	Tetrahydrocannabivarinic acid
CBNA	Cannabinolic acid
CBN	Cannabinol
EXO-THC	Exo-tetrahydrocannabinol
D9-THC	Δ9-Tetrahydrocannabinol
D8-THC	Δ8-Tetrahydrocannabinol
THCA-A	Tetrahydrocannabinolic acid A
CBCA	Cannabichromenic acid
CBL	Cannabicycol
CBC	Cannabichromene
CBLA	Cannabicyclolic acid



Quantification of 10 Cannabinoids in Cannabigerolic Acid (CBG-A) Dominan Cultivars by LC-UV

Stephanie Moon[1], Adam Williams[1], Sean Orlowicz[2], Scott Krepich[2], and Anthony Smith, Ph.D[1]
[1]EVIO, Inc. Medford, Oregon
[2]Phenomenex, Inc. Torrance, California

EVIO LABS

Introduction

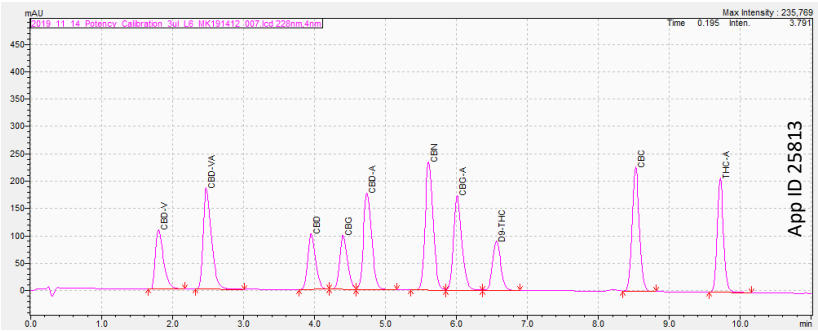
The increasing demands of the hemp industry on testing laboratories has created the need for a fast, efficient, and accurate quantification method for an increasing number of cannabinoids compared to previous needs of the marijuana dominant industry. In Oregon, more stringent Oregon Department of Agriculture regulations on dry weight tetrahydrocannabinol (THC) concentrations in pre-harvest hemp crops, as well as products intended for sale to consumers, have influenced the hemp market toward the cultivation of flowers that produce cannabigerolic acid (CBG-A) over cultivars that produce cannabidiolic acid (CBD-A). CBG-A dominant cultivars have shown lower total THC concentrations compared to CBD-A dominant cultivars and are sought after for their increased likelihood to pass total THC compliance testing. This shift in the hemp industry has led to the need for refinements in the way laboratories calibrate minor and major cannabinoids.

HPLC Parameters

Column: Kinetex® 2.6 µm C18
Dimension: 50 x 2.1 mm
Part No.: 00B-4462-AN
Mobile Phase: A: 0.10 % Formic acid in water
B: 0.05 % Formic acid in methanol
Injection Volume: 3 µL
Detection: UV @ 228 nm
Flow Rate: 0.8 mL/min
Gradient:

Time (min)	%A	%B
0	40	60
7	30	70
10.9	17	83
11	0	100
11.9	0	100
12	40	60
13	40	60

Figure 1: Ten analytes displayed at 100 µg/mL in just under 10 minutes



Potency

HPLC/UHPLC

Analytes and Retention Times

Abbreviation	Name	RT (min)
CBD-V	Cannabidivarin	1.8
CBD-VA	Cannabidivarinic acid	2.4
CBD	Cannabidiol	3.9
CBG	Cannabigerol	4.4
CBD-A	Cannabidiolic acid	4.7
CBN	Cannabinol	5.6
CBG-A	Cannabigerolic acid	6.0
D9-THC	Δ9-Tetrahydrocannabinol	6.5
CBC	Cannabichromene	8.5
THC-A	Tetrahydrocannabinolic acid A	9.7

Figure 2: Six analytes (CBD, CBG, CBD-A, CBG-A, D9-THC, and THC-A) at 600 µg/mL with full resolution

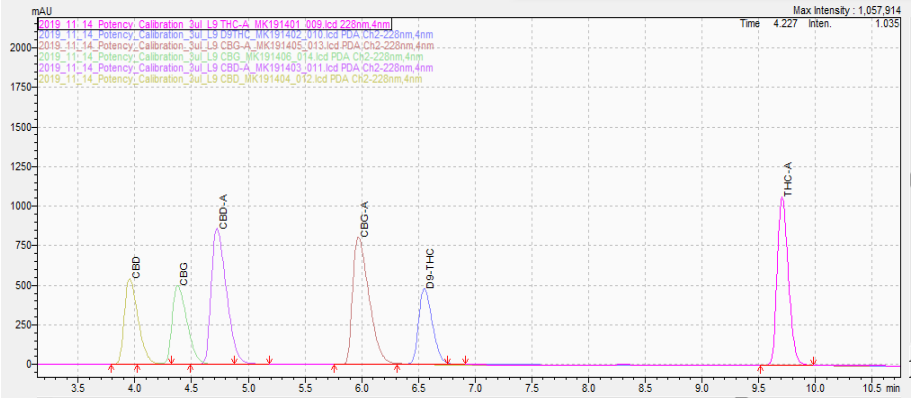


Figure 3: CBG-A dominant hemp cultivar

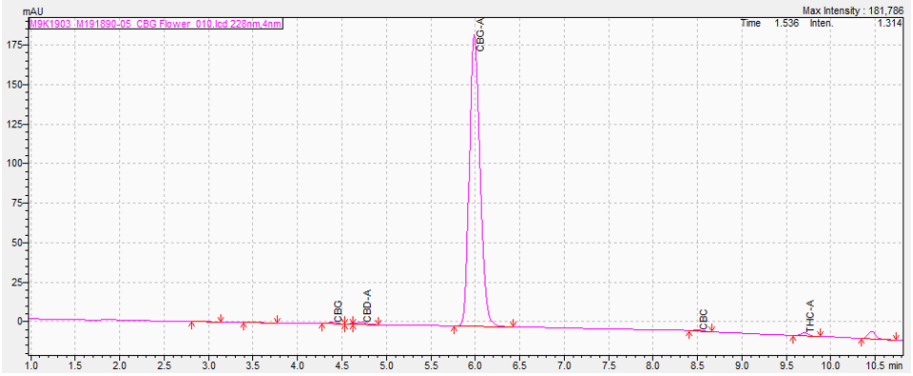
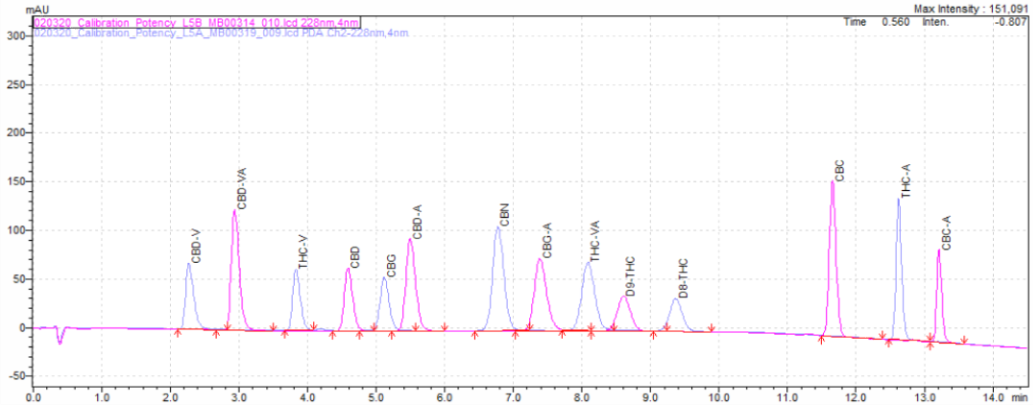


Figure 4: Expanded 14 cannabinoid quantification profile using the same column in under 14 minutes



Results and Discussion

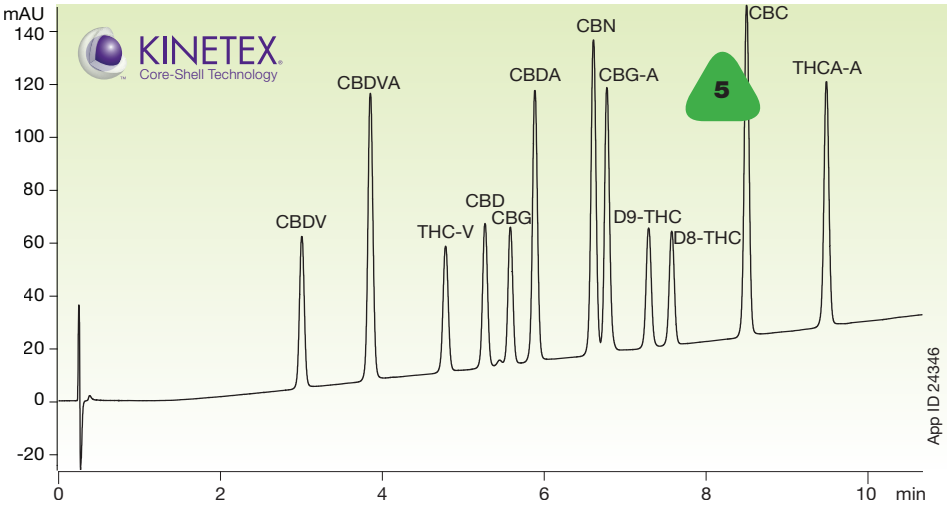
A major advantage to this method is the analytical range of 0.5 µg/mL – 600 µg/mL for THC-A, D9-THC, CBD-A, CBD, CBG-A, and CBG and 0.5 µg/mL – 100 µg/mL for CBC, CBN, CBD-VA, and CBD-V. This wide analytical range allows for fewer re-dilutions of samples containing what were once considered minor cannabinoids; most notably CBG-A dominant hemp cultivars. This method has proven its efficacy and reliability during the harvest season of 2019.

