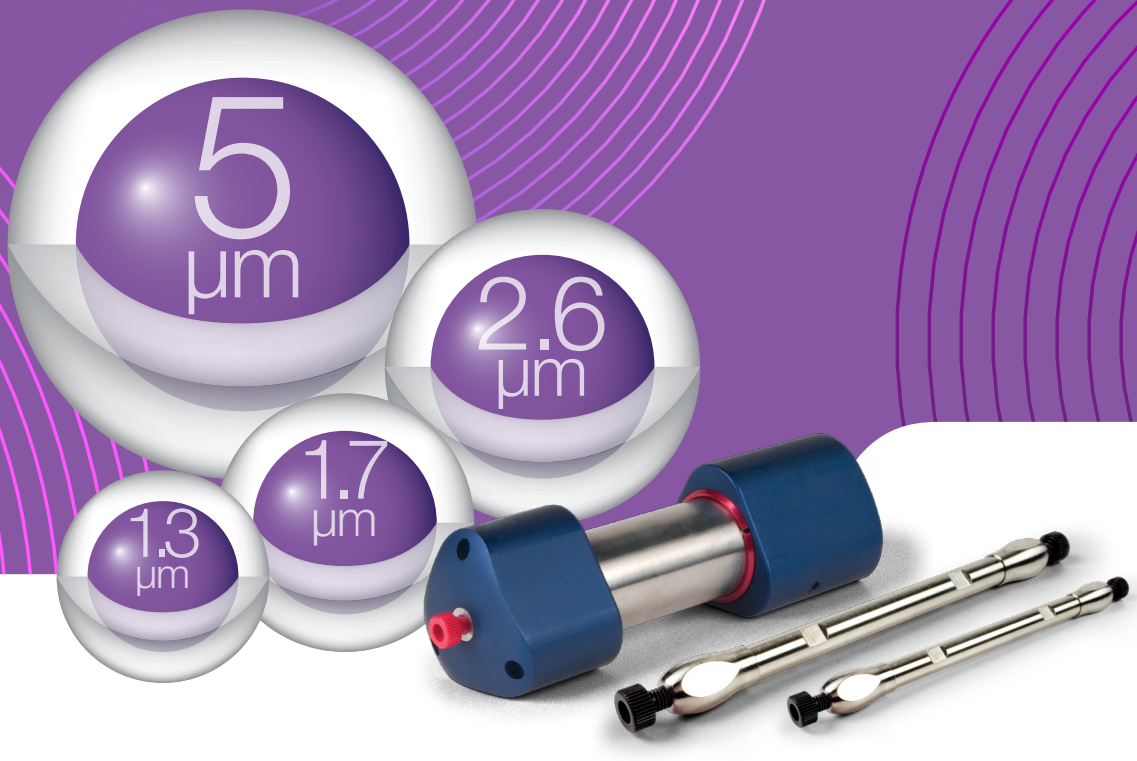
Kinetex™
Core-Shell Technology

Kinetex Core-Shell LC Columns

When Innovation Meets Quality



- Award Winning Particle Technology
- Reproducible, Consistent Results
- High Efficiency, Resolution, and Sensitivity

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Multi-Award Winning Technology

Kinetex Core-Shell is a multi-award winning technology, first introduced in 2009 by Phenomenex R&D experts, that has proven to deliver dramatic improvements in efficiency over conventional fully porous media providing advantages such as increased resolution, higher productivity, reduced solvent consumption, and decreased overall costs.

Whether you are running HPLC or UHPLC methods, the Kinetex core-shell family delivers dramatically improved performance over your current column.

Phenomenex designs and manufactures its own silica and organo-silica core-shell particles to ensure quality control throughout the entire manufacturing process. The combination of a consistent, solid high density core along with proprietary column packing technologies ensures optimum bed structure and high column performance.

- Performance gains on ANY LC system
- System-to-system and lab-to-lab method transferability
- Improve the productivity of dated, established legacy methods

Multi-Award-Winning Technology

2013 Laboratory Equipment Readers' Choice WINNER

SelectScience 2017 GOLD Seal of Quality

R&D 100

Strong History of Continuous Innovation

Kinetex has over 15 years of proven innovation, consistently delivering reliability and top performance across phases with robust retention mechanisms, meeting analytical needs across multiple industries.

Find your core-shell solution at www.phenomenex.com/Kinetex

Strong History of Continuous Innovation

KINETEX®
Core-Shell Technology

- 2 Particle Sizes
- 3 Phases

2009

- 5 Particle Sizes
- 11 Phases
- Available in Micro, Analytical, Semi Prep and Prep Columns

Kinetex™
Core-Shell Technology

NOW

Chromatographers in the following industries can benefit from the advantages of Core-Shell technology:

- Agriculture
- Forensics
- Clinical
- Life Science
- Environmental
- Pharmaceutical
- Food and Beverage
- Chemical/Industrial
- Consumer Products

Fully Porous		Kinetex Core-Shell	Average Efficiency Gain with Kinetex*
5 µm	vs	5 µm	90 % Higher
3 µm	vs	2.6 µm	85 % Higher

Fully Porous		Kinetex Core-Shell	Average Efficiency Gain with Kinetex*
1.7 µm	vs	1.7 µm	20 % Higher
1.7 µm	vs	1.3 µm	50 % Higher

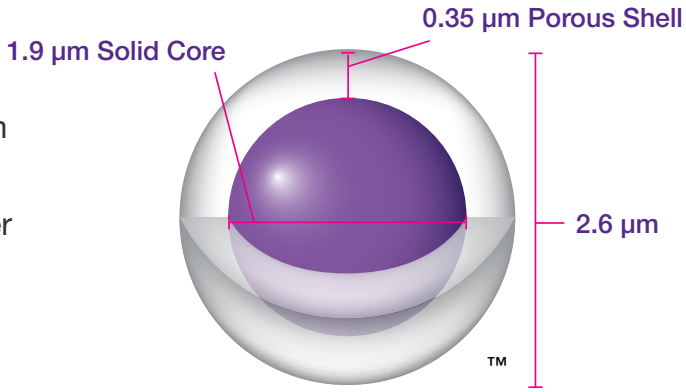
* May not be representative of all applications

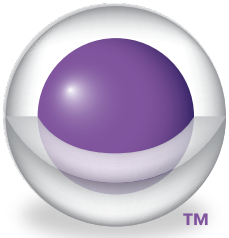
Core-Shell Advantage

By using sol-gel processing techniques that incorporate nano-structuring technology, a durable and homogeneous porous shell is grown on a solid silica core to create a Kinetex Core-Shell particle. This particle morphology reduces broadening contributions resulting in extremely high efficiencies when compared to columns featuring fully porous particles.

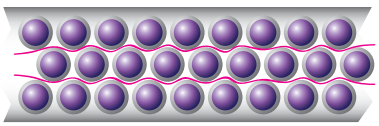
Kinetex 2.6 µm Core-Shell Particle

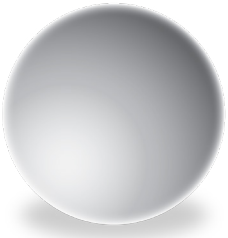
- Higher throughput without sacrificing resolution
- Easy method transfer across LC system platforms
- Reduce solvent consumption with faster analysis
- Achieve lower levels of detection and quantitation



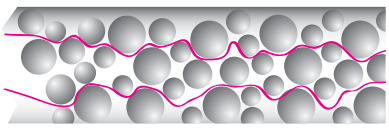


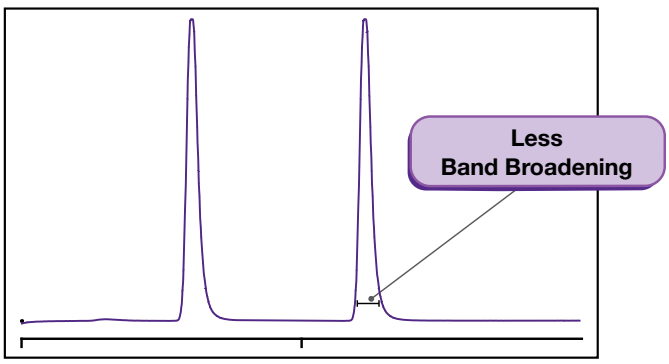
Kinetex Core-Shell

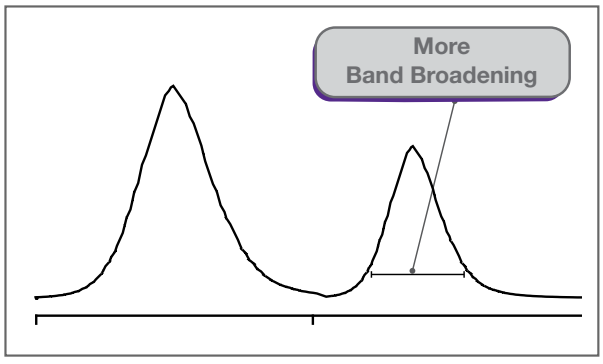




Fully Porous



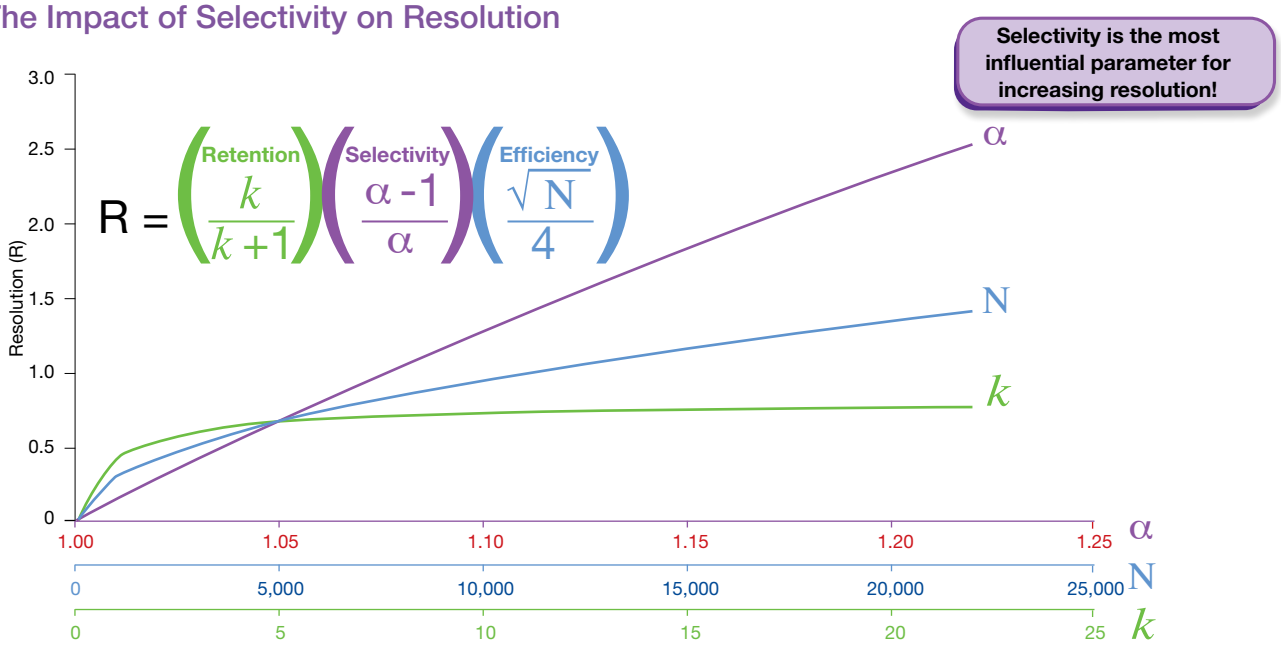


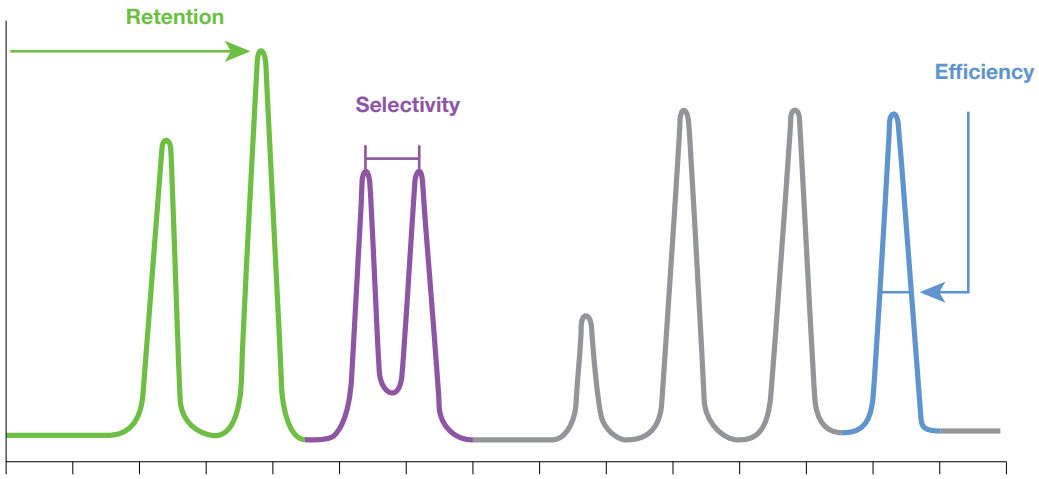


Impact of Selectivity on Resolution

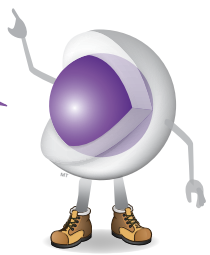
Selectivity (α) has the greatest impact on chromatographic resolution (R) when compared to other parameters. Often, the simplest and most effective way to improve your chromatographic results is to change your column's phase or solid support. Phenomenex offers a wide breadth of stationary phase chemistries across multiple solid supports for simplified method development and optimization.

The Impact of Selectivity on Resolution



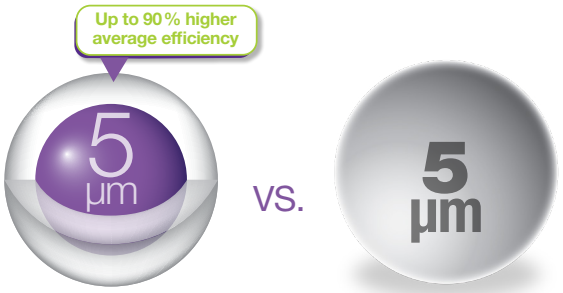


Find your Ideal Kinetex Selectivity on pages 14-15

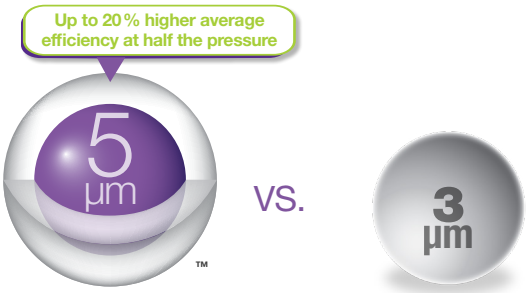


Improved Performance

Kinetex 5 µm columns have efficiencies and peak capacities on par with traditionally fully porous 3 µm columns while still only requiring backpressures seen with traditional 5 µm columns in both isocratic and gradient methods.



Kinetex Core-Shell | Fully Porous



Kinetex Core-Shell | Fully Porous

Advantages of Low Backpressures with Kinetex 5 µm Columns

- Longer column lifetime
- Higher throughput
- Increased system compatibility and method transferability

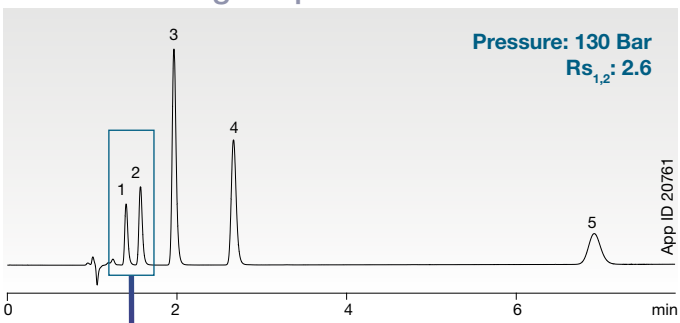
Instantly Improve 5 µm and 3 µm Methods

Immediately improve resolution, productivity, and sensitivity of your current 3 µm and 5 µm HPLC methods with Kinetex 5 µm core-shell technology. This core-shell particle was specifically developed for use on standard or older model HPLC systems that may have low pressure limitations.