As the hemp industry continues to grow and the demands of producers and processors continue to change, the need for detection and quantification of an even larger number of minor cannabinoids will increase. At EVIO, Inc., work is currently being done to expand this method to quantify four additional analytes (THC-VA, THC-V, CBC-A, and D8-THC). This application note is written by Stephanie Moon and Adam Williams of EVIO, Inc. and published by Phenomenex, Inc.

Potency

HPLC/UHPLC

12 Cannabinoids using Methanol and Kinetex 2.6 µm C18 LC Columns



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

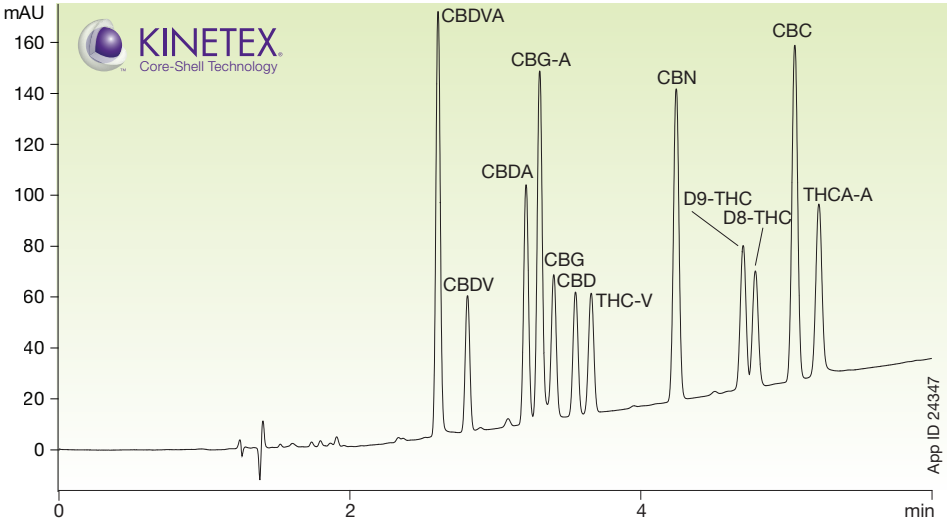
Different acidic modifiers might affect the retention behavior of matrix peaks

Gradient:	Time (min)	% B
	0	60
	10	85

Flow Rate: 0.5 mL/min
Back Pressure: 240 Bar
Temperature: 50 °C
Detection: UV @ 230 nm

	Elution Order MeOH	Elution Order AcCN
CBDV	1	2
CBDVA	2	1
THC-V	3	7
CBD	4	6
CBG	5	5
CBDA	6	3
CBN	7	8
CBG-A	8	4
D9-THC	9	9
D8-THC	10	10
CBC	11	11
THCA-A	12	12

12 Cannabinoids using Acetonitrile and Kinetex 2.6 µm Polar C18 LC Columns



Column: Kinetex 2.6 µm Polar C18
Dimensions: 150 x 4.6 mm
Part No.: 00F-4759-E0
Mobile Phase: A: Water with 0.1 % TFA
B: Acetonitrile with 0.1 % TFA

Different acidic modifiers might affect the retention behavior of matrix peaks

Gradient:	Time (min)	% B
	0	75
	7	100

Flow Rate: 1 mL/min
Back Pressure: 150 Bar
Temperature: 55 °C
Detection: UV @ 230 nm

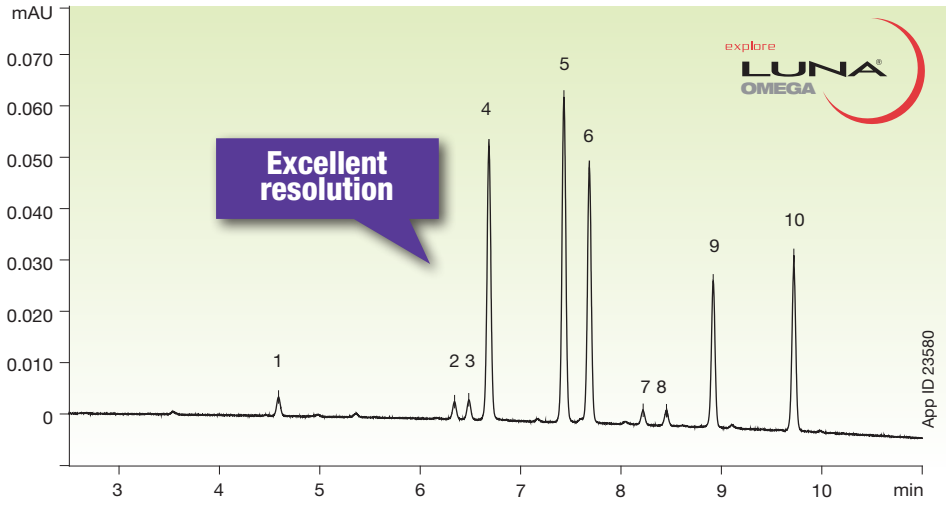
For more details visit

www.phenomenex.com/Search **TN-1225**

Potency

UHPLC

10 Cannabinoids using Luna Omega 1.6 µm Polar C18 UHPLC Columns



Conditions for both columns:

Columns: Luna Omega 1.6 µm Polar C18
Kinetex 1.7 µm F5

Dimension: 100 x 2.1 mm

Mobile Phases: A: 20 mM Ammonium formate pH 3.2
B: Acetonitrile

Gradient:

Time (min)	% B
0	60
12	95
13	95
13.01	60
15	60

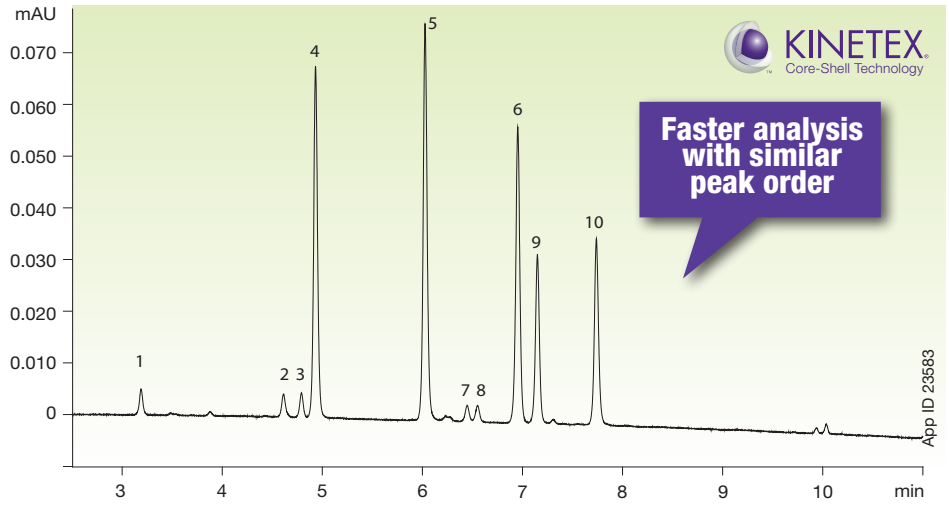
Flow Rate: 0.4 mL/min

Temperature: 40 °C

Detection: UV @ 256 nm

Sample:
1. CBVD
2. Cannabidiol
3. CBG
4. Cannabidolic Acid
5. CBG-A
6. Cannabinol
7. Δ-9 THC
8. Δ-8 THC
9. CBC
10. THCA-A

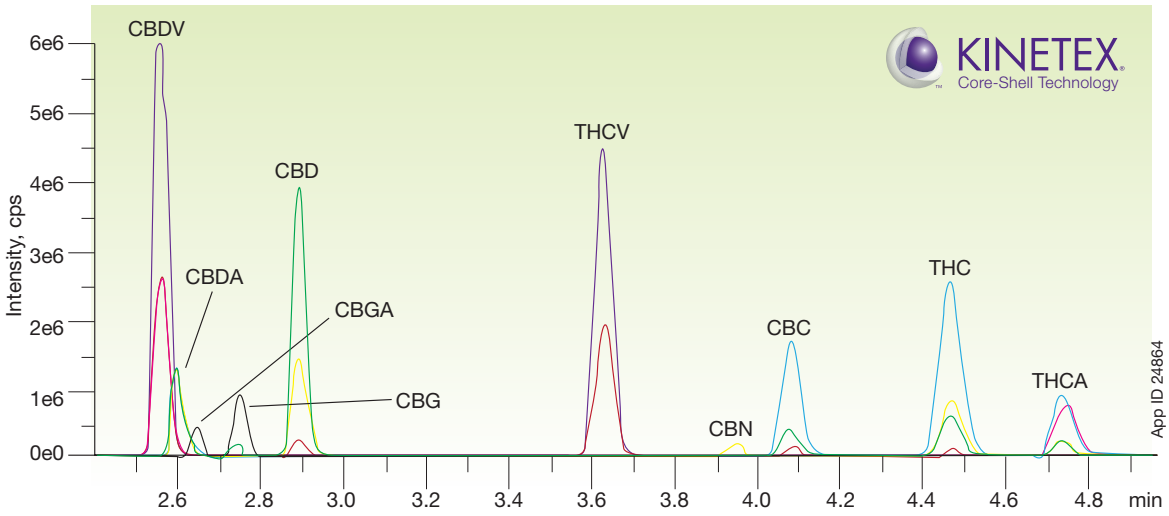
10 Cannabinoids using Kinetex 1.7 µm F5 UHPLC Columns



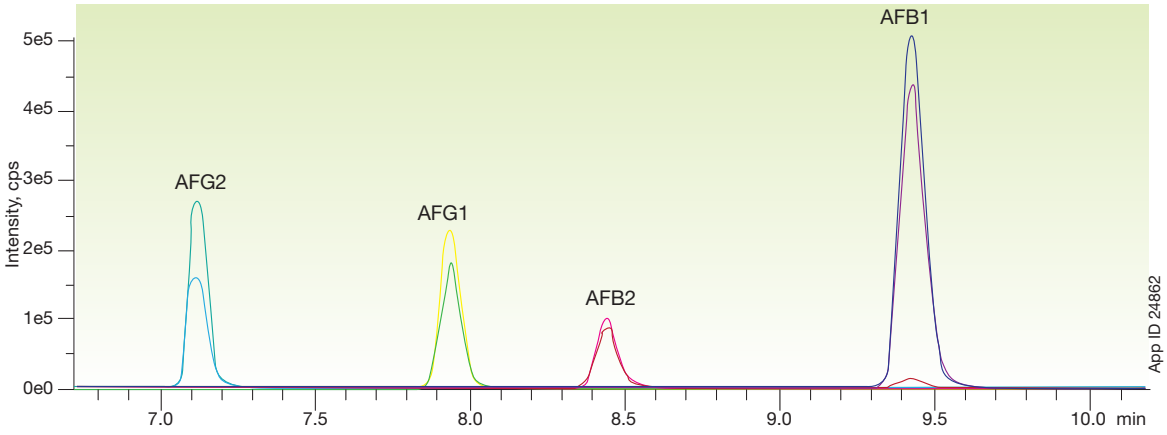
Potency and Mycotoxins

LC-MS/MS

10 Cannabinoids using Kinetex Biphenyl by LC-MS/MS



4 Aflatoxins using Kinetex Biphenyl by LC-MS/MS



Conditions for both applications

Column: Kinetex 2.6 µm Biphenyl
Dimension: 150 x 4.6 mm
Part No.: 00F-4622-E0
Mobile Phases: A: Water + 5 mM Ammonium acetate + 0.1% Formic acid
B: Methanol/Water (98:2) + 5 mM Ammonium acetate

Gradient:

Time (min)	% B
0.75	5
4	50
5	60
5.01	78
8	88
10	92
12	100
13.80	100
13.90	5
16	0

Flow Rate: 1 mL/min
Injection: 2 µL
Temperature: Ambient
Detector: SCIEX QTRAP® 6500+

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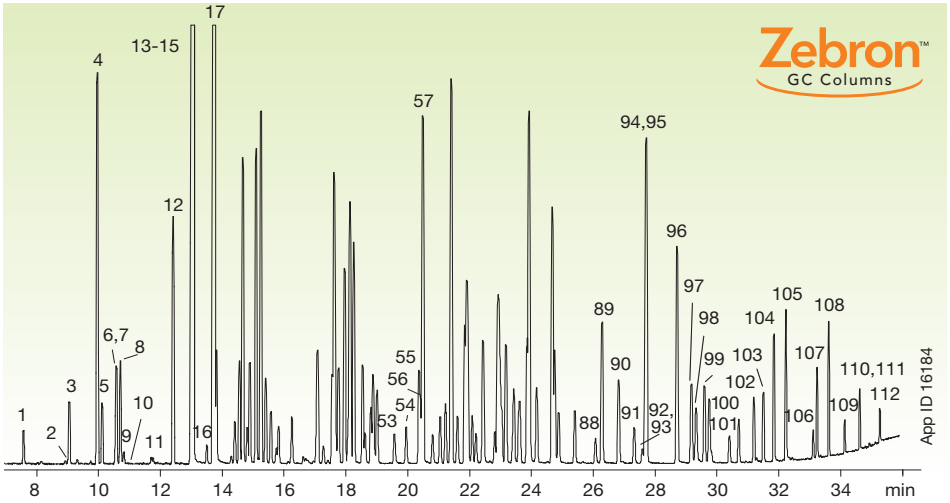
Pesticides

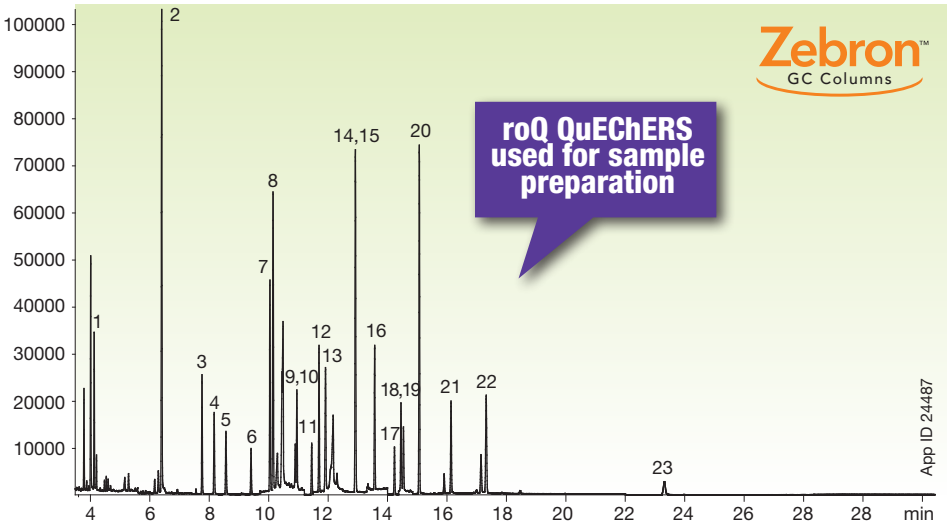
GC-MS

112 Pesticides Screen using Zebron ZB-MultiResidue-1 GC Columns



Column: Zebron 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: Zebron PLUS Single Taper Z-liner™
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

23 Pesticides from Leafy Produce using Zebron ZB-5*PLUS*™ GC Columns



Column: Zebron ZB-5*PLUS* with 5 µm Guardian™
Dimensions: 30 m x 0.25 mm x 0.25 µm
Part No.: 7HG-G032-11-GGA
Injection: Splitless @ 250 °C, 2 µL
Recommended Liner: Zebron PLUS Single Taper Z-liner™
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
2. o-phenylphenol
3. Trifluarlin
4. α-HCH-d6
5. Atrazine
6. Chlorothalonil
7. Chlorpyrifos-methyl
8. Carbaryl
9. d10-Parathion
10. Chlorpyrifos
11. Cyprodnil
12. Tolyfluanid
13. Procymidone
14. o,p-DDD
15. Kresoxim-methyl
16. Ethion
17. Endosulfan Sulfate
18. Tebuconazole
19. Triphenyl Phosphate
20. Bifenthrin
21. L-Cyhalothrin
22. Permethrins
23. Azoxystrobin

5 ways SCIEX addresses pesticide challenges in cannabis testing

Making your laboratory operations easier and more productive

1

Maximizing uptime

SCIEX instruments are robust and can help improve laboratory productivity by minimizing the downtime needed for cleaning and maintenance.

2

Meeting strict regulatory requirements

The SCIEX 7500 system is sensitive and can help labs meet the requirements set by cannabis regulators in Canada and the United States for measuring trace level pesticides and mycotoxins in cannabis products.

3

Establishing lab operations

Set up your lab with a vMethod™ application which outlines a step-by-step procedure requiring minimal training to get your lab staff performing analyses.

4

Finding technical and applications support

Get access to experts who are skilled in cannabis analysis to help address your most challenging problem analysis issues.

5

Learning LC-MS/MS for cannabis analysis

Take our course for hands-on experience with sample preparation, method development strategies, sample analysis and data reporting.

For more information visit: **sciex.li/cannabis**

SCAN ME

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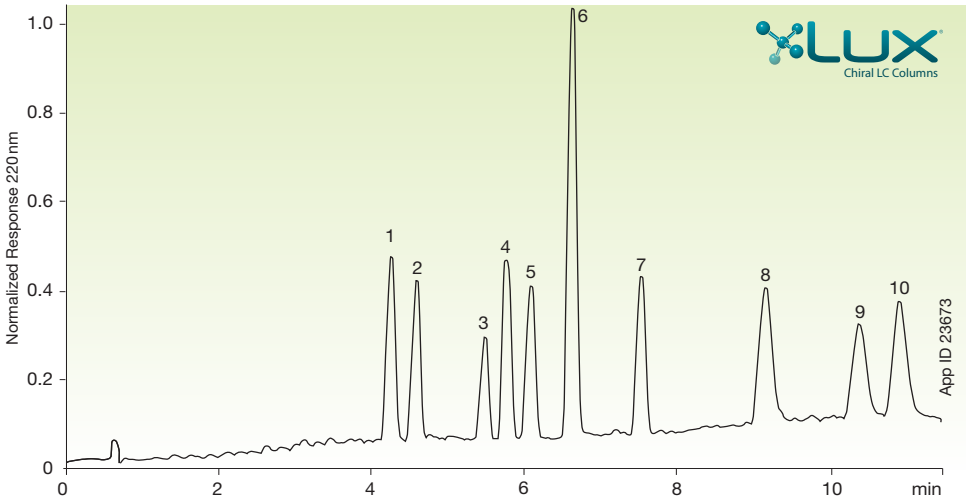
Purifications

Analytical/PREP

10 Cannabinoids using Lux 5 µm Cellulose-2 Chiral LC Columns



Column: Lux 5 µm Cellulose-2
Dimensions: 250 x 4.6 mm
Part No.: 00G-4457-E0
Mobile Phase: A: Carbon dioxide
B: Ethanol