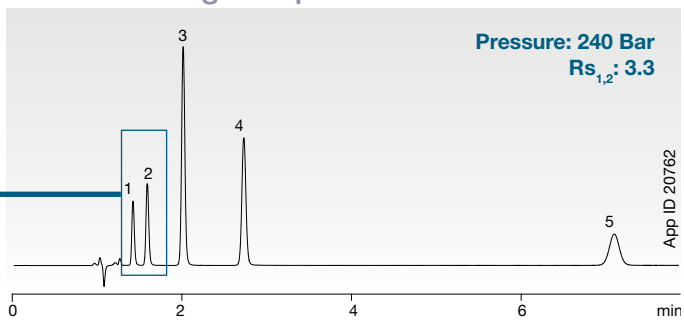
Resolution of Core-shell vs. Fully Porous

Higher Resolution with no Pressure Increase

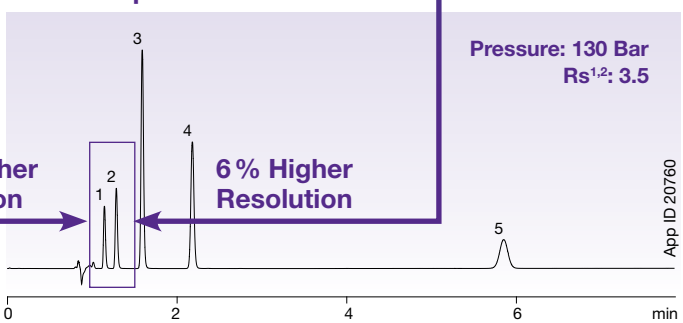
Waters® XBridge® 5 µm C18



Waters XBridge 3.5 µm C18



Kinetex 5 µm C18



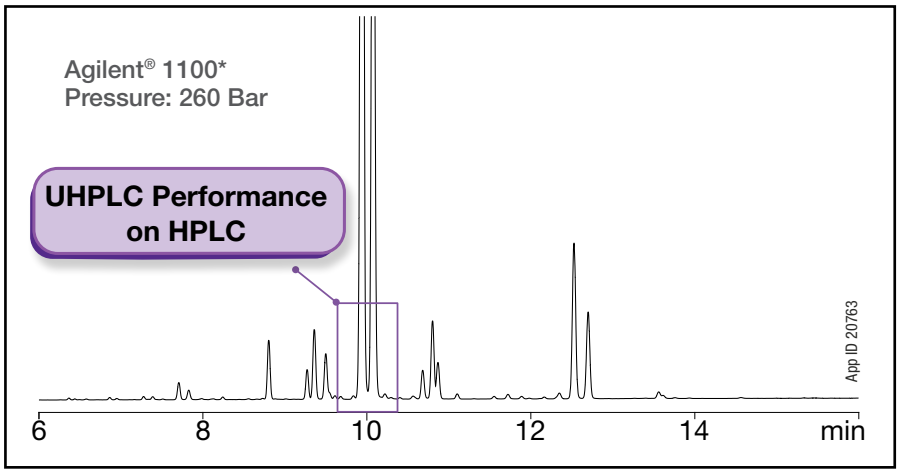
Waters and XBridge are registered trademarks of Waters Corporation. Phenomenex is not affiliated with Waters Corporation. Comparative separations may not be representative of all applications.

Ultra-High Performance on Both U/HPLC Systems

Dramatically improve the productivity and performance of your existing methods with the use of shorter Kinetex columns, while decreasing your solvent usage! On a low volume HPLC or UHPLC system Kinetex 2.6 µm columns will provide up to 3x the efficiency of 5 µm and potentially double the efficiency of 3 µm fully porous media.

Performance with Kinetex 2.6 µm

HPLC System

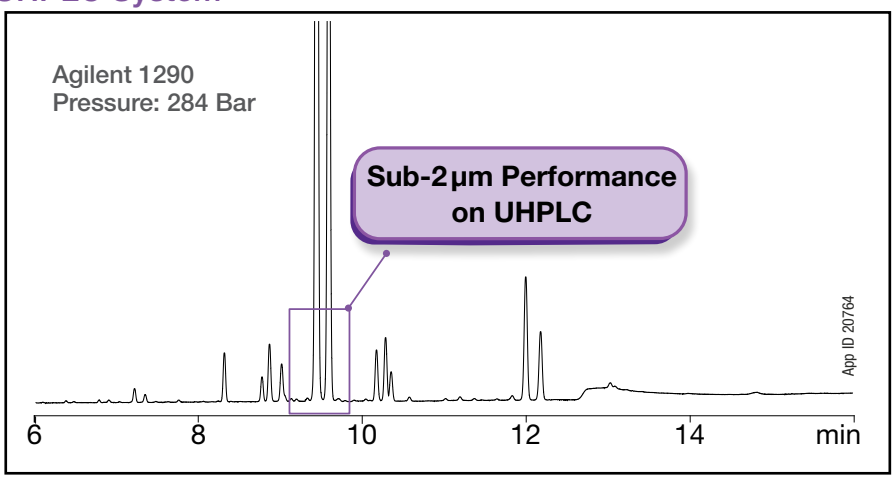


Conditions for all columns

Columns:	Kinetex 2.6 µm C18
Part No.:	00D-4462-E0
Dimensions:	100 x 4.6 mm
Mobile Phase:	A: Water with 0.1% TFA B: Acetonitrile with 0.1% TFA
Gradient:	Time (min) % B 0 10 20 70
Flow Rate:	1.2 mL/min
Temperature:	Ambient
Detection:	UV @ 210 nm
Sample:	Mupirocin degradants

*Agilent 1100 was optimized with the Core-Shell Performance Enhancement Kit AQ0-8892. Comparative separations may not be representative of all applications.

UHPLC System

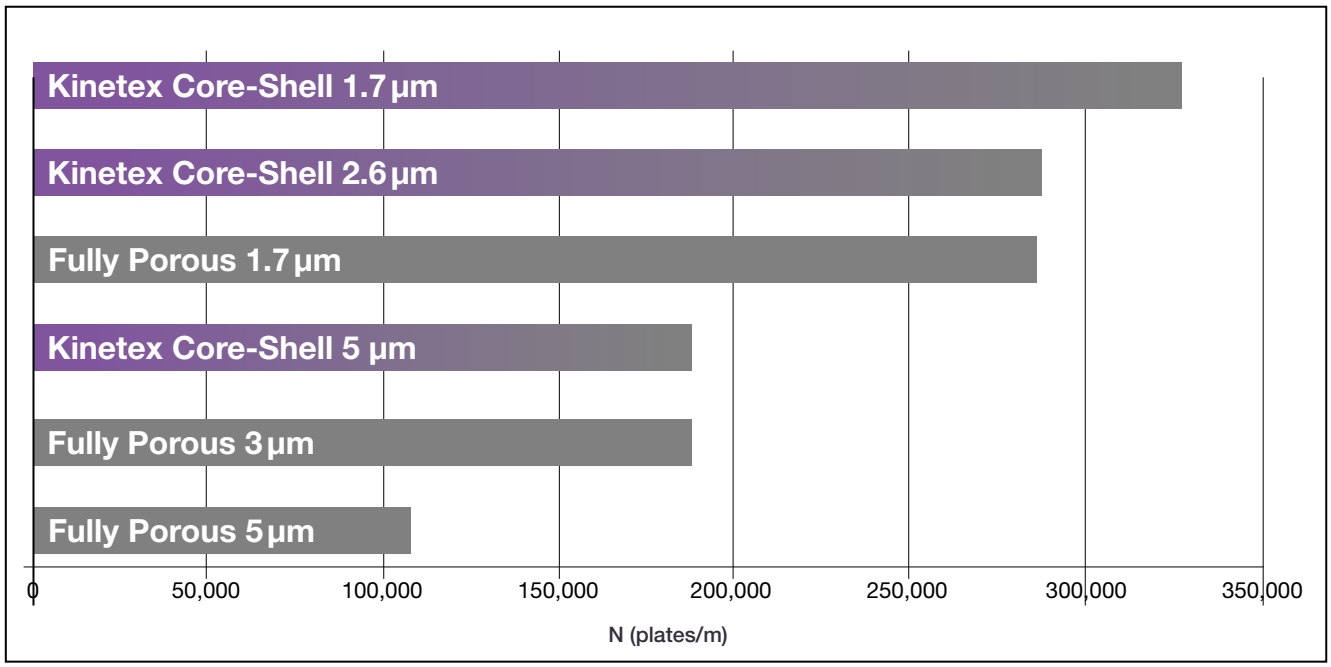


Learn more about Kinetex LC solutions at www.phenomenex.com/Kinetex

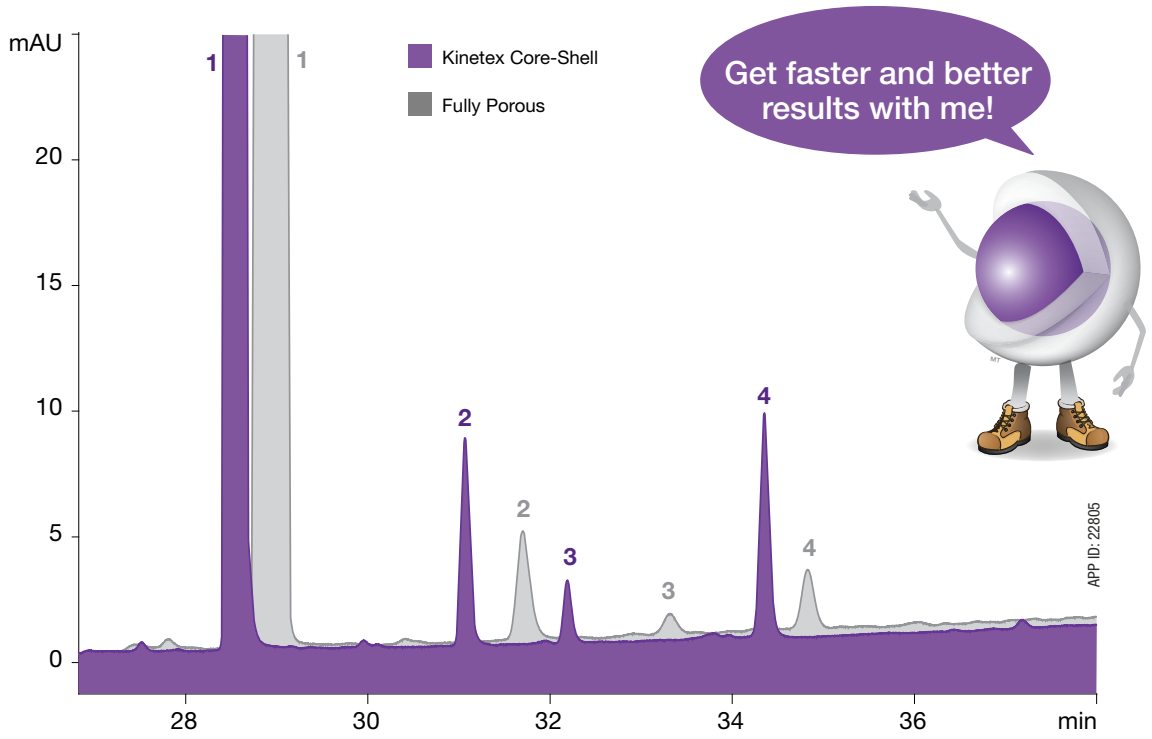
Ultra-High Efficiency with Core-Shell Particles

The band broadening (wide peaks) and lengthy retention times of traditional fully porous products can limit your results. Kinetex Core-Shell ultra-high efficient performance achieves shorter run times, higher levels of sensitivity, and overall better HPLC or UHPLC results.

Core-Shell vs. Fully Porous Efficiency Levels (plates/m)



Core-Shell Performance Gains



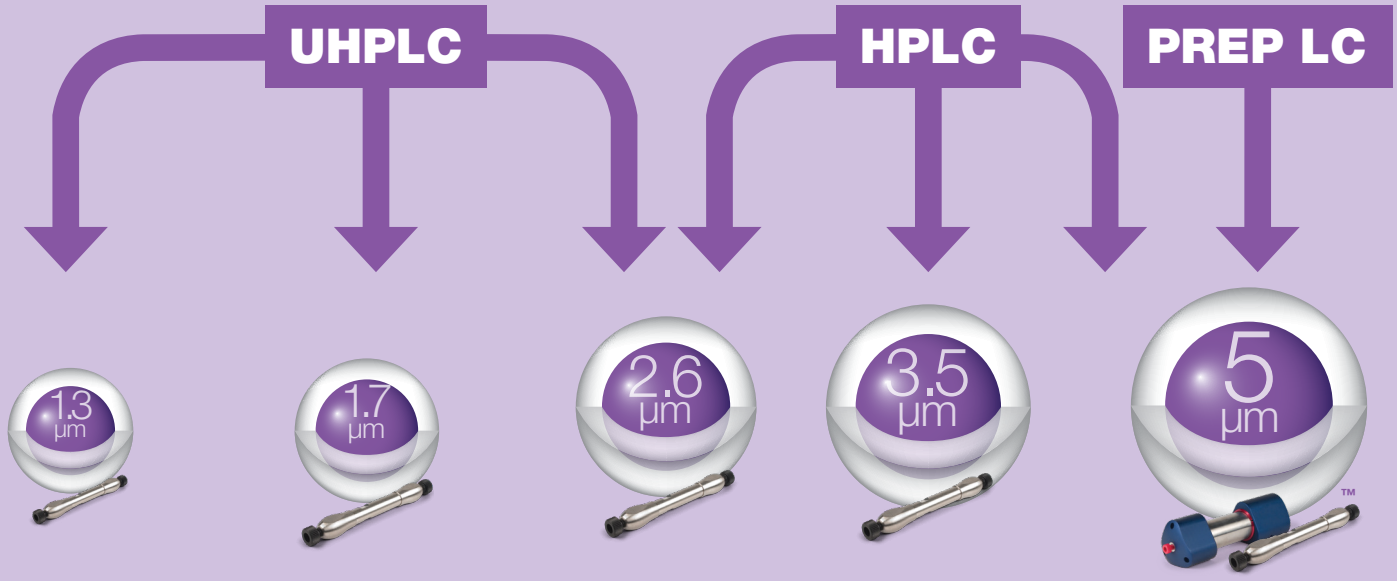
Scalable Particle Platform

Easily develop and transfer your method between systems

Kinetex™ Core-Shell Technology

With **Kinetex 5 µm, 3.5 µm, 2.6 µm, 1.7 µm**, and **1.3 µm Core-Shell Technology**, you are no longer restricted from developing high-performance LC methods. These five scalable Kinetex particle sizes allow to develop and transfer your method effortlessly from system to system.

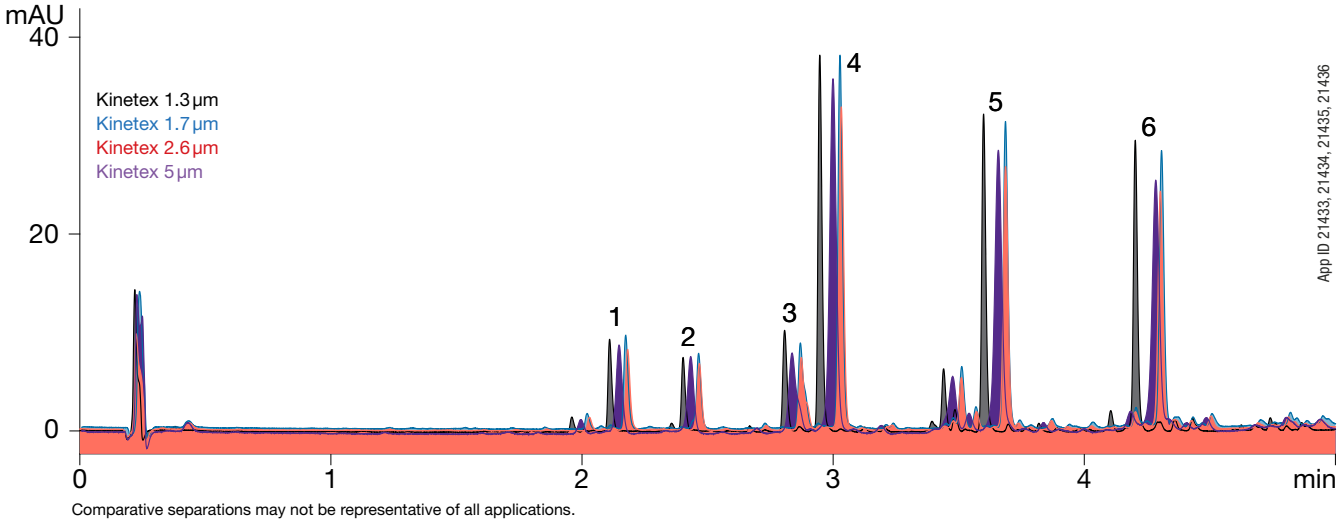
Complete Scalable Solution from UHPLC to HPLC to PREP LC



Incredible UHPLC efficiency and performance gains	20 % higher efficiency than fully porous 1.7 µm columns	Achieve sub-2 µm performance on HPLC and UHPLC systems	Instantly improve your pharmacopoeia (Ph. Eur. & USP) monographs that require 3.5 µm particle size	3 µm or better efficiencies at 5 µm pressures for HPLC and PREP LC methods

Scalability: UHPLC/HPLC/PREP LC

Gingerols

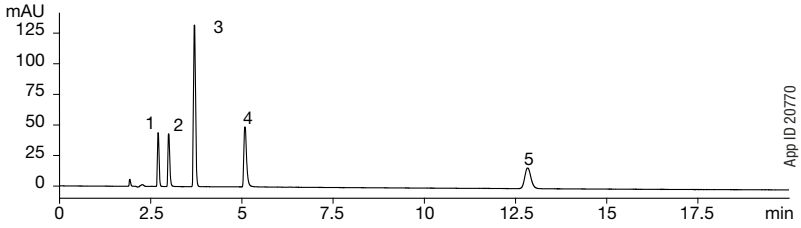


Comparative separations may not be representative of all applications.