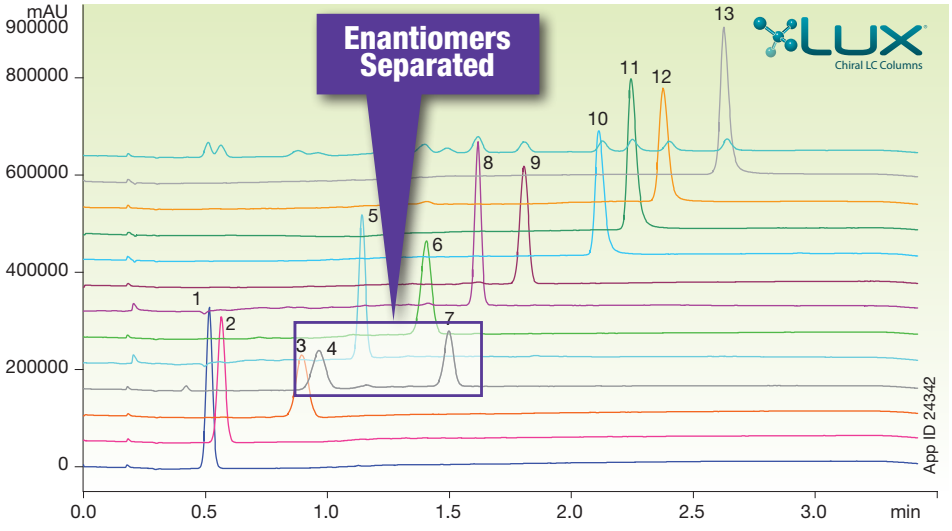
Gradient:	**Time (min)**	**%B**
	0	1.5
	2.8	4
	9.7	17
	10.6	17
	10.9	1.5
	11.5	1.5

Injection: 2 µL
Flow Rate: 6 mL/min
Temperature: Ambient
Backpressure: 120 Bar
Detection: UV @ 220 nm
Sample:
1. Cannabidivarin (CBDV)
2. Cannabidiol (CBD)
3. Cannabichromene (CBC)
4. Tetrahydrocannabivarin (THCV)
5. Tetrahydrocannabinol (THC)
6. Cannabinol (CBN)
7. Cannabigerol (CBG)
8. Cannabidiolic acid (CBD-A)
9. Tetrahydrocannabinolic Acid (THCA)
10. Cannabigerolic Acid (CBG-A)

Note: 100 µg/mL mix of 10 cannabinoid standards obtained from Restek® and Cayman Chemicals®

Instrument: JASCO® 4000 analytical SFC (CO2 pump PU-4350, Co-solvent PU-4380, PDA MD-4010, BPR BP-4340 AS AS-4350)

13 Cannabinoids using Lux 3 µm Cellulose-2 Chiral LC Columns



Column: Lux 3 µm Cellulose-2
Dimensions: 150 x 3.0 mm
Part No.: 00F-4456-Y0
Mobile Phase: A: Carbon dioxide
B: Methanol

Gradient:	**Time (min)**	**% B**
	0	4
	3	25
	3.5	25

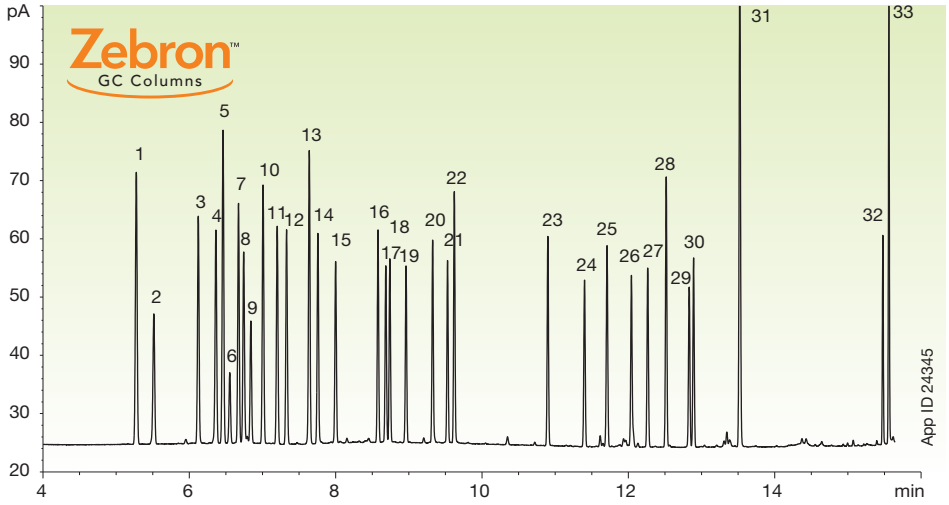
Flow Rate: 5 mL/min
Detection: UV @ 220 nm
Temperature: 40 °C
Sample: Cannabinoid mix of 12

1. CBDV
2. CBN
3. Δ-8-THC
4. CBC (Enantiomer 1)
5. CBD
6. Δ-9-THC
7. CBC (Enantiomer 2)
8. THCV
9. CBG
10. CBDA
11. CBDVA
12. THCA
13. CBG-A

Terpenes

GC-FID

33 Primary and Secondary Terpenes by GC-FID using Zebron ZB-5*PLUS*™ GC Columns

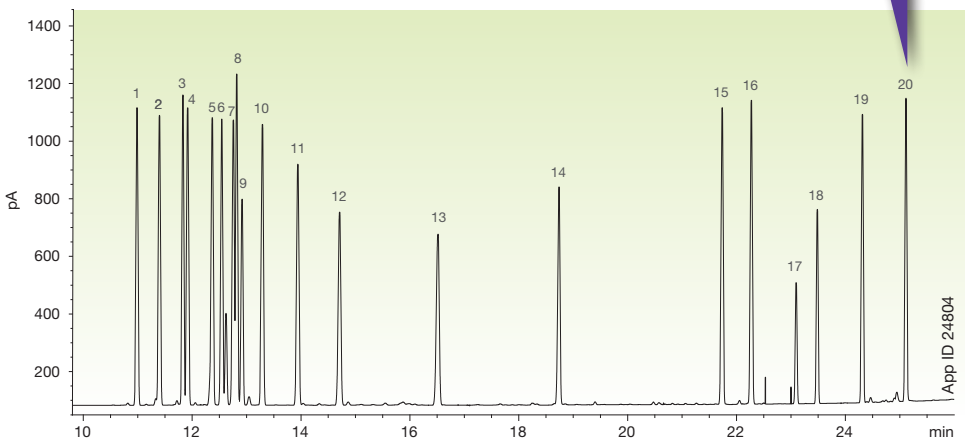


Column: Zebron ZB-5*PLUS*
Dimensions: 20 m x 0.18 mm x 0.36 µm
Part No.: 7FD-G032-53
Guard: 5 m Z-Guard™ (7AD-G000-00-GZ0)
Injection: Split 20:1 @ 250 °C, 1 µL
Recommended Liner: Zebron PLUS Single Taper Z-Liner™
Liner Part No.: AG2-0A13-01
Carrier Gas: Helium @ 1.9 mL/min
Oven Program: 35 °C to 105 °C @ 10 °C/min to 205 °C @ 15 °C/min to 360 °C @ 35 °C/min for 1.9 min
Detector: FID @ 340 °C
Sample: Terpenes are 50-100 ppm in acetonitrile

1. α-Pinene
2. Camphene
3. Myrcene
4. α-Phellandrene
5. 3-Carene
6. α-Terpinene
7. p-Cymene
8. Limonene
9. Ocimene-1
10. Ocimene-2
11. γ-Terpinene
12. Sabinine hydrate
13. Terpineolene
14. Linalool
15. Fenchol
16. Isoborneol
17. Borneol
18. Menthol
19. α-Terpineol
20. Citronellol
21. Pulegone
22. Geraniol
23. Geranyl acetate
24. Trans-Caryophyllene
25. α-Humulene
26. Valencene
27. Nerolidol-1
28. Nerolidol-2
29. Caryophyllene oxide
30. Guaiol
31. α-Bisabolol
32. Phytol-1
33. Phytol-2

20 Terpenes using Zebron ZB-624*PLUS*™

Last analyte elutes around 280 °C



Column: Zebron ZB-624*PLUS*
Dimensions: 30 m x 0.25 mm x 1.40 µm
Part No.: 7HG-G040-27
Recommended Liner: Straight Z-Liner™
Injection: Split 20:1 1 µL @ 250 °C,
Carrier Gas: Helium @ 1.0 mL/min (constant flow)
Oven Program: 50 °C for 1 minute, 160 °C @ 10 °C/min for 4 min, then go to 280 °C @ 12 °C/min
Detection: FID @ 300 °C
Analytes:

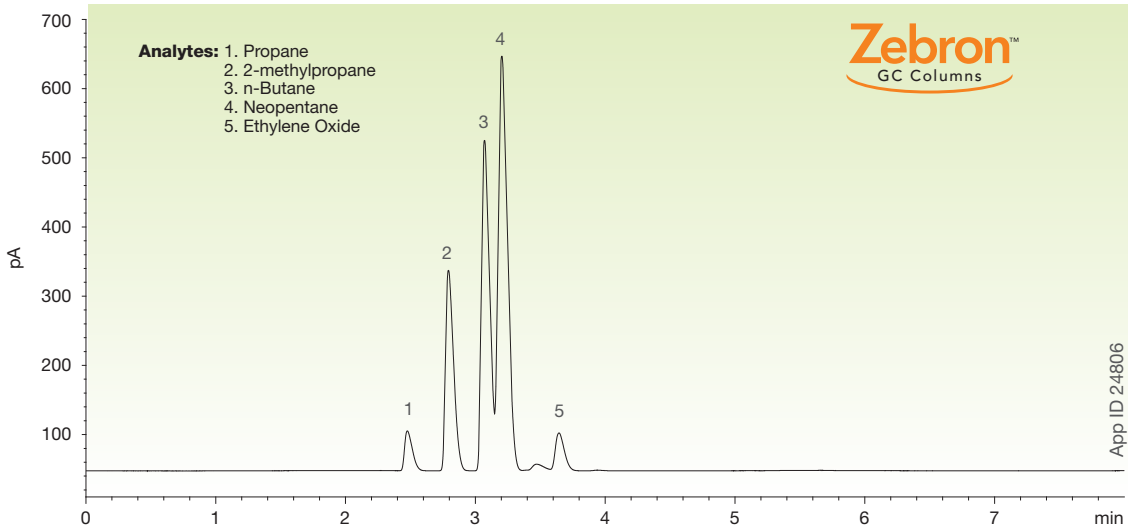
1. α-Pinene
2. Camphene
3. β-Myrcene
4. (-)-β-Pinene
5. Δ-3-Carene
6. α-Terpinene
7. d-Limonene
8. Δ-Cymene
9. Ocimene
10. γ-Terpinene
11. Terpinolene
12. Linalool
13. Isopulegol
14. Geraniol
15. β-Caryophllene
16. α-Humulene
17. Nerolidol 1
18. Nerolidol 1
19. Guaiol
20. α-Bisabolol

For more details visit
www.phenomenex.com/Search **TN-1277**

Residual Solvents

GC-FID

Cannabis Residual Solvents by GC-FID using Zebron ZB-624*PLUS*

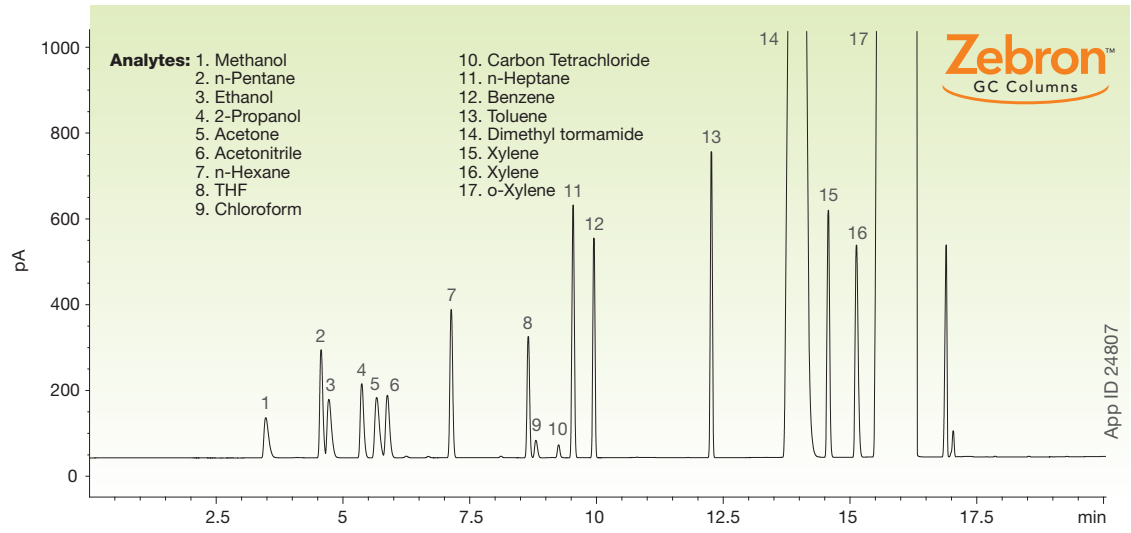


One Column Solution for Cannabis Residual Solvents and Terpenes

Same conditions for all separations:

Column: Zebron ZB-624*PLUS*
Dimensions: 30 m x 0.25 mm x 1.4 µm
Part No.: 7HG-G040-27
Recommended Liner: Zebron PLUS Liner Straight Z-Liner™
Liner Part No.: AG2-0A03-05
Injection: Split 10:1 1 µL @ 200 °C,
Carrier Gas: Helium @ 1.0 mL/min (constant flow)
Oven Program: 35 °C for 4.0 min, 50 °C at 20 °C/min for 1.0 min, 160 °C at 10 °C/min for 4.0 min, 300 °C at 15 °C/min for 5.0 min.
Detection: FID @ 240 °C

Cannabis Residual Solvents by GC-FID using Zebron ZB-624*PLUS*



Sample Preparation

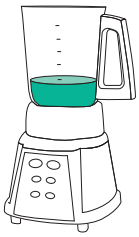
Ordering Information

roQ™ QuEChERS Kits

QuEChERS, a quicker and easier sample preparation choice

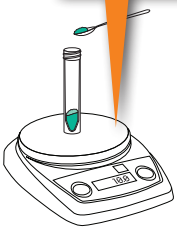
Step 1

Extraction



Blend fruits or vegetables to be analyzed.

Easily Weigh Out Samples

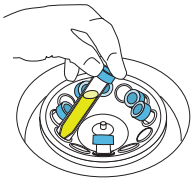


Weigh blended sample.

No Mess Salt Packets

Add salts and acetonitrile.

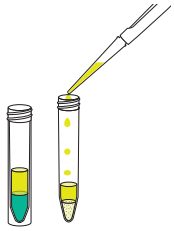
Shake tube for 1 minute.



Centrifuge tube for 5 minutes.

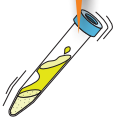
Step 2

Clean Up/dSPE

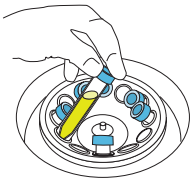


Add supernatant from extraction procedure into a roQ dSPE tube.

Avoid Leaky Tubes! Our tubes are designed to seal completely



Shake dSPE tube for 30 seconds.



Centrifuge dSPE tube for 5 minutes.

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	KS0-9504
150 mg $MgSO_4$, 25 mg PSA, 2.5 mg GCB	100/pk	KS0-9505
150 mg, $MgSO_4$, 25 mg PSA, 7.5 mg GCB	100/pk	KS0-8906
150 mg $MgSO_4$, 25 mg PSA	100/pk	KS0-9503
150 mg $MgSO_4$, 50 mg PSA, 50 mg C18E, 50 mg GCB	100/pk	KS0-9514
150 mg $MgSO_4$, 50 mg PSA, 50 mg C18E	100/pk	KS0-9512
150 mg $MgSO_4$, 50 mg PSA, 50 mg GCB	100/pk	KS0-9513
150 mg $MgSO_4$, 50 mg PSA	100/pk	KS0-9513
15 mL dSPE Kits		
900 mg $MgSO_4$, 150 mg PSA, 150 mg C18E	100/pk	KS0-9508
900 mg $MgSO_4$, 150 mg PSA, 15 mg GCB	100/pk	KS0-9509
900 mg $MgSO_4$, 150 mg PSA, 45 mg GCB	100/pk	KS0-9510
900 mg $MgSO_4$, 150 mg PSA	100/pk	KS0-9507
1200 mg $MgSO_4$, 400 mg PSA, 400 mg C18E, 400 mg GCB	100/pk	KS0-9518
1200 mg $MgSO_4$, 400 mg PSA, 400 mg C18E	100/pk	KS0-9516
1200 mg $MgSO_4$, 400 mg PSA, 400 mg GCB	100/pk	KS0-9517
1200 mg $MgSO_4$, 400 mg PSA	100/pk	KS0-9515

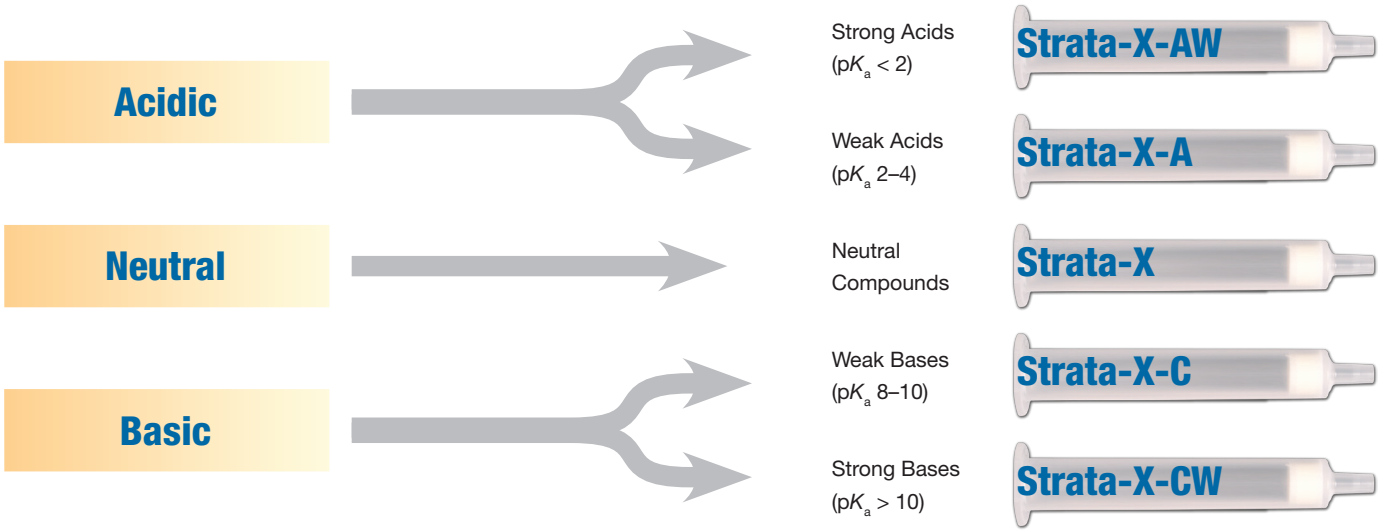
Sample Preparation

Ordering Information

Solid Phase Extraction (SPE)
Targeted Extraction & Clean-up

strata®X

Strata-X polymer-based SPE sorbent designed to meet your separation needs.