Scalable Particle Platform

Kinetex™ Core-Shell Technology

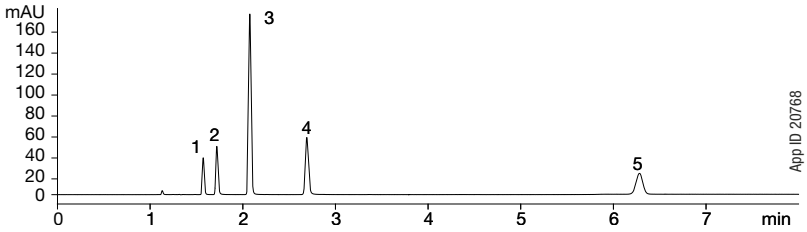
Kinetex 5 µm C18 on Shimadzu® LC-20A



Columns: Kinetex 5 µm C18
Dimension: 250 x 4.6 mm
Part No.: 00G-4601-E0

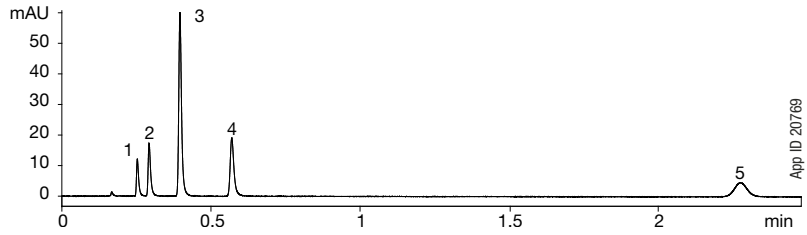
Conditions are the same except as noted:
Mobile Phase: Water/Acetonitrile/ Phosphoric Acid (600:400:2)
Flow Rate: 1 mL/min
Temperature: Ambient
Detection: UV @ 237 nm
Sample: 1. Impurity A
2. Impurity B
3. Impurity C
4. Acetylsalicylic acid
5. Impurity D

Kinetex 2.6 µm C18 on Agilent® 1100



Columns: Kinetex 2.6 µm C18
Dimension: 150 x 4.6 mm
Part No.: 00F-4462-E0

Kinetex 1.7 µm C18 on Agilent 1290



Columns: Kinetex 1.7 µm C18
Dimension: 50 x 3.0 mm
Part No.: 00B-4475-Y0
Mobile Phase: 680:320:2

Particle Size Recommended Based on System

	5 µm	3.5 µm	2.6 µm	1.7 µm	1.3 µm
UHPLC					
HPLC					
PREP LC					

To find Kinetex applications go to https://www.phenomenex.com/applications

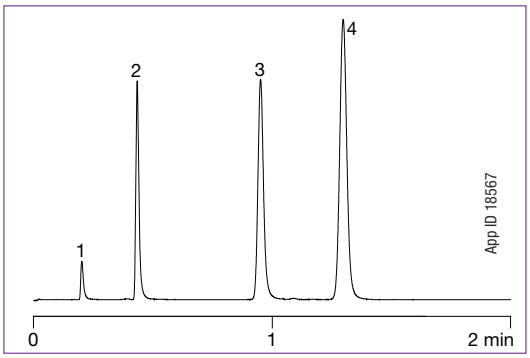
Adaptability and Method Transfers

UHPLC methods developed with fully porous sub-2 µm columns often generate higher backpressure that only certain systems can run. With the **Kinetex 2.6 µm** particle performance you are no longer restricted by system limitations for your HPLC or UHPLC method development.

Kinetex 2.6 µm, 4.6 mm ID on Agilent® 1100

Column: Kinetex 2.6 µm C18
Dimensions: 50 x 4.6 mm
Part No.: 00B-4462-E0
Mobile Phase: Acetonitrile / Water (50:50)
Flow Rate: 2.35 mL/min*
Temperature: Ambient
Detection: UV @ 254 nm
Sample: 1. Uracil
2. Acetophenone
3. Toluene
4. Naphthalene

Kinetex 2.6 µm, 3.0 mm ID on Shimadzu® Prominence UFLC®

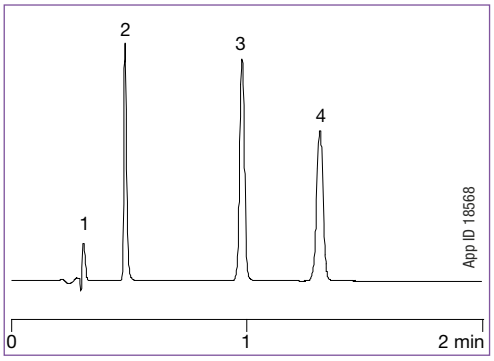


Column: Kinetex 2.6 µm C18
Dimensions: 50 x 3.0 mm
Part No.: 00B-4462-Y0
Mobile Phase: Acetonitrile / Water (50:50)
Flow Rate: 1.0 mL/min*
Temperature: Ambient
Detection: UV @ 254 nm
Sample: 1. Uracil
2. Acetophenone
3. Toluene
4. Naphthalene

Kinetex 2.6 µm, 2.1 mm ID on Agilent 1200

Column: Kinetex 2.6 µm C18
Dimensions: 50 x 2.1 mm
Part No.: 00B-4462-AN
Mobile Phase: Acetonitrile / Water (50:50)
Flow Rate: 0.49 mL/min*
Temperature: Ambient
Detection: UV @ 254 nm
Sample: 1. Uracil
2. Acetophenone
3. Toluene
4. Naphthalene

Kinetex 2.6 µm, 2.1 mm ID on Waters® ACQUITY® UPLC®



Column: Kinetex 2.6 µm C18
Dimensions: 50 x 2.1 mm
Part No.: 00B-4462-AN
Mobile Phase: Acetonitrile / Water (50:50)
Flow Rate: 0.49 mL/min*
Temperature: Ambient
Detection: UV @ 254 nm
Sample: 1. Uracil
2. Acetophenone
3. Toluene
4. Naphthalene

*Please note that the flow rates were scaled to maintain the same linear velocity.

Recommended Selectivities

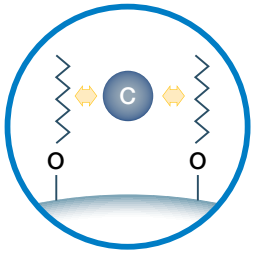
Kinetex™ Core-Shell Technology

Quick guide to easily select your phase

Acids	Bases	Neutrals	Aromatics
C18	EVO C18	C18	Biphenyl
F5	XB-C18	C8	Phenyl-Hexyl
Phenyl-Hexyl	Biphenyl	Biphenyl	F5
	Polar C18		
	PS-C18		

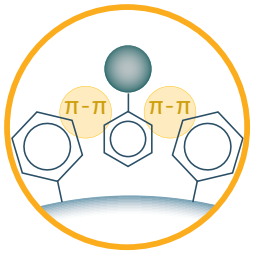
Acids, Bases, and Neutrals	Highly Polar Compounds	High pH	Isomers
Polar C18	Polar C18	EVO C18	F5
Biphenyl	F5		
EVO C18	Biphenyl		
F5	HILIC		

Separation Mechanisms



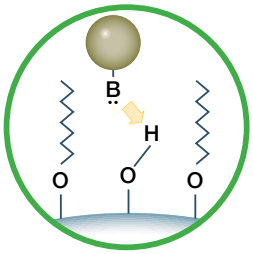
Hydrophobicity

The ability of a phase to hydrophobically interact with carbon groups



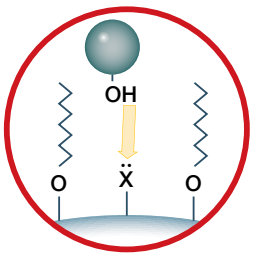
Steric Interaction

The ability of a phase to separate compounds based on structural differences



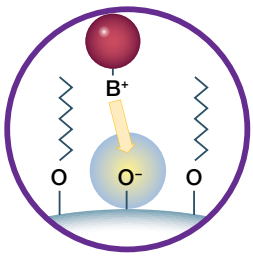
Hydrogen Bond Donating Capacity

The ability of a phase to hydrogen-bond with proton accepting groups



Hydrogen Bond Accepting Capacity

The ability of a phase to hydrogen-bond with proton donating groups



Cation Selectivity at pH 2.8

The ability of a phase to interact with cation groups at acidic pH

Cation Selectivity at pH 7.0

The ability of a phase to interact with cation groups at neutral pH

Select the Right Phase for Your Analysis

Kinetex™ Core-Shell Technology

Combining the high efficiency of Kinetex Core-Shell Technology with an excellent range of surface chemistries gives you the best opportunity for increased resolution.

Kinetex Phase Selection

Unbonded silica phase for HILIC conditions to provide selectivity for polar compounds

100 % aqueous stable which allows for excellent reversed phase retention and enhanced polar and aromatic selectivity

All-purpose hydrophobic retention and methylene selectivity

Minimized hydrophobic retention for highly hydrophobic compounds

High pH stability from 1-12 to deliver robust methods and improved peak shape for bases

Highly reproducible pentafluorophenylpropyl phase, exceptional for halogenated, conjugated, isomeric, or highly polar compounds

Greater retention and separation of aromatic compounds

Superior peak shape and enhanced separation of basic compounds under neutral and acidic conditions

A multi-modal C18 column with a unique positive surface modification that displays improved peak shape for basic compounds

Polymerically bonded C18 phase specifically developed for the separation of EU and EPA priority PAHs

Combined C18 and polar modified surface that provide polar and non-polar retention alongside 100 % aqueous stability

Simple Selection of the Suitable Column

	Particle Sizes (µm)	Pore Size (Å)	Effective Surface Area (m^2/g)	Effective Carbon Load (%)	pH Range	Pressure Stability (bar/PSI)
Kinetex Phases						
Kinetex Polar C18	2.6	100	200	9	1.5 – 8.5*	1,034/15,000
Kinetex PS C18	2.6	100	200	9	1.5 – 8.5*	1,034/15,000
Kinetex C18	1.3, 1.7, 2.6, 5	100	200	12	1.5 – 8.5*	1,034/15,000
Kinetex EVO C18	1.7, 2.6, 5	100	200	11	1.5 – 12	1,034/15,000
Kinetex XB-C18	1.7, 2.6, 3.5, 5	100	200	10	1.5 – 8.5*	1,034/15,000
Kinetex C8	1.7, 2.6, 5	100	200	8	1.5 – 8.5*	1,034/15,000
Kinetex Biphenyl	1.7, 2.6, 5	100	200	11	1.5 – 8.5*	1,034/15,000
Kinetex Phenyl-Hexyl	1.7, 2.6, 5	100	200	11	1.5 – 8.5*	1,034/15,000
Kinetex F5	1.7, 2.6, 5	100	200	9	1.5 – 8.5*	1,034/15,000

† Shipping conditions may vary slightly in terms of organic to aqueous ratio, depending on column dimensions.

* pH stability under gradient conditions. pH stability is 1.5-10 under isocratic conditions.

**Pressure limits are stable for all Kinetex columns 4.6 mm ID and under. For 10 mm ID Kinetex columns pressure > 413 bar/6000 psi may compromise column longevity. For 21.1, 30, and 50 mm ID Kinetex columns pressure > 241 bar/3500 psi may compromise column longevity.

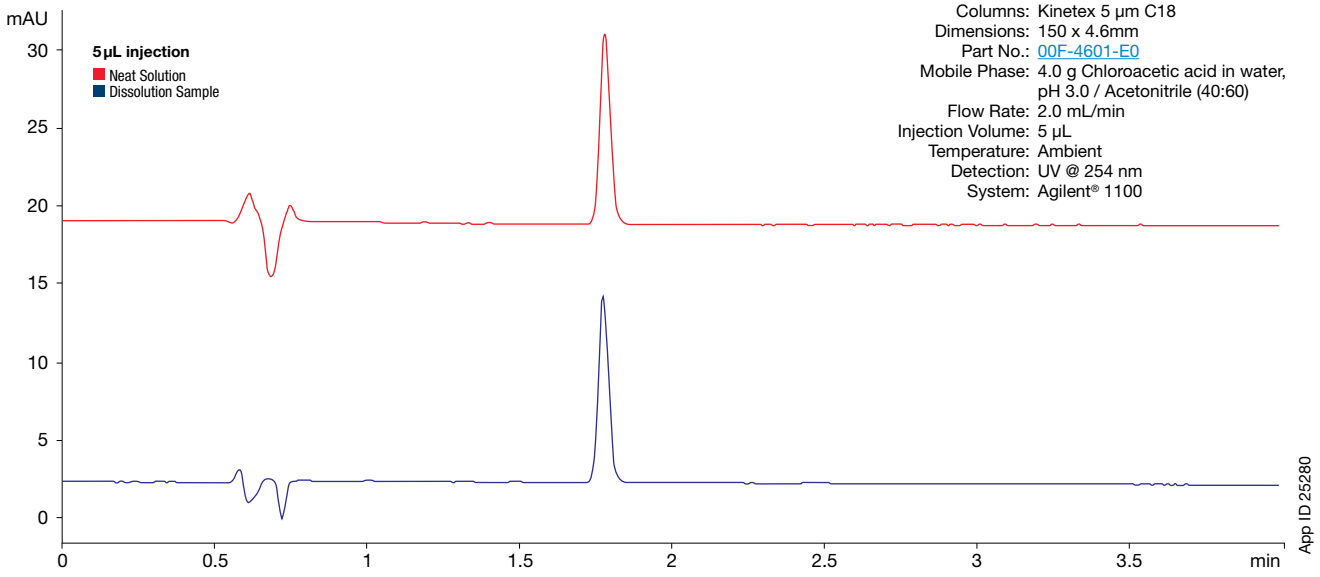
Industry Applications

Kinetex™
Core-Shell Technology

- Pharmaceutical
- Clinical/Toxicology
- PFAS Analysis
- Environmental
- Food & Beverages
- Cannabis

Pharmaceutical Applications

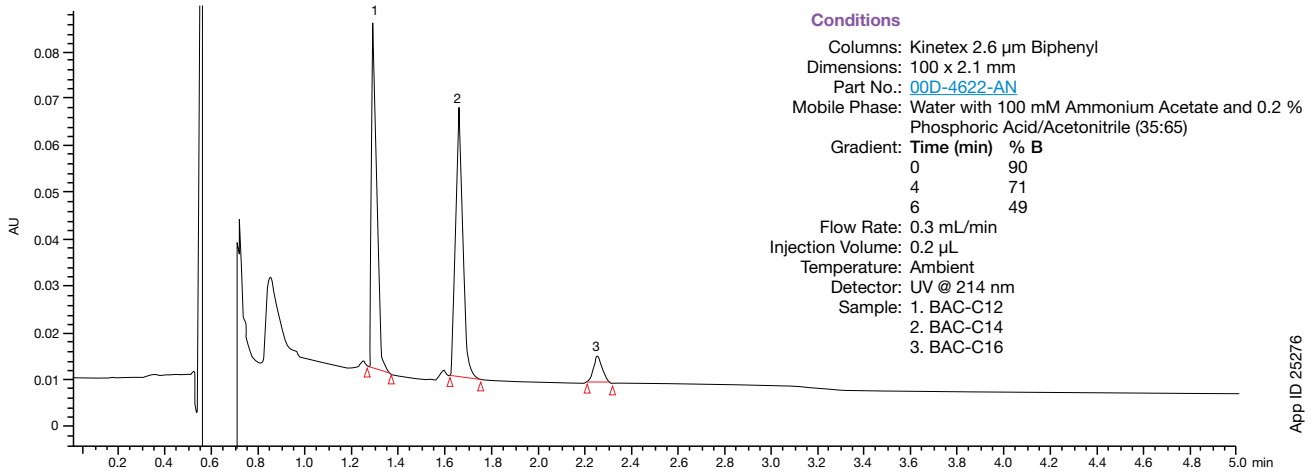
Ibuprofen Tablet USP Dissolution: A Rapid HPLC Alternative to the Traditional UV Method



LC-UV Conditions

Columns: Kinetex 5 µm C18
Dimensions: 150 x 4.6mm
Part No.: 00F-4601-E0
Mobile Phase: 4.0 g Chloroacetic acid in water, pH 3.0 / Acetonitrile (40:60)
Flow Rate: 2.0 mL/min
Injection Volume: 5 µL
Temperature: Ambient
Detection: UV @ 254 nm
System: Agilent® 1100

Separation of Benzalkonium Chloride Homologs (C12, C14, and C16)



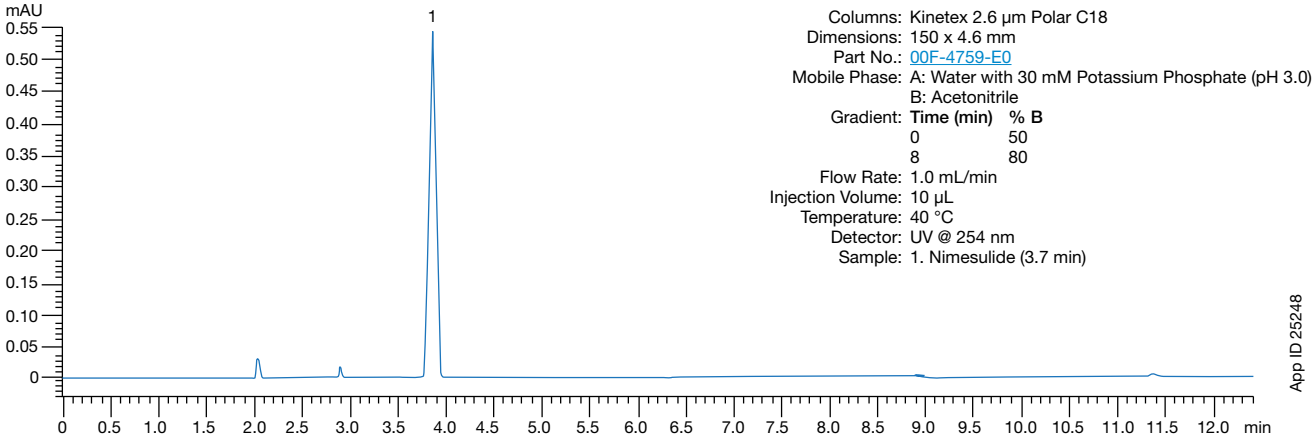
Conditions

Columns: Kinetex 2.6 µm Biphenyl
Dimensions: 100 x 2.1 mm
Part No.: 00D-4622-AN
Mobile Phase: Water with 100 mM Ammonium Acetate and 0.2 % Phosphoric Acid/Acetonitrile (35:65)
Gradient:

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

Flow Rate: 0.3 mL/min
Injection Volume: 0.2 µL
Temperature: Ambient
Detector: UV @ 214 nm
Sample: 1. BAC-C12
2. BAC-C14
3. BAC-C16

NSAID Active Ingredient Nimesulide from a Topical Gel Formulation Using a Kinetex 2.6 µm Polar C18 Column



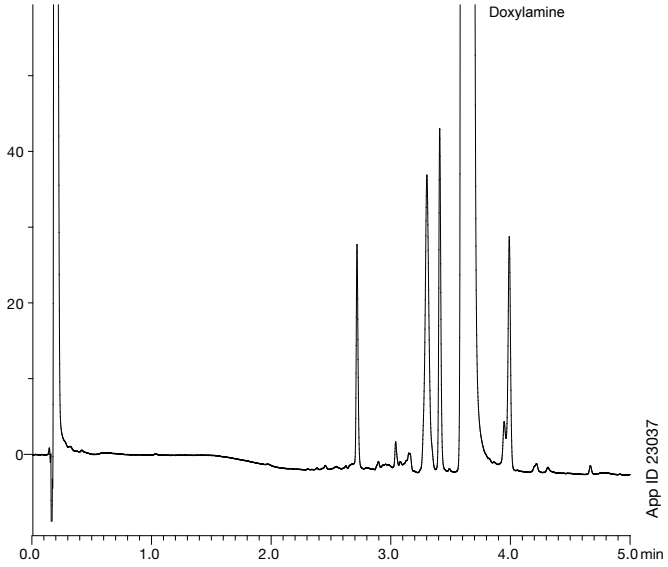
Columns: Kinetex 2.6 µm Polar C18
Dimensions: 150 x 4.6 mm
Part No.: 00F-4759-E0
Mobile Phase: A: Water with 30 mM Potassium Phosphate (pH 3.0)
B: Acetonitrile
Gradient:

Time (min)	% B
0	50
8	80

Flow Rate: 1.0 mL/min
Injection Volume: 10 µL
Temperature: 40 °C
Detector: UV @ 254 nm
Sample: 1. Nimesulide (3.7 min)

Pharmaceutical Applications

Doxylamine Impurity Profile Using a Kinetex EVO C18 Core-Shell LC Column



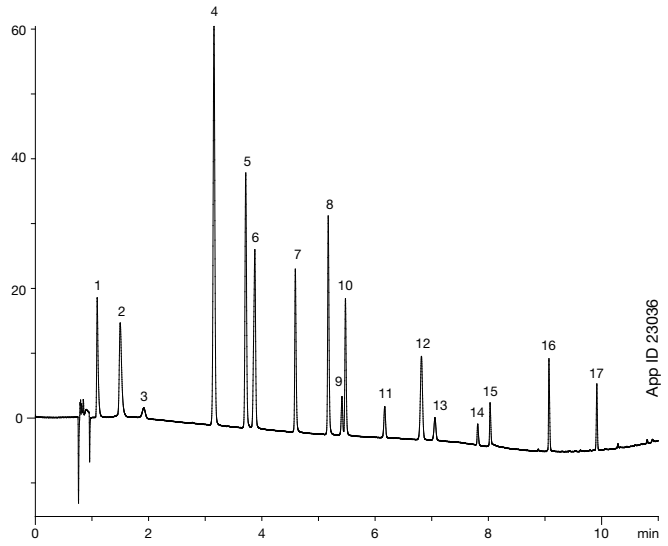
LC-UV Conditions

Columns: Kinetex 2.6 µm EVO C18
Dimensions: 50 x 2.1 mm
Part No.: 00B-4725-AN
Mobile Phase: A: 20 mM Ammonium bicarbonate (pH 10)
B: Acetonitrile
Gradient:

Time (min)	% B
0	5
5	09

Flow Rate: 0.7 mL/min
Temperature: Ambient
Detector: UV @ 254 nm
Sample: Impurity profile of Doxylamine
Concentration: 25 mg/mL API in DMSO

Cold Medicine API Screen Using a Kinetex EVO C18 Core-Shell LC Column



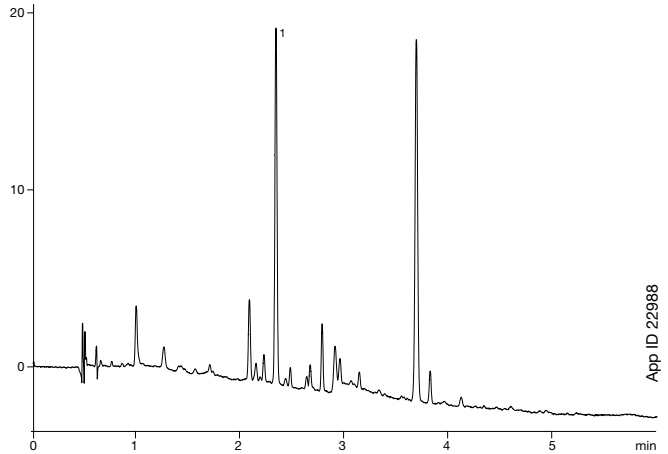
LC-UV Conditions

Columns: Kinetex 2.6 µm EVO C18
Dimensions: 100 x 4.6 mm
Part No.: 00D-4725-E0
Mobile Phase: A: 0.1 % TFA
B: 0.1 % TFA in Acetonitrile
Gradient:

Time (min)	% B
0	2
6	30
11	100

Flow Rate: 1.25 mL/min
Temperature: Ambient
Detector: UV @ 254 nm
Sample:
1. Maleic acid
2. Fumaric acid
3. Phenylephrine
4. Acetaminophen
5. Pheniramine
6. Doxylamine
7. Pyrilamine
8. Chlorpheniramine
9. Guaifenesin
10. Brompheniramine
11. Acetylsalicylic acid
12. 4-Nitrophenol
13. Impurity
14. Dextromethorphan
15. Diphenhydramine
16. Clemastine
17. Ibuprofen

Forced Degradation of Cefaclor Analysis Using Kinetex EVO C18 Core-Shell LC Column



LC-UV Conditions

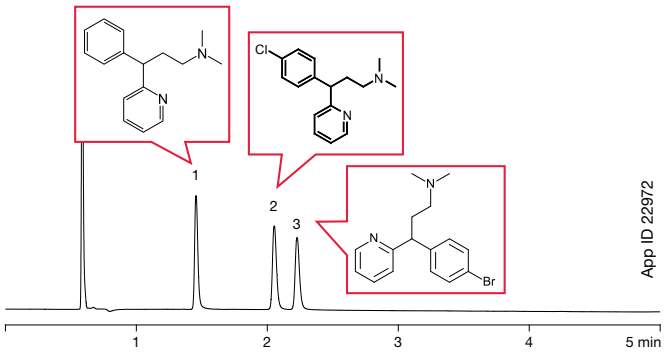
Columns: Kinetex 2.6 µm EVO C18
Dimensions: 100 x 4.6 mm
Part No.: 00D-4725-E0
Mobile Phase: A: 0.1 % H3PO4 in Water
B: 0.1 % H3PO4 in Acetonitrile
Gradient:

Time (min)	% B
0	5
6	40

Flow Rate: 1.75 mL/min
Temperature: Ambient
Detector: UV @ 254 nm
Sample: 1. Cefaclor

Pharmaceutical Applications

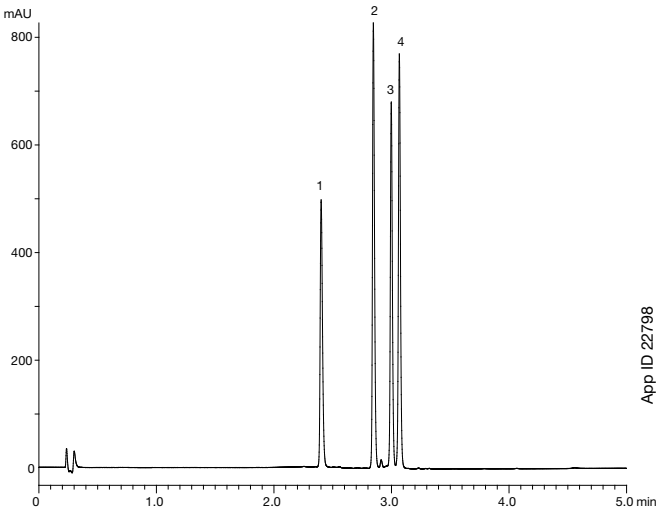
Pheniramine and Halogenated Derivatives Separated with a Kinetex 2.6 µm EVO C18 Core-Shell Column



LC-UV Conditions

Columns: Kinetex 2.6 µm EVO C18
Dimensions: 100 x 4.6 mm
Part No.: 00D-4725-E0
Mobile Phase: A: 10 mM Ammonium bicarbonate (pH 10.2)
B: Acetonitrile
Gradient: **Time (min) % B**
0 50
4 60
Flow Rate: 1.25 mL/min
Temperature: Ambient
Detector: UV @ 210 nm
Sample: 1. Pheniramine
2. Chlorpheniramine
3. Brompheniramine

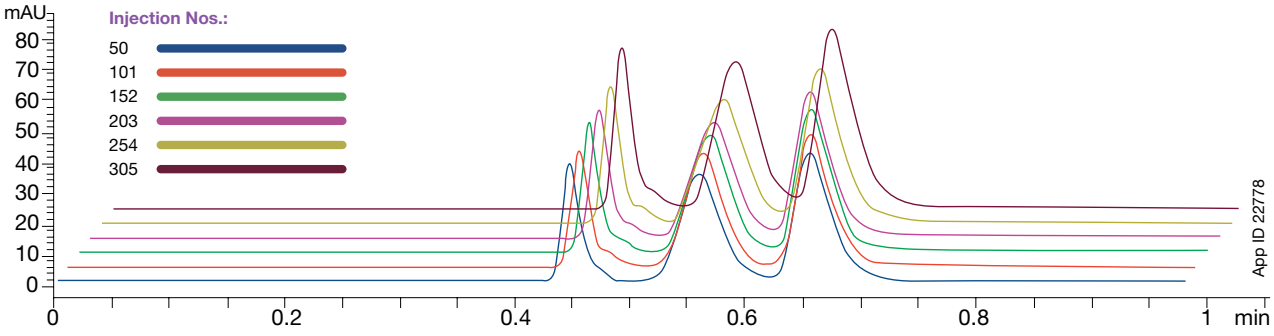
Analysis of Common Statin Drugs Using a Kinetex F5 Core-Shell LC Column



LC-UV Conditions

Columns: Kinetex 2.6 µm F5
Dimensions: 50 x 2.1 mm
Part No.: 00B-4723-AN
Mobile Phase: A: 0.1 % TFA in Water
B: Acetonitrile
Gradient: **20 to 90 % B in 1 min. Hold for 4 min**
Flow Rate: 0.5 mL/min
Temperature: Ambient
Detector: UV @ 248 nm
Sample: 1. Lovastatin
2. Atorvastatin
3. Pravastatin
4. Simvastatin

100% Aqueous Stability of Kinetex EVO C18 Core-Shell LC Columns

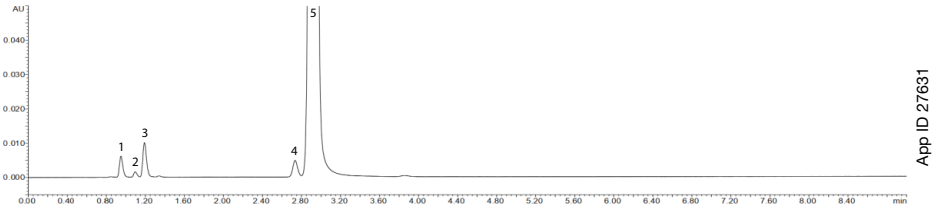


LC-UV Conditions

Columns: Kinetex 5 µm EVO C18
Dimensions: 50 x 4.6 mm
Part No.: 00B-4633-E0
Mobile Phase: 0 mM Sodium phosphate pH 2.5
Flow Rate: 1 mL/min
Temperature: 30 °C
Detector: UV @ 270 nm
Sample: 1. Norepinephrine
2. Epinephrine
3. Dopamine

Pharmaceutical Applications

Ph. Eur. Monograph 2217: Lamivudine Related Substances with Ph. Eur. Method Modernization



LC-UV Conditions

Columns:	Kinetex 2.6 µm C18
Dimensions:	150 x 3.0 mm
Part No.:	00F-4462-Y0 – Method 4
Mobile Phase:	Mobile Phase Table 1
Flow Rate:	0.82 mL/min – Method 4
Injection Volume:	3 µL – Method 4
Temperature:	35 °C
Detector:	UV @ 277 nm
Sample:	Waters® ACQUITY Arc® HPLC – Method 4

Click Each!