Ordering Information

			Strata-X	Strata-X-A	Strata-X-AW	Strata-X-C	Strata-X-CW
Format	Sorbent Mass	Unit	Part Number	Part Number	Part Number	Part Number	Part Number
Tube							
	100 mg	6 mL (30/box)	8B-S100-ECH	8B-S123-ECH	8B-S038-ECH	8B-S029-ECH	8B-S035-ECH
	200 mg	3 mL (50/box)	8B-S100-FBJ	8B-S123-FBJ	8B-S038-FBJ	8B-S029-FBJ	8B-S035-FBJ
	200 mg	6 mL (30/box)	8B-S100-FCH	8B-S123-FCH	8B-S038-FCH	8B-S029-FCH	8B-S035-FCH
	500 mg	6 mL (30/box)	8B-S100-HCH	8B-S123-HCH	8B-S038-HCH	8B-S029-HCH	8B-S035-HCH
Giga™ Tube							
	500 mg	12 mL (20/box)	8B-S100-HDG	8B-S123-HDG	8B-S038-HDG	8B-S029-HDG	–
	1 g	12 mL (20/box)	8B-S100-JDG	8B-S123-JDG	8B-S038-JDG	8B-S029-JDG	8B-S035-JDG
	1 g	20 mL (20/box)	8B-S100-JEG	8B-S123-JEG	8B-S038-JEG	8B-S029-JEG	8B-S035-JEG
	2 g	20 mL (20/box)	8B-S100-KEG	8B-S123-KEG	–	8B-S029-KEG	8B-S035-KEG
	5 g	60 mL (16/box)	8B-S100-LFF	8B-S123-LFF	8B-S038-LFF	8B-S029-LFF	8B-S035-LFF

Watch How SPE Works

www.phenomenex.com/SPE

GC Chromatography

Ordering Information

Zebron® GC Columns

Zebron ZB-MultiResidue™ GC Columns

ZB-MultiResidue-1 GC Columns				
Length (m)	**ID (mm)**	**df (µm)**	**Temp. Limits (°C)**	**Part No.**
20	0.18	0.18	-60 to 320/340	7FD-G016-08
30	0.25	0.25	-60 to 320/340	7HG-G016-11
30	0.32	0.25	-60 to 320/340	7HM-G016-11
30	0.32	0.50	-60 to 320/340	7HM-G016-17
30	0.53	0.50	-60 to 320/340	7HK-G016-17

ZB-MultiResidue-2 GC Columns				
Length (m)	**ID (mm)**	**df (µm)**	**Temp. Limits (°C)**	**Part No.**
30	0.25	0.20	-60 to 320/340	7HG-G017-10
30	0.32	0.25	-60 to 320/340	7HM-G017-11
30	0.53	0.50	-60 to 320/340	7HK-G017-17

Zebron ZB-624*PLUS*™ GC Columns

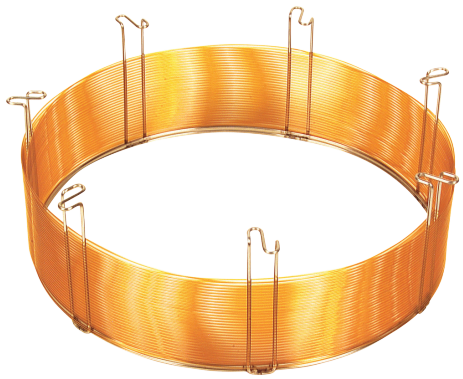
Length (m)	ID (mm)	df (µm)	Temp. Limits (°C)	Part No.
20	0.18	1.00	-20 to 300/320	7FD-G040-22
30	0.25	1.40	-20 to 300/320	7HG-G040-27
30	0.32	1.80	-20 to 300/320	7HM-G040-31
30	0.53	3.00	-20 to 300/320	7HK-G040-36
60	0.25	1.40	-20 to 300/320	7KG-G040-27
60	0.32	1.80	-20 to 300/320	7KM-G040-31
60	0.53	3.00	-20 to 300/320	7KK-G040-36

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.

Zebron ZB-5*PLUS*™ GC Columns

Length (m)	ID (mm)	df (µm)	Temp. Limits (°C)	Part No.
10	0.18	0.18	-60 to 360/370	7CD-G032-08
15	0.25	0.25	-60 to 360/370	7EG-G032-11
20	0.18	0.18	-60 to 360/370	7FD-G032-08
30	0.25	1.00	-60 to 360/370	7HG-G032-22
30	0.25	0.25	-60 to 360/370	7HG-G032-11
30	0.25	0.5	-60 to 360/370	7HG-G032-17
30	0.32	1.00	-60 to 360/370	7HM-G032-22
30	0.32	0.50	-60 to 360/370	7HM-G032-17
30	0.32	0.25	-60 to 360/370	7HM-G032-11
60	0.25	0.25	-60 to 360/370	7KG-G032-11

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.



For more details visit
www.phenomenex.com/Zebron

HPLC/UHPLC Chromatography

Ordering Information

KINETEX® Core-Shell Technology

1.7 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
F5	—	00B-4722-AN	00D-4722-AN	00F-4722-AN	AJ0-9322
Biphenyl	00A-4328-AN	00B-4628-AN	00D-4628-AN	00F-4628-AN	AJ0-9209
XB-C18	00A-4498-AN	00B-4498-AN	00D-4498-AN	00F-4498-AN	AJ0-8782
C18	00A-4475-AN	00B-4475-AN	00D-4475-AN	00F-4475-AN	AJ0-8782

for 2.1 mm ID

1.7 µm MidBore Columns (mm)				SecurityGuard ULTRA Cartridges‡
Phases	30 x 3.0	50 x 3.0	100 x 3.0	3/pk
XB-C18	00A-4498-Y0	00B-4498-Y0	00D-4498-Y0	AJ0-8775
C18	—	00B-4475-Y0	00D-4475-Y0	AJ0-8775
HILIC	—	00B-4474-Y0	—	AJ0-8779

for 3.0 mm ID

2.6 µm Microbore Columns (mm)			
Phases	50 x 1.0	100 x 1.0	150 x 1.0
XB-C18	00B-4496-A0	00D-4496-A0	00F-4496-A0

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
Polar C18	00A-4759-AN	00B-4759-AN	—	00D-4759-AN	00F-4759-AN	AJ0-9532
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

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
Polar C18	—	00B-4759-Y0	—	00D-4759-Y0	00F-4759-Y0	AJ0-9531
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

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
Polar C18	—	00B-4759-E0	—	00D-4759-E0	00F-4759-E0	AJ0-9530
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

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
F5	00A-4724-AN	00B-4724-AN	00D-4724-AN	00F-4724-AN	AJ0-9322
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

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
F5	00B-4724-Y0	00D-4724-Y0	00F-4724-Y0	AJ0-9321
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

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
F5	00B-4724-E0	00D-4724-E0	00F-4724-E0	00G-4724-E0	AJ0-9320
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

for 4.6 mm ID

‡ SecurityGuard ULTRA Cartridges require holder, Part No.: AJ0-9000
* PREP SecurityGuard Cartridges require holder, Part No.: AJ0-8223
** PREP SecurityGuard Cartridges require holder, Part No.: AJ0-8277
*** SemiPrep SecurityGuard Cartridges require holder, Part No.: AJ0-9281

HPLC/UHPLC Chromatography

Ordering Information

explore LUNA® OMEGA

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

1.6 µm Minibore Columns (mm)					SecurityGuard™ ULTRA Cartridges‡
Phases	30 x 2.1	50 x 2.1	100 x 2.1	150 x 2.1	3/pk
Polar C18	00A-4748-AN	00B-4748-AN	00D-4748-AN	00F-4748-AN	AJ0-9505
C18	00A-4742-AN	00B-4742-AN	00D-4742-AN	00F-4742-AN	AJ0-9502
					for 2.1 mm ID

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

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

3 µm Analytical Columns (mm)					SecurityGuard Cartridges (mm)
Phases	50 x 4.6	100 x 4.6	150 x 4.6	250 x 4.6	4 x 3.0*
Polar C18	00B-4760-E0	00D-4760-E0	00F-4760-E0	00G-4760-E0	AJ0-7601
				for ID:	3.1-8.0 mm

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

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

5 µm Analytical Columns (mm)					SecurityGuard Cartridges (mm)
Phases	50 x 4.6	100 x 4.6	150 x 4.6	250 x 4.6	4 x 3.0*
Polar C18	00B-4754-E0	00D-4754-E0	00F-4754-E0	00G-4754-E0	AJ0-7601
				for ID:	3.1-8.0 mm

5 µm Axia™ Packed Preparative Columns (mm)				SecurityGuard Cartridges (mm)	
Phases	150 x 21.2	250 x 21.2	150 x 30	15 x 21.2**	15 x 30.0♦
Polar C18	00F-4754-P0-AX	00G-4754-P0-AX	00F-4754-U0-AX	AJ0-7603	AJ0-7604
				for ID: 21.2 mm	for ID: 30 mm

5 µm Axia™ Packed Preparative Columns (mm)			SecurityGuard Cartridges (mm)	
Phases	250 x 30	250 x 50	15 x 21.2**	15 x 30.0♦
Polar C18	00G-4754-U0-AX	00G-4754-V0-AX	AJ0-7603	AJ0-7604
			for ID: 21.2 mm	for ID: 30 mm

‡ SecurityGuard ULTRA Cartridges require holder, Part No.: AJ0-9000
* SecurityGuard Analytical Cartridges require holder, Part No.: KJ0-4282
** PREP SecurityGuard Cartridges require holder, Part No.: AJ0-8223
♦ PREP SecurityGuard Cartridges require holder, Part No.: AJ0-8277

Straggering UHPLC and HPLC
Efficiency and Performance
www.phenomenex.com/LunaOmega

Supercritical Fluid Extractions

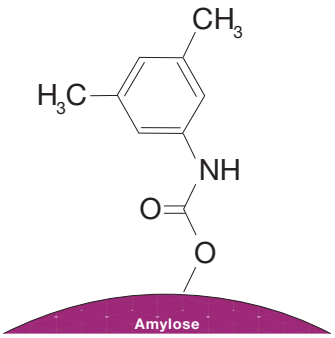
Ordering Information

Lux

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

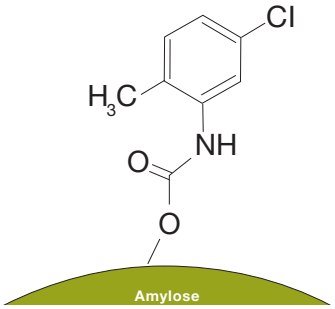
5 µm Minibore and Analytical Columns (mm)						SecurityGuard™ Cartridges (mm)	
Phases	**50 x 2.0**	**50 x 4.6**	**100 x 4.6**	**150 x 4.6**	**250 x 4.6**	**4 x 2.0***	**4 x 3.0***
i-Cellulose-5	—	00B-4756-E0	00D-4756-E0	00F-4756-E0	00G-4756-E0	AJ0-8631	AJ0-8632
Cellulose-1	00B-4459-B0	00B-4459-E0	00D-4459-E0	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



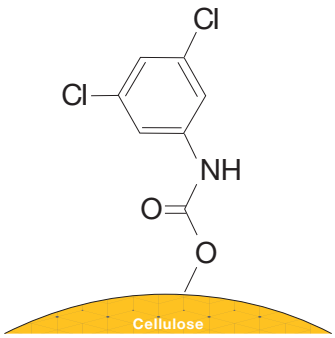
Lux Amylose-1

Amylose tris
(3,5-dimethylphenylcarbamate)



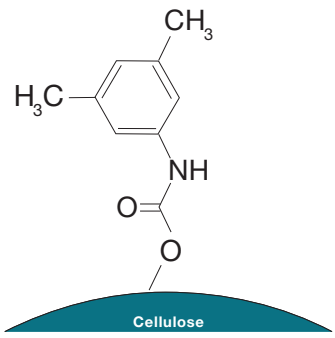
Lux Amylose-2

Amylose tris
(5-chloro-2-methylphenylcarbamate)



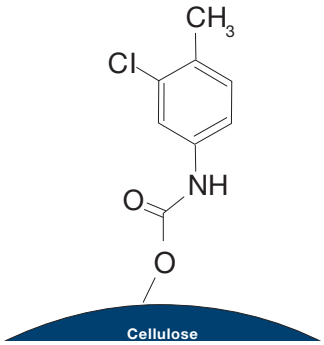
Lux i-Cellulose-5

Cellulose tris
(3,5-dichlorophenylcarbamate)



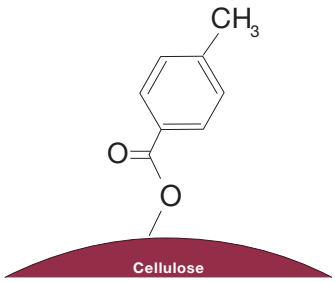
Lux Cellulose-1

Cellulose tris
(3,5-dimethylphenylcarbamate)



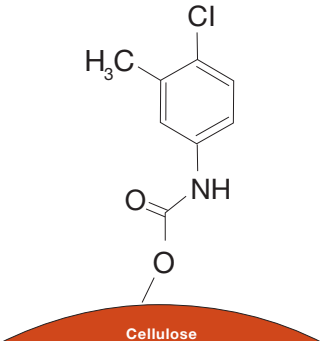
Lux Cellulose-2

Cellulose tris
(3-chloro-4-methylphenylcarbamate)



Lux Cellulose-3

Cellulose tris(4-methylbenzoate)



Lux Cellulose-4

Cellulose tris
(4-chloro-3-methylphenylcarbamate)

Accessories Selection

Ordering Information

Phenex™ Syringe Filters

- Increase column life and save money!
- Ensure more accurate, consistent results

1. 26 mm diameter.
2. Hydrophobic membrane. Can be made hydrophilic by pre-wetting with IPA.
3. 28 mm diameter.
4. 17 mm diameter

	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		
	Part No.		Unit	Part No.		Unit	Part No.		Unit
	0.20 µm	0.45 µm		0.20 µm	0.45 µm		0.20 µm	0.45 µm	
Phenex-RC (Regenerated Cellulose)	AF0-3203-12	AF0-3103-12	100/pk	AF0-2203-12	AF0-2103-12	100/pk	AF0-8203-12 [1]	AF0-8103-12 [1]	100/pk
	AF0-3203-52	AF0-3103-52	500/pk	AF0-2203-52	AF0-2103-52	500/pk	AF0-8203-52 [1]	AF0-8103-52 [1]	500/pk
Phenex-PTFE [2] (Polytetrafluoroethylene)	AF0-3202-12	AF0-3102-12	100/pk	AF0-2202-12	AF0-2102-12	100/pk	AF0-1202-12	AF0-1102-12	100/pk
	AF0-3202-52	AF0-3102-52	500/pk	AF0-2202-52	AF0-2102-52	500/pk	AF0-1202-52	AF0-1102-52	500/pk
Phenex-NY (Nylon)	AF3-3207-12	AF3-3107-12	100/pk	AF0-2207-12	AF0-2107-12	100/pk	AF0-1207-12	AF0-1107-12	100/pk
	AF3-3207-52	AF3-3107-52	500/pk	AF0-2207-52	AF0-2107-52	500/pk	AF0-1207-52	AF0-1107-52	500/pk
Phenex-GF/NY (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. Use less hand pressure to filter even the most difficult samples. Outlet connection is luer lock.						AF0-1A47-12 [3]	AF0-1B47-12 [3]	100/pk
							AF0-1A47-52 [3]	AF0-1B47-52 [3]	500/pk
Phenex-PVDF (Polyvinylidene Fluoride)	–	–	–	AF6-5206-12 [4]	AF6-5106-12 [4]	100/pk	AF6-6206-12	AF6-6106-12	100/pk
	–	–	–	AF6-5206-52 [4]	AF6-5106-52 [4]	500/pk	AF6-6206-52	AF6-6106-52	500/pk
Phenex-GF/PVDF (Glass Fiber / Polyvinylidene Fluoride)	An integrated syringe filter unit containing an inert borosilicate glass fiber prefilter and a PVDF membrane. The hydrophilic PVDF membrane provides high flow rates and throughput, low extractables and broad chemical compatibility. This membrane binds less protein than nylon or PTFE.						AF6-6C06-12	AF6-6D06-12	100/pk
							AF6-6C06-52	AF6-6D06-52	500/pk

Verex™ Assembled Vial Kits and Storage Vial Kits

- Clear or amber, with open top or closed caps
- PTFE (Teflon®) faced 0.125 in. silicone septa or PTFE with foam urethane backing

Part No.	Description	Unit
AR0-9540-12	VOA/ASE 40 mL Screw, Clear w/ Caps 24-400 white PTFE/Silicone, open top	100/pk
AR0-9540-12-A	VOA/ASE 40 mL Screw, Clear w/ Caps 24-400 white PTFE/Silicone, (assembled), open top	100/pk
AR0-9551-12	Storage, 20 mL Screw, Amber w/ Caps 24-400 white PTFE/Foam Urethane liner, closed top	100/pk
AR0-9559-12	Storage, 20 mL Screw, Clear w/ Caps 24-400 white PTFE/Foam Urethane liner, closed top	100/pk

Verex Vials and Caps (Separate)

Part No.	Description	Unit
AR0-35V0-22	Vial, VOA/ASE, 40 mL Screw, Clear, 24-400 Threads (No Cap)	200/pk
AR0-8557-13-B	Cap (pre-assembled), Screw (24-414), w/ Bonded-in PTFE/Silicone septa, white	1000/pk

Headspace Screw-Top and Crimp-Top Seals / Closures

Part No.	Description	Unit
	Crimp-Top	
AR0-5255-13	Seal, 20 mm Diameter, PTFE/Silicone magnetic cap	1000/pk
AR0-5250-13	Seal, 20 mm Diameter, PTFE/Silicone, silver	1000/pk
AR0-5220-13	Seal, 20 mm Diameter, PTFE/Silicone Pressure Release, silver	1000/pk
	Screw-Top	
AR0-815M-13	Screw Cap, 18 mm, Magnetic, Silver, PTFE/Silicone septa (red/white)	1000/pk
AR0-81AM-13	Screw Cap, 18 mm, Magnetic, Silver, PTFE/Silicone septa (blue/white)	1000/pk

Headspace Vials - Screw-Top and Crimp-Top Headspace Vials

Part No.	Description	Unit
	Crimp-Top	
AR0-3260-13	Headspace Vial, 23 x 75 mm, 20 mL Beveled Edge, Flat Bottom, Clear, No Patch	1000/pk
AR0-3263-13	Headspace Vial, 23 x 75 mm, 20 mL Beveled Rim, Flat Bottom., Clear, No Patch, Silanized	1000/pk
AR0-3290-13	Headspace Vial, 23 x 75 mm, 20 mL Square Rim, Flat Bottom, Clear, No Patch	1000/pk
AR0-3270-13	Headspace Vial, 23 x 75 mm, 20 mL Beveled Edge, Round Bottom, Clear, No Patch	1000/pk
	Screw-Top	
AR0-3280-13	Headspace Vial, 23 x 75 mm, 20 mL 18 mm Screw, Round Bottom, Clear, No Patch	1000/pk
AR0-3281-13	Headspace Vial, 23 x 75 mm, 20 mL 18 mm Screw, Round Bottom, Amber, No Patch	1000/pk