Tech Note
European Pharmacopoeia Paracetamol Monograph Draft Method: Achieving Improved Sensitivity, Resolution, and Separation for Paracetamol and All 14 Related Impurities using Kinetex 5 µm C18 Core-Shell Columns

Tech Note
LC-MS/MS Quantitative Analysis of NDMA in Ranitidine Active Pharmaceutical Ingredient (API) and Drug Product using the SCIEX® 4500 QTRAP™

Tech Note
Ph. Eur. Monograph 2217: Lamivudine Related Substances with Ph. Eur. Method Modernization

Tech Note
Assay of Doxepin Hydrochloride According to USP Monograph Using Three Different HPLC Columns

Tech Note
USP Butamben Assay and Organic Impurities by LC-UV using the Kinetex 5 µm XB-C18 Core- Shell HPLC Column

Tech Note
Meeting and Surpassing System Suitability for USP Sildenafil Citrate Assay and Organic Impurities

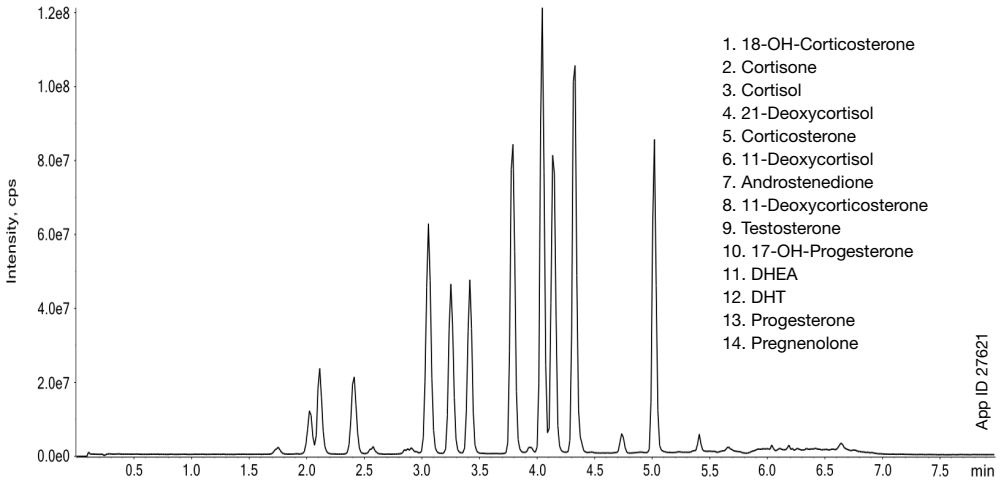
Tech Note
Meeting and Surpassing System Suitability for USP Fluconazole and Related Impurities

Tech Note
USP Assay and Organic Impurities (LC-UV) for Chloroquine Phosphate

Tech Note
USP Assay (LC-UV) for Lopinavir and Ritonavir Tablets

Clinical/Toxicology Applications

Total Ion Chromatogram (TIC) in Negative Ion Mode of Steroid Isomers Fully Separated in an 8-minute Method Using a Kinetex C18 Column



LC-MS/MS Conditions

Columns:	Kinetex 2.6 µm C18
Dimensions:	50 x 3.0 mm
Part No.:	00B-4462-Y0
Mobile Phase:	A: 0.5 mM Ammonium Fluoride in Water
	B: Methanol

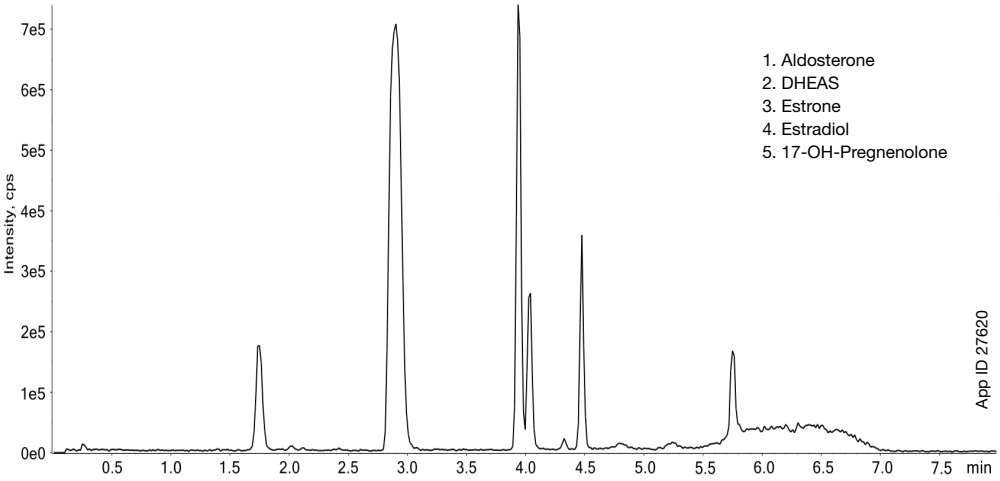
Gradient:	Time (min)	% B
	0	40
	2	50
	4.5	75
	5	95
	6	95
	6.5	40
	8	40

Flow Rate:	0.8 mL/min
Injection Volume:	5 µL
Temperature:	30 °C
LC System:	Agilent® 1290 Infinity
Detection:	MS/MS
Detector:	SCIEX® 7500 Triple Quad™

MS/MS Conditions

Ion Source:	ESI
Polarity:	Negative
Source Temperature:	700 °C
GS1:	60 psi
GS2:	60 psi
CUR:	40 psi
CAD:	10
IS:	-3000V
EP:	-10 V

Total Ion Chromatogram (TIC) in Positive Ion Mode of Steroid Isomers Fully Separated in an 8-minute Method Using a Kinetex C18 Column



LC-MS/MS Conditions

Columns:	Kinetex 2.6 µm C18
Dimensions:	50 x 3.0 mm
Part No.:	00B-4462-Y0
Mobile Phase:	A: 0.5 mM Ammonium Fluoride in Water
	B: Methanol

Gradient:	Time (min)	% B
	0	40
	2	50
	4.5	75
	5	95
	6	95
	6.5	40
	8	40

Flow Rate:	0.8 mL/min
Injection Volume:	5 µL
Temperature:	30 °C
LC System:	Agilent® 1290 Infinity
Detection:	MS/MS
Detector:	SCIEX® 7500 Triple Quad™

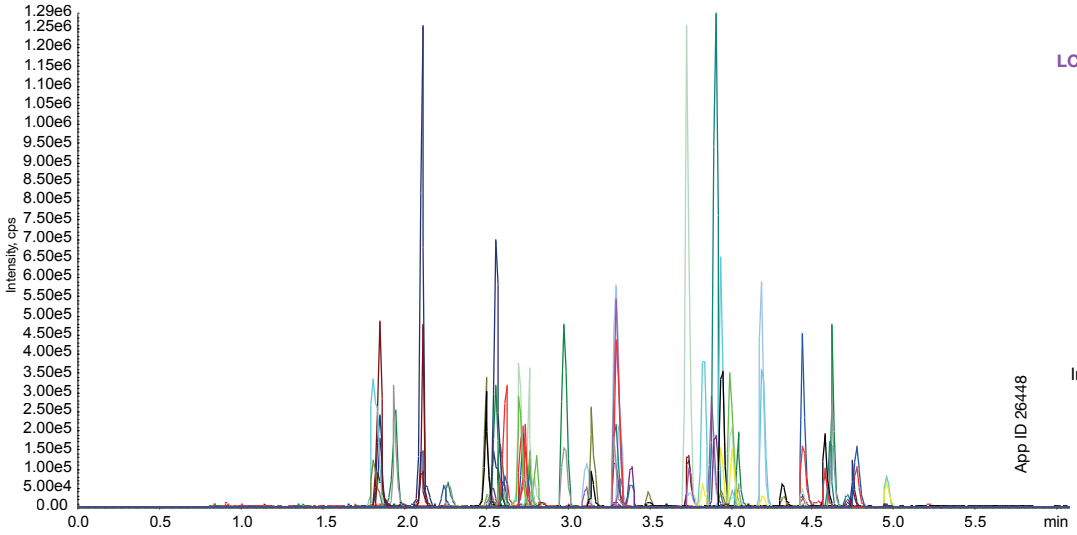
MS/MS Conditions

Ion Source:	ESI
Polarity:	Positive
Source Temperature:	700 °C
GS1:	60 psi
GS2:	60 psi
CUR:	40 psi
CAD:	10
IS:	3000V
EP:	10 V

To view the full analyte table and MS transitions, view the full technical note

Clinical/Toxicology Applications

Separation of 39 Pain Panel Analytes Using Protein Precipitation



LC-MS/MS Conditions

Columns: Kinetex 2.6 µm Biphenyl
Dimensions: 50 x 3.0 mm
Part No.: 00B-4622-Y0
Mobile Phase: A: 0.1 % Formic Acid in Water
B: 0.1 % Formic Acid in Methanol
Gradient:

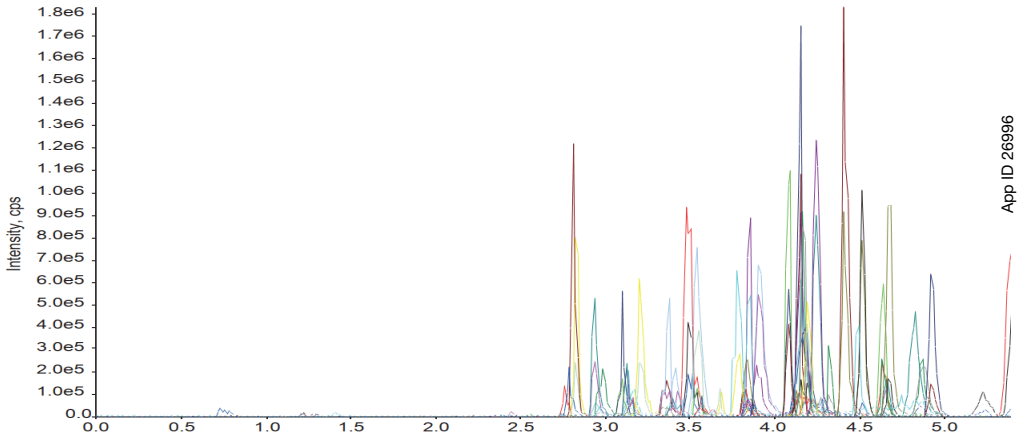
Time (min)	% B
0	15
3.5	95
5	95
5.01	15
7	15

Flow Rate: 0.5 mL/min
Injection Volume: Ambient
Temperature: 25 °C
LC System: Agilent® 1200 Series
Detection: MS/MS
Detector: SCIEX® 4500

					Protein Precipitation		Phree PLR	
Peak No.	Analyte Name	RT (min)	Q1	Q3	% Rec.	% CV (N=4)	% Rec.	% CV (N=4)
1	Alprazolam	4.8	309.1	281.1	93	4.3	107	5.6
2	Amphetamine	2.3	136.1	91.1	88	9.6	81	8.8
3	Benzoylecgonine	3.3	290.1	168.1	87	3.9	91	13.8
4	Codeine	2.6	300.2	152.1	84	7.5	91	15.2
5	Diazepam	4.9	285	193.2	85	9.9	91	12
6	MDMA	2.9	194.1	105.1	75	0.9	95	12.4
7	Methamphetamine	2.6	150.1	91	78	13.5	85	15
8	Norbuprenorphine	3.6	414.3	83.2	95	10.3	93	13.4
9	Oxazepam	4.4	287	241	93	4.1	100	5.1
10	Oxymorphone	2	302.1	227	72	11.7	73	4.8
11	PCP	4	244.3	91	80	7.4	95	10.3
12	Propoxyphene	4	340.3	266.3	93	12.5	100	10.6
13	Sufentanil	4.1	387.2	238.1	92	14.3	90	3.2
14	6MAM	2.57	328.1	165.1	71	2.9	80	13.5
15	Buprenorphine	3.9	468.3	55.2	93	12.5	97	10.6
16	Carisoprodol	3.9	261.1	176.2	103	11.9	98	11
17	Clonazepam	4.4	316.1	270.1	94	2	96	6.5
18	EDDP	4.2	278.2	234.2	84	4.1	88	4.8
19	Fentanyl	3.9	337.3	105.1	103	9.3	105	11.6
20	Flunitrazepam	4.7	314.1	268.2	86	1.9	97	3.3
21	Flurazepam	4	388.2	315.2	112	13.3	104	3.8
22	Hydrocodone	2.8	300.2	199	85	8.6	94	14.2
23	Hydromorphone	2.1	286.1	185.1	78	7.2	82	12.6
24	Lorazepam	4.3	321	275	100	4.1	109	12.3
25	MDA	2.7	180.1	133	78	7	93	8.8
26	MDEA	3	208.2	163	81	9.7	91	15.3
27	Meperidine	3.4	248.2	220.2	98	4.9	95	7.2
28	Methadone	4.4	310	265	99	14.9	99	7.1
29	Midazolam	4.1	326.1	291.1	107	11.1	93	8.6
30	Morphine	1.9	286.1	152.1	92	15.7	94	5.4
31	Naloxone	2.56	328.2	212	76	15.1	104	8.5
32	Naltrexone	2.8	342.2	267.1	94	14.1	92	10.5
33	Nordiazepam	4.64	271	140	98	5.3	98	8.9
34	Norfentanyl	3.2	233.2	84.1	99	6.5	94	11.2
35	Normeperidine	3.4	234.1	160.1	93	8.5	86	13.1
36	Norpropoxyphene	4.1	308.2	100.1	99	15	97	4.4
37	Oxycodone	2.8	316.1	241.2	95	2.4	110	7.6
38	Temazepam	4.7	301.1	255.1	90	4.6	89	5.8
39	Tramadol	3.2	264.1	58.1	87	10.2	89	13.9
% Recovery range for 39 analytes					71-112%		73-110%	

Clinical/Toxicology Applications

Representative Chromatogram of 32 Pain Panel Analytes Extracted from Oral Fluid Matrix Utilizing a Kinetex 2.6 µm Biphenyl Column



LC-MS/MS Conditions

Column:	Kinetex 2.6 µm Biphenyl
Dimensions:	50 x 4.6 mm
Part No.:	00B-4622-E0
Mobile Phase:	A: 10 mM Ammonium Formate
	B: Methanol

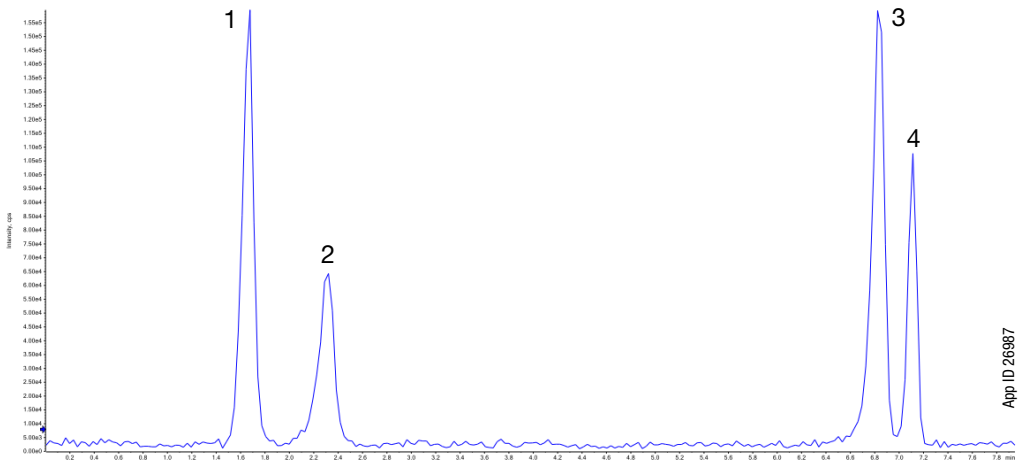
Gradient:	**Time (min)**	**% B**
	0	15
	1	70
	3.5	95
	5.5	85
	5.51	15
	7	15

Flow Rate:	0.6 mL/min
Injection Volume:	5 µL
Temperature:	Ambient
LC System:	Agilent® 1260 Infinity
Detection:	MS/MS
Detector:	SCIEX® 4500 Triple Quad™

MS/MS Conditions

Ion Source:	ESI
Polarity:	Positive
Source Temperature:	650 °C
GS1:	70
GS2:	70
CUR:	25
IS:	5000

Separation of THC and Metabolites using β-Gone™ Sample Preparation and the Kinetex 2.6 µm C18 Column



LC-MS/MS Conditions

Column:	Kinetex 2.6 µm C18
Dimensions:	50 x 201 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**
	0.25	68
	5.25	70
	7.75	80
	7.95	100
	8.95	100
	9.15	68
	11.0	68

Flow Rate:	3 mL/min
Injection Volume:	10 µL
Temperature:	40 °C
LC System:	Agilent® 1260 Infinity
Detection:	MS/MS
Detector:	SCIEX API 4000 QTRAP®
Analytes:	1. D9 THC-OH
	2. D9 THC-COOH
	3. D9 THC
	4. D8 THC

MS/MS Conditions

Polarity:	Positive or Negative
Source Temperature:	600 °C
GS1:	50
GS2:	50
CUR:	10
IS:	+5500 or -4500

Clinical/Toxicology Applications

Click Each!

Additional applications available on https://www.phenomenex.com/applications

Tech Note
25-OH Vitamin D2 and D3 from Serum

Tech Note
A Fast Approach of a Supported Liquid Extraction (SLE) Method to Determine 25-OH Vitamin D2/D3 in Human Serum Using LC-MS/MS (TN-0128)

Tech Note
Analysis of Fat-Soluble Vitamins using the Kinetex Core-Shell Biphenyl LC Column

Tech Note
Analyzing Testosterone in Human Serum by UHPLC using High Efficiency Kinetex 1.7µm C18 Core-Shell Columns

Tech Note
Comparison of Two Clean-up Techniques and a Quick Analysis of 39 Pain Management Drugs from Serum (AN-1019)

Tech Note
Evaluation of Newer HPLC/UHPLC Technologies for the Analysis of Steroids (TN-1097)

Tech Note
Increased Sensitivity of THC and Metabolites using B-Gone and Kinetex 2.6 µm C18 Column by LC-MS/MS

Tech Note
LC-MS/MS Analysis of a Comprehensive Steroid Panel from Serum for Using Supported Liquid Extraction

Tech Note
LC-MS/MS based Quantification of 47 Therapeutic Drug Monitoring Compounds in Serum: A Simple Sample Preparation Strategy for Efficient Analysis (TN-0159)

Tech Note
Quantitation of Clinical Research Steroid Analytes from Serum Utilizing Solid Phase Extraction with LC-MS/MS

Tech Note
Quantitative Analysis of Illicit Drugs of Abuse in Whole Blood by LC-MS/MS

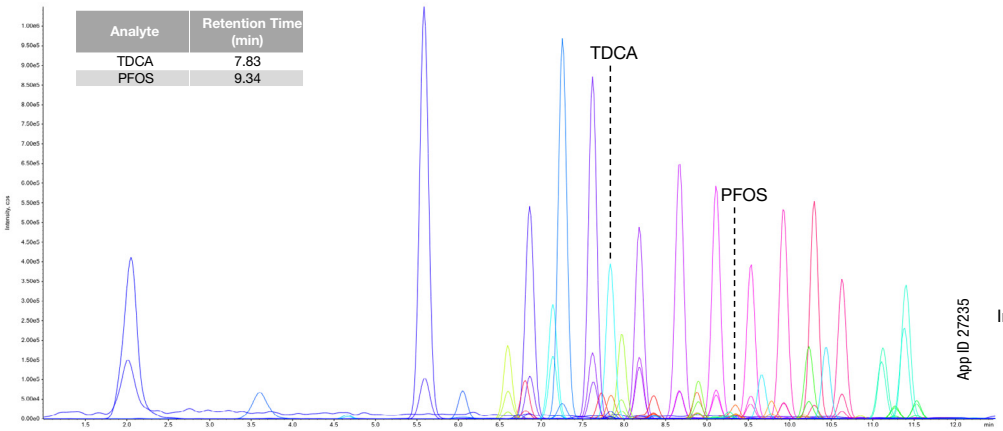
Tech Note
Steroid Panel by LC-MS/MS

Tech Note
Simplifying Urine Drug Testing by Combining IMCSzyme® RT and β-Gone™ Plus β-Glucoronidase Removal

PFAS Applications

TDCA and PFOS Separation on Kinetex C18

Analyte	Retention Time (min)
TDCA	7.83
PFOS	9.34



LC-MS/MS Conditions

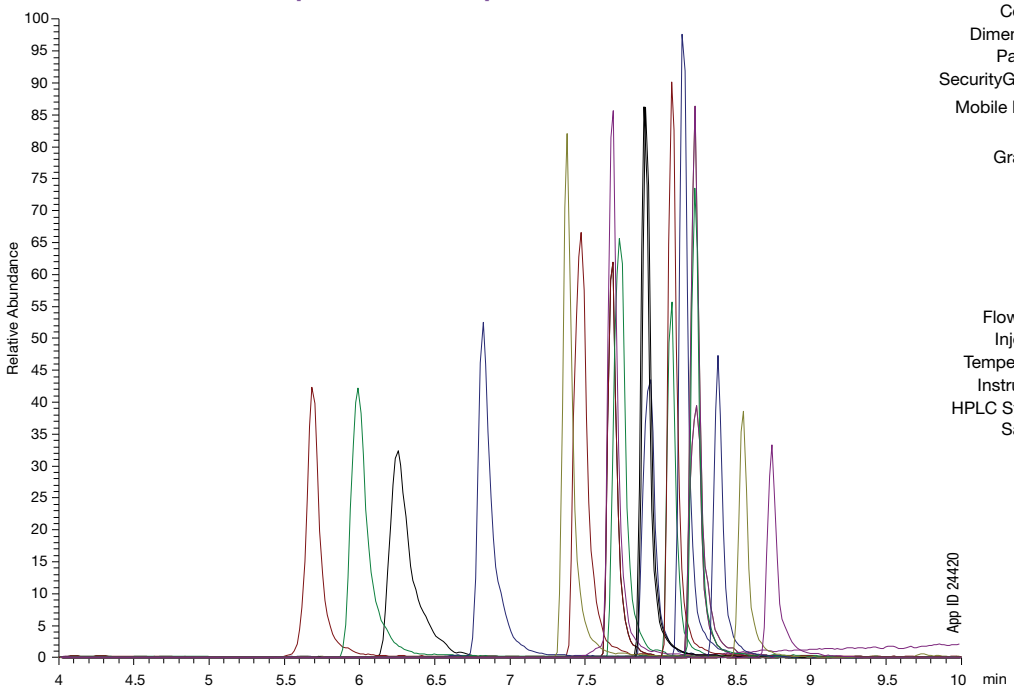
Column: Kinetex 1.7 µm C18
Dimensions: 50 x 2.1 mm
Part No.: 00B 4475 AN (Kinetex)
Mobile Phase: A: Acetonitrile
B: 2 mM Ammonium Acetate in Water / Acetonitrile (95:5, v/v)

Gradient:

Time (min)	% B	Flow Rate (µL/min)
0	98	350
0.2	98	350
4	70	400
7	45	400
9	25	400
10	5	400
10.4	98	400
11.8	98	400
12	98	350
15	98	350

Injection Volume: 5 µL
Temperature: 40 °C
Instrument: Agilent® 1260 Quaternary
Detection: MS/MS
Detector: SCIEX® Triple Quad ™4500

Perfluorinated Compounds in Aqueous Matrices



LC-MS/MS Conditions

Column: Kinetex 5 µm EVO C18 100 Å
Dimensions: 100 x 2.1 mm
Part No.: 00D-4633-AN
SecurityGuard™: AJ0-9298
Mobile Phase: A: 0.4 % v/v Ammonium hydroxide in Water
B: Methanol

Gradient:

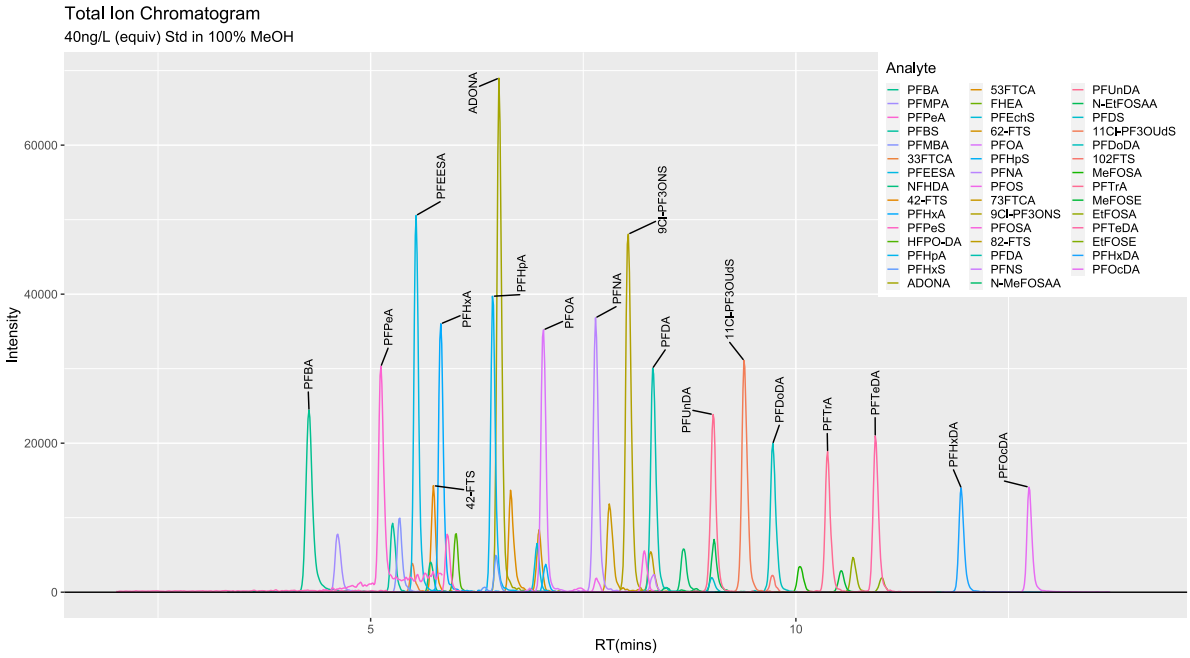
Time (min)	% B
0	90
3.1	20
4.5	20
6.1	90
11	90
14	90

Flow Rate: 0.3 mL/min
Injection: 5 mL
Temperature: Ambient
Instrument: Thermo TSQ Quantum® Ultra QQQ
HPLC System: Thermo Accela™ 1250

Sample:

Analyte	Retention Time (Min)
1. PFBA	5.69
2. PFPeA	6
3. PFBS	6.3
4. PFHxA	6.83
5. PFHpA	7.39
6. PFHxS	7.5
7. 6:2 FTS	7.68
8. PFOA	7.7
9. PFOS	7.7
10. PFNA	7.92
11. PFDS	7.9
12. 8:2 FTS	8.08
13. PFDA	8.09
14. N-MeFOSAA	8.15
15. PFDA	8.2
16. N-EtFOSAA	8.23
17. PFUnDA	8.25
18. PFDoA	8.4
19. PFTrDA	8.56
20. PFTeDA	8.74

Method Validation for the California Expanded List of PFAS Compounds



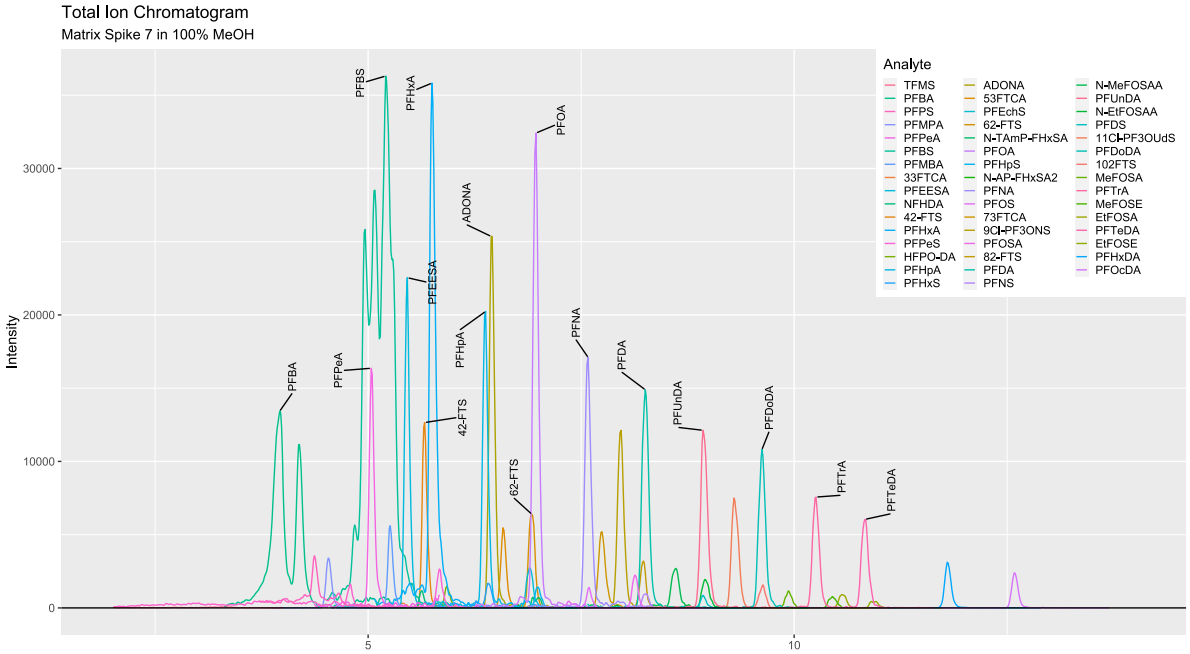
HPLC Conditions (for both)

Column: Kinetex EVO C18
100 x 2.1mm (00D-4633-AN)
Delay Column: Kinetex EVO C18
50 x 2.1mm (00B-4633-AN)
Mobile Phase: A: 20 mM Acetic Acid
B: 25 mM Ammonium Hydroxide in Methanol
Gradient:

Time (min)	% B
0	5
1.2	45
3.6	65
11	90
13	90
13.01	5
17	5

Column Temp: 350°C
Injection Volume: 10 µL
HPLC System: Agilent® 1100

Matrix Studies Chromatographic Separation of Spiked PFAS Compounds in a Wastewater Sample



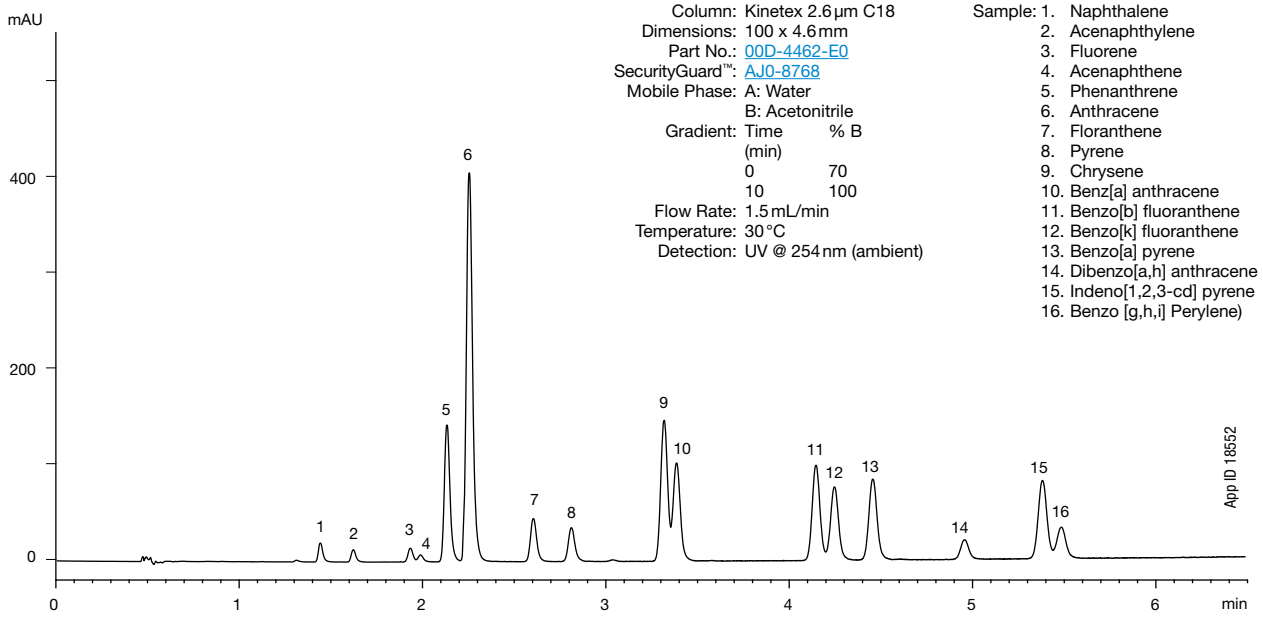
Environmental Applications

Polycyclic Aromatic Hydrocarbons (PAHs) in Water by LC/UV

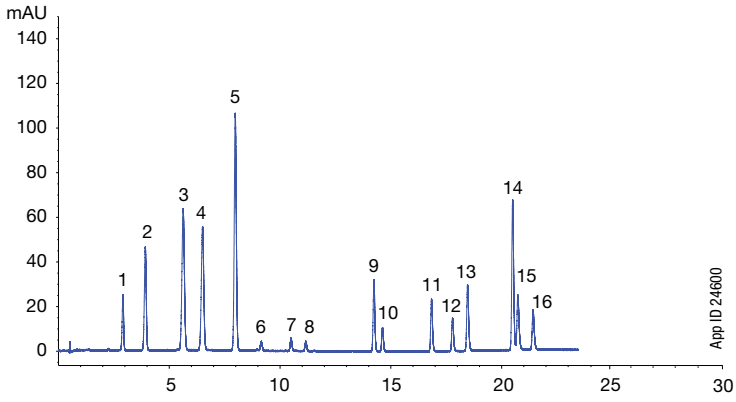
LC-UV Conditions

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)