Part No.	Description	Unit
	Crimp-Top	
AR0-3260-13	Headspace Vial, 23 x 75 mm, 20 mL Beveled Edge, Flat Bottom, Clear, No Patch	1000/pk
AR0-3263-13	Headspace Vial, 23 x 75 mm, 20 mL Beveled Rim, Flat Bottom., Clear, No Patch, Silanized	1000/pk
AR0-3290-13	Headspace Vial, 23 x 75 mm, 20 mL Square Rim, Flat Bottom, Clear, No Patch	1000/pk
AR0-3270-13	Headspace Vial, 23 x 75 mm, 20 mL Beveled Edge, Round Bottom, Clear, No Patch	1000/pk
	Screw-Top	
AR0-3280-13	Headspace Vial, 23 x 75 mm, 20 mL 18 mm Screw, Round Bottom, Clear, No Patch	1000/pk
AR0-3281-13	Headspace Vial, 23 x 75 mm, 20 mL 18 mm Screw, Round Bottom, Amber, No Patch	1000/pk

1. 26 mm diameter.
2. Hydrophobic membrane. Can be made hydrophilic by pre-wetting with IPA.
3. 28 mm diameter.
4. 17 mm diameter

Accessories Selection

Ordering Information

Easy Seals™

Description	Unit	Part No.
Easy Seal Inlet Base Seal, Gold Plated, for Agilent GCs	2/pk	AG0-8619
Easy Seal Inlet Base Seal, Gold Plated, for Agilent GCs	10/pk	AG0-8620

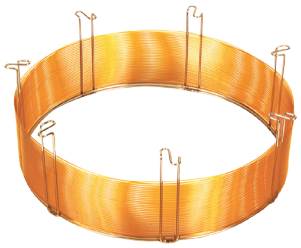
Zebron™ PLUS GC Inlet Liners for Agilent® Systems

Description	Applications	Dimensions ID x L (mm)	Unit	Part No.
Single Taper with Wool	Semi-volatiles	4 x 78.5	5/pk 25/pk	AG2-0A11-05 AG2-0A11-25
Single Taper	Pesticides	4 x 78.5	5/pk 25/pk	AG2-0A10-05 AG2-0A10-25
Single Taper Z-Liner™	Semi-volatiles Dirty samples	4 x 78.5	5/pk 25/pk	AG2-0A13-05 AG2-0A13-25
Straight Z-Liner	Dirty samples Volatiles High initial oven temperatures	4 x 78.5	5/pk 25/pk	AG2-0A03-05 AG2-0A03-25
Straight Single Baffle	Semi-volatiles Pesticides	1.8 x 71	5/pk 25/pk	AG2-1F06-05 AG2-1F06-25

Zebron Z-Guard™ GC Column Protection

- Improve separation and peak shapes (especially early elutors)
- Extend column lifetime by preventing stationary phase damage

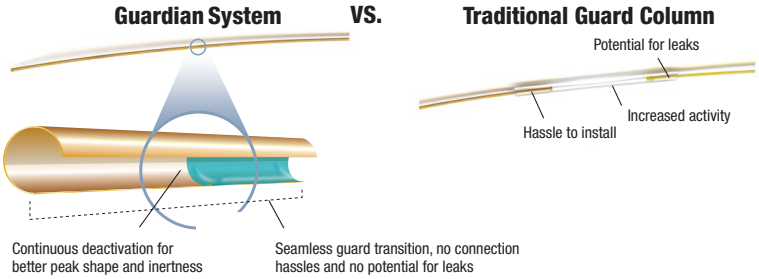
ID (mm)	Description	Part No. 5 Meter	Part No. 10 Meter
0.25	Guard Column	7AG-G000-00-GZ0	7CG-G000-00-GZ0
	Guard Column Kit	7AG-G000-00-GZK	7CG-G000-00-GZK
0.32	Guard Column	7AM-G000-00-GZ0	7CM-G000-00-GZ0
	Guard Column Kit	7AM-G000-00-GZK	7CM-G000-00-GZK
0.53	Guard Column	7AK-G000-00-GZ0	7CK-G000-00-GZ0
	Guard Column Kit	7AK-G000-00-GZK	7CK-G000-00-GZK



Zebron Guardian™ Integrated Guard Columns

Built-In Column Protection: No Leaks, No Worries!

- Eliminate the potential for leaks
- Extend column life



Accessories Selection

Ordering Information

SecurityGuard™ Standard and PREP Column Protection*

- Effectively removes both contaminants and particulates to increase column lifetime
- Prevents micro-particulates and chemical contaminants from damaging your column and detector

			Choose your HPLC Column ID (mm)				
			2.0 - 3.0	3.2 - 8.0	9.0 - 16.0	18.0 - 29.0	30.0 - 49.0
Material	**Description**	**pH Stability**	**Analytical**		**SemiPrep**	**Prep**	
Cartridges for General Purpose			**10/pk**	**10/pk**	**3/pk**	**Ea**	**Ea**
C18	(ODS, Octadecyl)	1.5 - 10	AJ0-4286	AJ0-4287	AJ0-7221	AJ0-7839	AJ0-8301
C8	(MOS, Octyl)	1.5 - 10	AJ0-4289	AJ0-4290	AJ0-7222	AJ0-7840	AJ0-8302
Silica	—	—	AJ0-4347	AJ0-4348	AJ0-7223	AJ0-7229	AJ0-8312
HILIC	HILIC	1.5 - 8	AJ0-8328	AJ0-8329	AJ0-8902	—	—
NH2	(Amino, Aminopropyl)	1.5 - 11	AJ0-4301	AJ0-4302	AJ0-7364	AJ0-8162	AJ0-8309
CN	(Cyano, Cyanopropyl)	2 - 7.5	AJ0-4304	AJ0-4305	AJ0-7313	AJ0-8220	AJ0-8311
Phenyl	(Phenylhexyl)	1.5 - 10	AJ0-4350	AJ0-4351	AJ0-7314	AJ0-7841	AJ0-8303
PFP(2)	Pentafluorophenyl	1.5 - 8	AJ0-8326	AJ0-8327	AJ0-8376	AJ0-8377	AJ0-8378
Polar-RP	(Ether-linked Phenyl)	1.5 - 7	AJ0-6075	AJ0-6076	AJ0-7276	AJ0-7845	AJ0-8307
Fusion-RP	(C18 Polar Embedded)	1.5 - 10	AJ0-7556	AJ0-7557	AJ0-7558	AJ0-7844	AJ0-8306
Gemini® NX-C18	(C18 TWIN-NX™ Technology)	1 - 12	AJ0-8367	AJ0-8368	AJ0-8369	AJ0-8370	AJ0-8371
Gemini C18	(C18 TWIN-NX™ Technology)	1 - 12	AJ0-7596	AJ0-7597	AJ0-7598	AJ0-7846	AJ0-8308
Gemini C6-Phenyl	(C6-Phenyl TWIN Technology)	1 - 12	AJ0-7914	AJ0-7915	AJ0-9156	AJ0-9157	AJ0-9158
Luna® Omega Polar C18	(Polar Function C18)	1.5 – 10	AJ0-7600	AJ0-7601	AJ0-9519	AJ0-7603	AJ0-7604
Guard Cartridge Holders (one-time purchase only)			**/kit**		**/holder**	**/kit**	**/kit**
*For additional guard column phases see www.phenomenex.com/securityguard			KJ0-4282		AJ0-9281	AJ0-8223 	AJ0-8277 

SecurityGuard ULTRA Column Protection**

- Protects your columns and detectors from micro-particulates in the sample, solvent, or instrument
- Improve your UHPLC column lifetime

Part No.	Description	Unit
	Cartridges for 4.6 mm ID UHPLC columns	
AJ0-8768	C18 (ODS, Octadecyl) with 1.5 - 8.5 * pH stability	3/pk
AJ0-9320	F5 (Pentafluorphenyl) with 1.5 - 8.5 pH stability	3/pk
AJ0-8770	C8 (MOS, Octyl) with 1.5 - 8.5 * pH stability	3/pk
AJ0-8774	Phenyl (Phenylhexyl) with 1.5 - 8.5 * pH stability	3/pk
AJ0-8772	HILIC (HILIC) with 2.0 – 7.5 pH stability	3/pk
	Holder	
AJ0-9000	SecurityGuard ULTRA Cartridge Holder	Ea

* pH stable 1.5 - 8.5 under gradient conditions. pH stable 1.5 - 10 under isocratic conditions

**For additional guard column phases see www.phenomenex.com/securityguardultra

HPLC / UHPLC Core-Shell Performance Enhancement Kits

- Increase method efficiency, resolution, and detection
- Improve results for sensitive and demanding applications

Part No.	Description	Unit
AQ0-8892	Core-Shell Performance Enhancement Kit, Includes: PEEKsil™ Tubing, Fittings and Tool	Ea
*Kit AQ0-8892 includes the following components:		Kit Quantity
	PEEKsil Tubing 0.100 mm ID x 1/16 in. OD x 20 cm L, Red	2/pk
	PEEKsil Tubing 0.100 mm ID x 1/16 in. OD x 10 cm L, Red	Ea
	Sure-Lok™ High Pressure PEEK 1-Pc Nut, 10-32, for 1/16 in. Tubing	10/pk
	Sure-Lok Fitting Tightening Tool, Aluminum	Ea

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