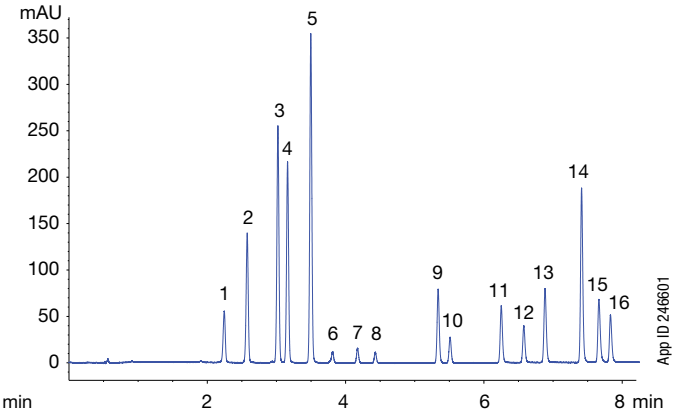
Sample:
1. Naphthalene
2. Acenaphthylene
3. Fluorene
4. Acenaphthene
5. Phenanthrene
6. Anthracene
7. Floranthene
8. Pyrene
9. Chrysene
10. Benz[a] anthracene
11. Benzo[b] fluoranthene
12. Benzo[k] fluoranthene
13. Benzo[a] pyrene
14. Dibenzo[a,h] anthracene
15. Indeno[1,2,3-cd] pyrene
16. Benzo [g,h,i]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



Separation of 16 PAHs in EPA Method 610 Using a Core-Shell Kinetex 3.5 µm PAH 100 X 4.6 mm Column

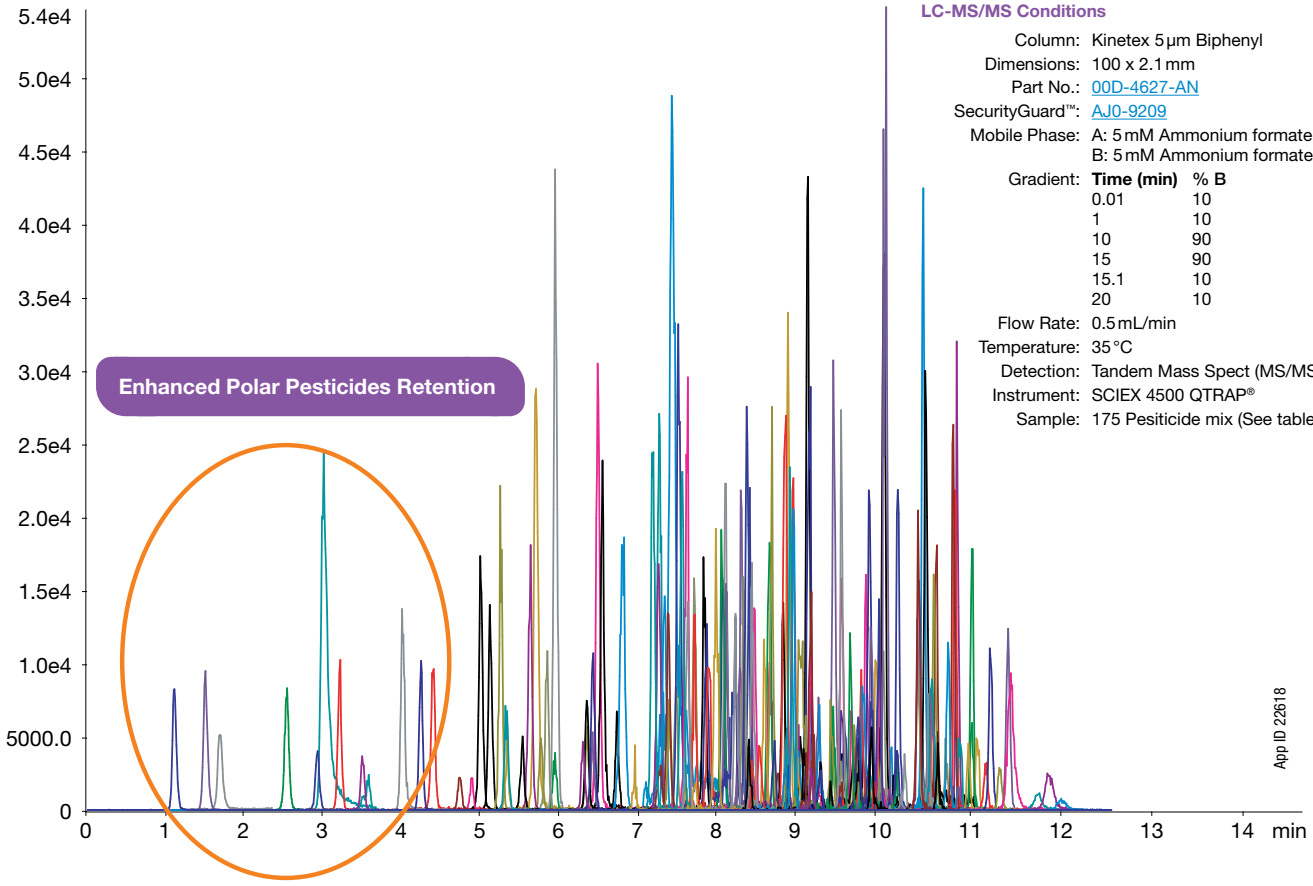


Improved Analysis of the EPA Method 610 PAH Mixture a Core-Shell Kinetex 3.5 µm PAH 100 x 4.6 mm Column Under Adjusted Gradient Conditions



Environmental Applications

Multi-Residue Pesticides



LC-MS/MS Conditions

Column: Kinetex 5 µm Biphenyl
Dimensions: 100 x 2.1 mm
Part No.: 00D-4627-AN
SecurityGuard™: AJ0-9209
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

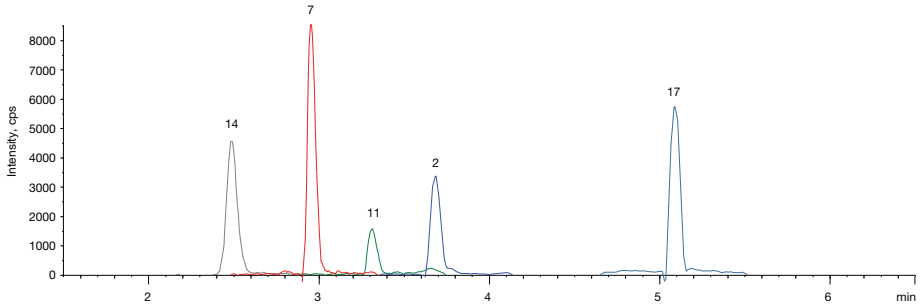
Flow Rate: 0.5 mL/min
Temperature: 35 °C
Detection: Tandem Mass Spect (MS/MS) (0 °C)
Instrument: SCIEX 4500 QTRAP®
Sample: 175 Pesiticide mix (See table below)

1. Methamidophos	21. Aldicarb	41. Acetamiprid	61. Carbetamide	81. Oxadixyl	101. Clofentezine	121. Diniconazole	141. Clethodim Z	161. Azoxystrobin
2. Methomyl	22. Promecarb	42. Mexacarbate	62. Oxamyl	82. Metalaxyl	102.Fenpropimorph	122. Benalaxyl	142. Etoxazole	162. Trifloxystrobin
3. Fenuron	23. Aminocarb	43. Dioxacarb	63. Dicrotophos	83. Penconazole	103. Buprofezin	123. Dimoxystrobin	143. Benzoximate	163. Benfuracarb
4. Cyromazine	24. Propoxur	44. Mepanipyrim	64. 3-Hydroxycarbofuran	84. Vamidothion	104. Fenazaquin	124. Diclobutrazol	144. Flufenacet	164. Spirodiclofen
5. Acephate	25. Ethirimol	45. Monocrotophos	65. Pirimicarb	85. Myclobutanil	105. Quinoxyfen	125. Pencycuron	145. Pyridaben	165. Carfentrazone-ethyl
6. Fuberidazole	26. Acibenzolar-S-methyl	46. Bendiocarb	66. Prometryn	86. Chloroxuron	106.Tebuconazole	126. Epoxiconazole	146. Picoxystrobin	166. Mandipropamid
7. Propamocarb	27. Chlortoluron	47. Mevinphos E	67. Terbutryn	87. Thiamethoxam	107. Diflubenzuron	127. Fenarimol	147. Propargite	167. Fenpyroximate
8. Tricyclazole	28. Omethoate	48. Mevinphos Z	68. Forchlorfenuron	88. Paclobutrazol	108. Fenamidone	128. Tebufenpyrad	148. Tetraconazole	168. Fluoxastrobin
9. Butocarboxim	29. Simetryn	49. Terbumeton	69. Linuron	89. Triadimefon	109. Hexaconazole	129. Ipconazole	149. Spirotetramat	169. Temephos
10. Carbendazim	30. Metribuzin	50. Ethiofencarb	70. Clothianidin	90. Amitraz	110. Kresoxim-methyl	130. Zoxamide	150. Fluquinconazole	170. Flufenoxuron
11. Isoprocarb	31. Monolinuron	51. Methiocarb	71. Thiacloprid	91. Triadimenol	111. Nuarimol	131. Fenbuconazole	151.Prochloraz	171.Butafenacil
12. Cymoxanil	32. Pymetrozine	52. Prometon	72. Imidacloprid	92. Imazalil	112. Flusilazole	132. Propiconazole	152. Bromuconazole -cis	172. Novaluron
13. Cycluron	33. Pyracarbolid	53. Secbumeton	73. Thiobencarb	93. Spiroxamine	113. Bupirimate	133. Boscalid	153. Bromuconazole -trans	173. Hydramethylnon
14. Pyrimethanil	34. Thiofanox	54. Ametryn	74. Metobromuron	94. Mefenacet	114. Desmedipham	134. Thiophanate-methyl	154. Furathiocarb	174. Metaflumizone
15. Carbaryl	35. Thidiazuron	55. Tebuthiuron	75. Fludioxinil	95. Bifenazate	115. Triticonazole	135. Triflumizole	155. Pyraclostrobin	175. Chlorfluazuron
16. Thiabendazole	36. Formetanate	56. Dimethoate	76. Diethofencarb	96. Phenmedipham	116. Metconazole	136. Hexythiazox	156. Dimethomorph (isomer 2)	176. Spinosyn A
17. Dinotefuran	37. Methabenzthiazuron	57. Diuron	77. Mepronil	97. Fenhexamid	117. Iprovalicarb	137. Tebufenozide	157. Dimethomorph (isomer 1)	177. Spinosyn D
18. Aldicarbsulfoxide	38. Carbofuran	58. Fluometuron	78. Nitenpyram	98 .Flutriafol	118. Pyriproxyfen	138. Piperonyl butoxide	158. Rotenone	178. Spinetoram A
19. Isoproturon	39. Aldicarbsulfone	59. Siduron	79. Methoprotryne	99. Furalaxyl	119. Flutolanil	139. Triflumuron	159. Ethiprole	179. Spinetoram B
20. Fenobucarb	40. Butoxycarboxim	60. Carboxin	80. Neburon	100. Fenoxycarb	120. Cyazofamid	140. Clethodim E	160. Alanycarb	

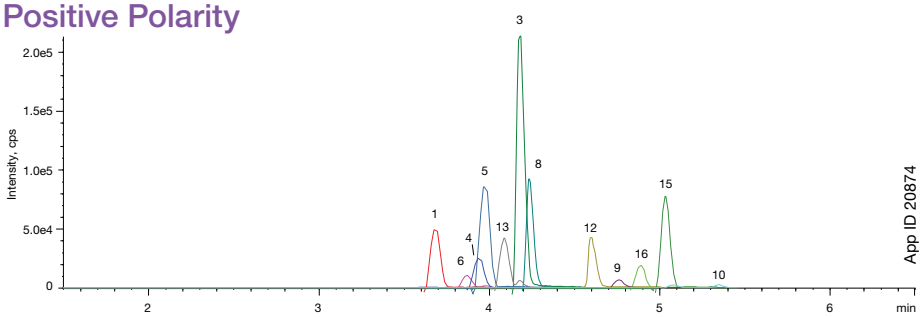
Food Applications

Multi-Toxin Screening in Cereal Based Foods by LC-MS/MS

Negative Polarity



Positive Polarity



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

LC-MS/MS Conditions

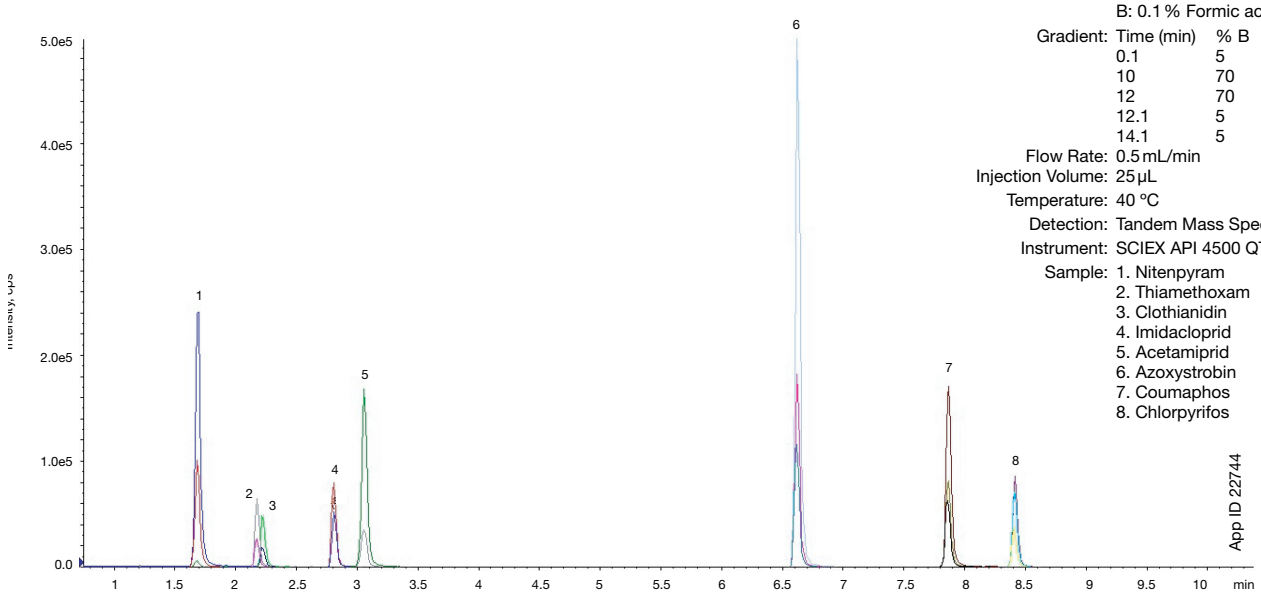
Column: Kinetex 2.6 µm XB-C18
Dimensions: 50 x 2.1 mm
Part No.: 00B-4496-AN
Mobile Phase: A: Water with 5 mM Ammonium acetate and 0.5 % Acetic acid
B: Methanol with 5 mM Ammonium acetate and 0.5 % Acetic acid

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

Flow Rate: 450 µL/min
Temperature: Ambient
Detection: 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. Fumonisn B1 (FB1)
10. Fumonisn 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)

Neonicotinoid Pesticide Residues in Honey by QuEChERS and LC-MS/MS

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



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

LC-MS/MS Conditions

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

Food Applications

Antibiotics in Meat by LC-MS/MS

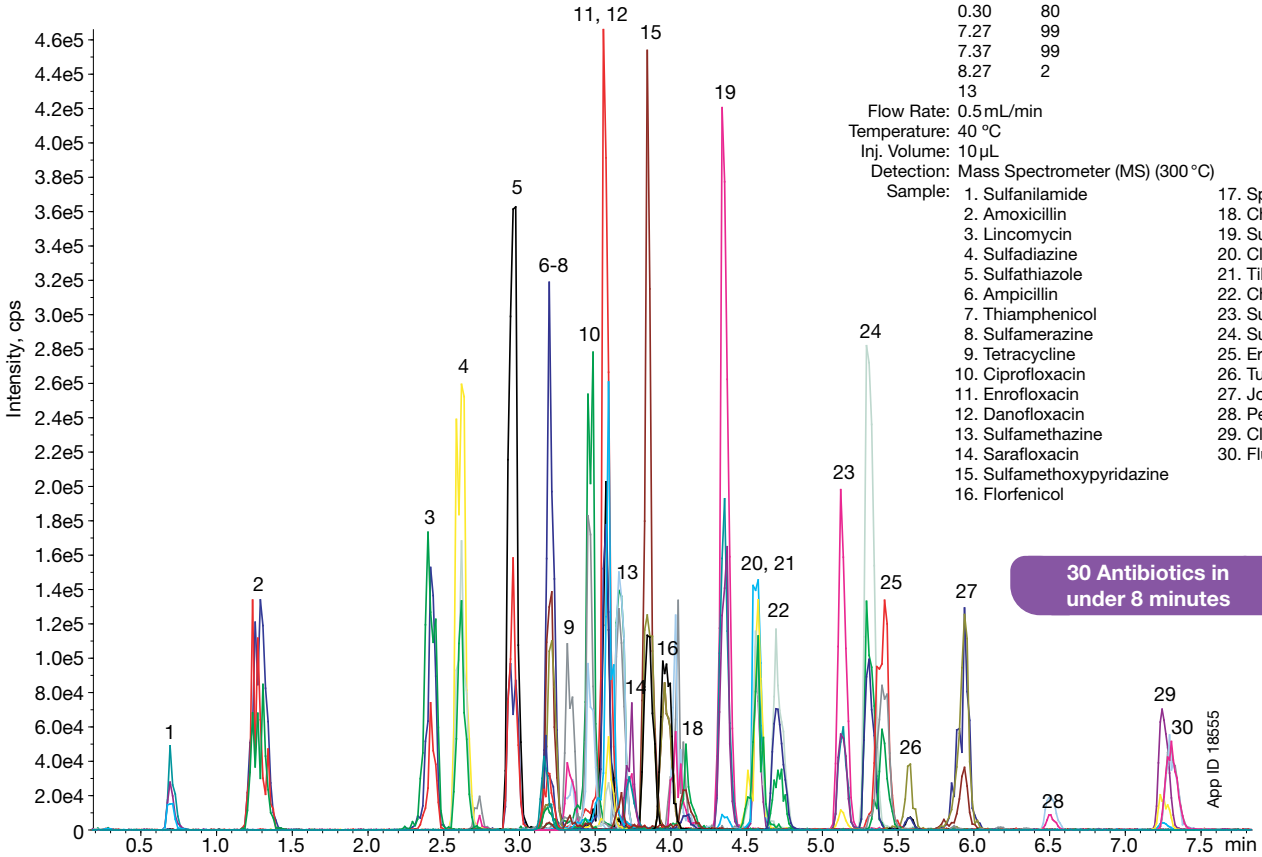
LC-MS/MS Conditions

Column: Kinetex 2.6µm C18
Dimensions: 50 x 2.1mm
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	80
7.27	99
7.37	99
8.27	2
13	

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

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



Note: Analytes spiked at 100 ng/mL

Nitrates and Nitrites by Ion Pair LC-UV

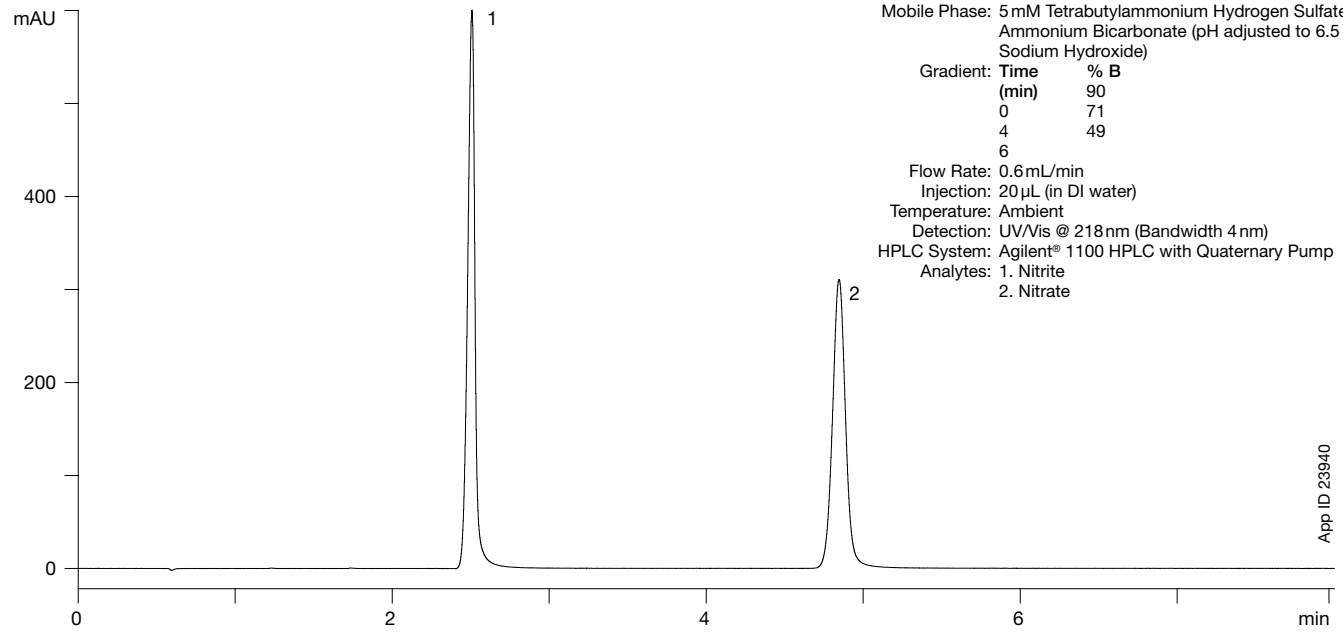
LC-UV Conditions

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

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

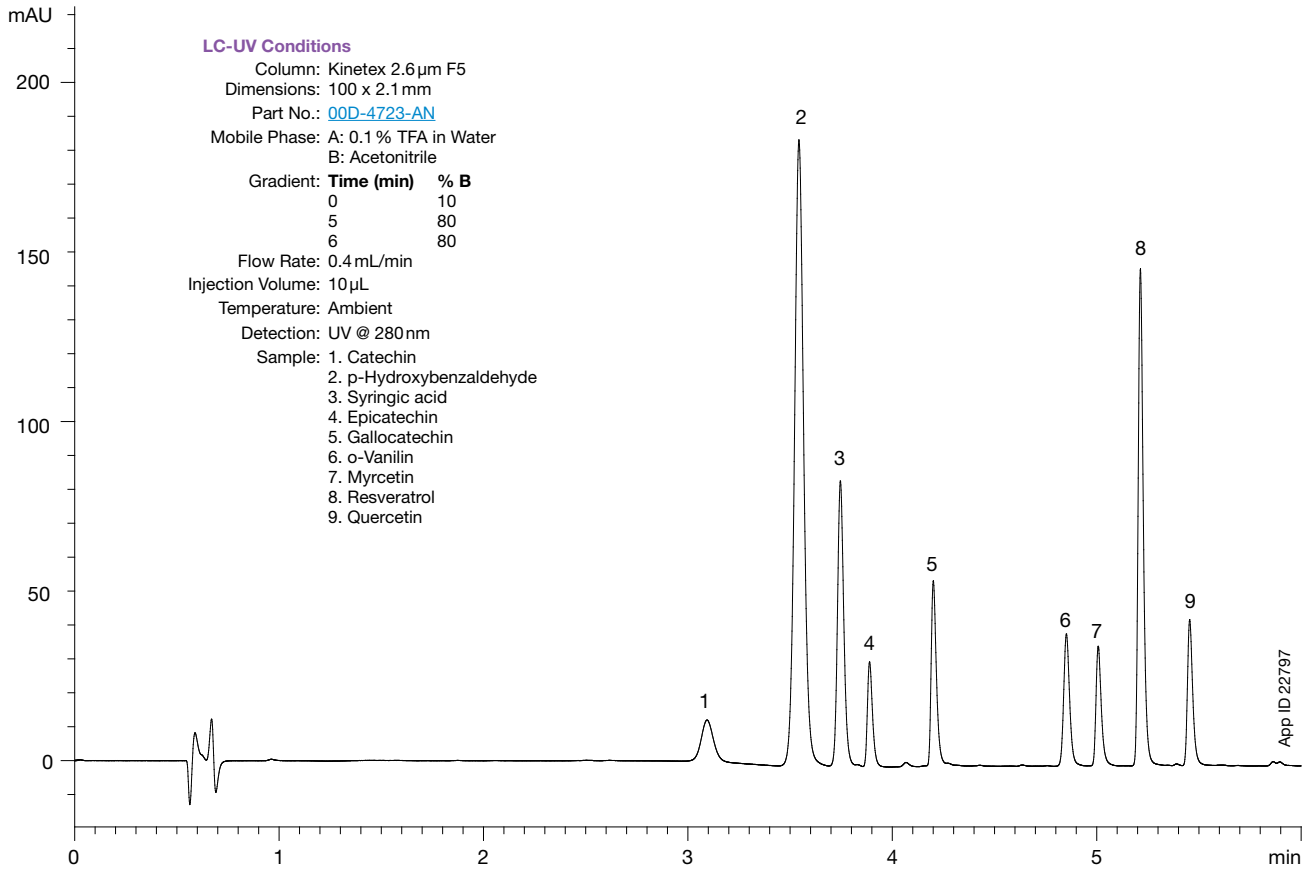
Flow Rate: 0.6mL/min
Injection: 20µL (in DI water)
Temperature: Ambient
Detection: UV/Vis @ 218nm (Bandwidth 4nm)
HPLC System: Agilent® 1100 HPLC with Quaternary Pump
Analytes:

1. Nitrite
2. Nitrate



Food Applications

Polyphenols in Wine by LC-UV



LC-UV Conditions

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-Vanilin
7. Myrcetin
8. Resveratrol
9. Quercetin

Click Each!

Tech Note
Multi-Class Antibiotics From Ground Meat

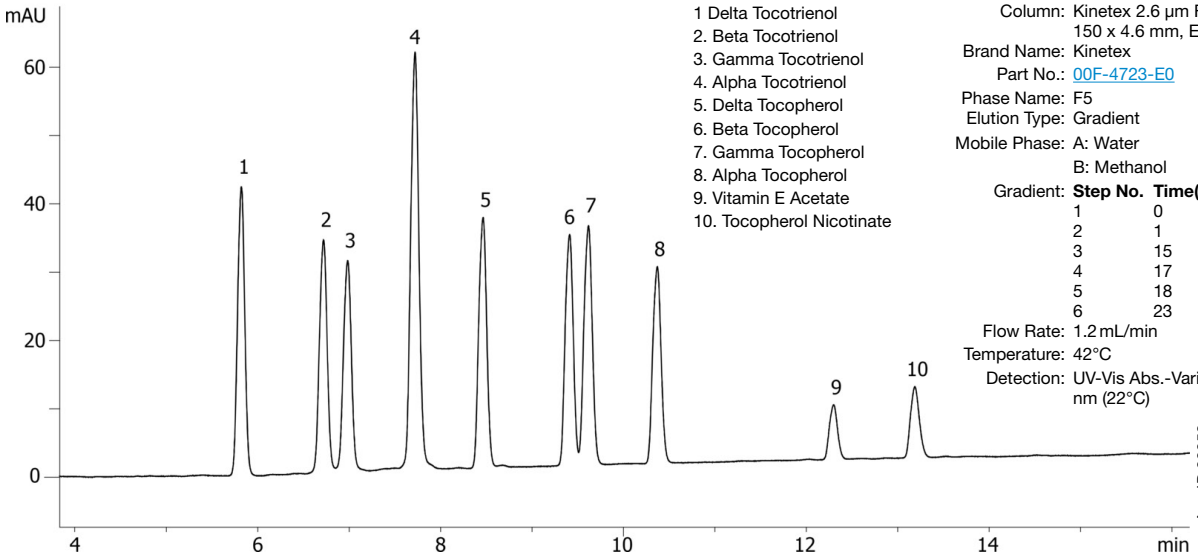
Tech Note
Fast and Robust Analysis of Organic Acids from Wine using HPLC-UV

Tech Note
Extraction and Separation of Phenolic Antioxidants from Edible Oils using a Kinetex 2.6 µm Polar C18 Column

To find more Kinetex Applications for Food, go to www.phenomenex.com/food

Food Applications

Alpha Beta Gamma Delta Tocopherols and Tocotrienols on Kinetex 2.6 µm F5 150x4.6mm



Sample:

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

LC Conditions

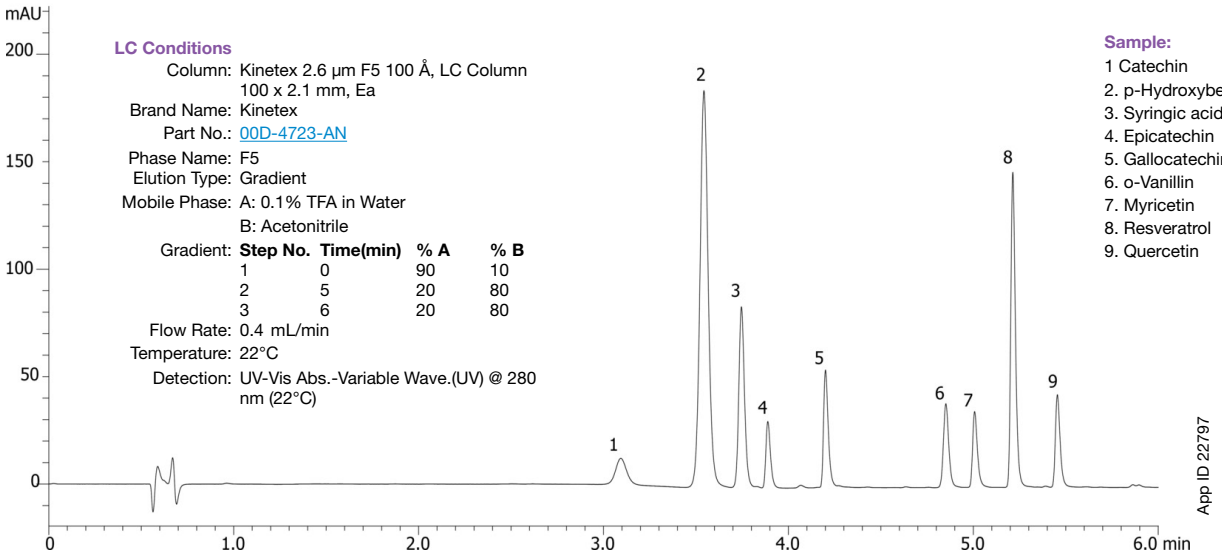
Column: Kinetex 2.6 µm F5 100 Å, LC Column 150 x 4.6 mm, Ea
Brand Name: Kinetex
Part No.: 00F-4723-E0
Phase Name: F5
Elution Type: Gradient
Mobile Phase: A: Water
B: Methanol

Gradient:

Step No.	Time(min)	% A	% B
1	0	15	85
2	1	15	85
3	15	0	100
4	17	0	100
5	18	15	85
6	23	15	85

Flow Rate: 1.2 mL/min
Temperature: 42°C
Detection: UV-Vis Abs.-Variable Wave.(UV) @ 290 nm (22°C)

Catechins and Phenolic acids on a Kinetex 2.6 µm F5 100 x 2.1



LC Conditions

Column: Kinetex 2.6 µm F5 100 Å, LC Column 100 x 2.1 mm, Ea
Brand Name: Kinetex
Part No.: 00D-4723-AN
Phase Name: F5
Elution Type: Gradient
Mobile Phase: A: 0.1% TFA in Water
B: Acetonitrile

Gradient:

Step No.	Time(min)	% A	% B
1	0	90	10
2	5	20	80
3	6	20	80

Flow Rate: 0.4 mL/min
Temperature: 22°C
Detection: UV-Vis Abs.-Variable Wave.(UV) @ 280 nm (22°C)

Sample:

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

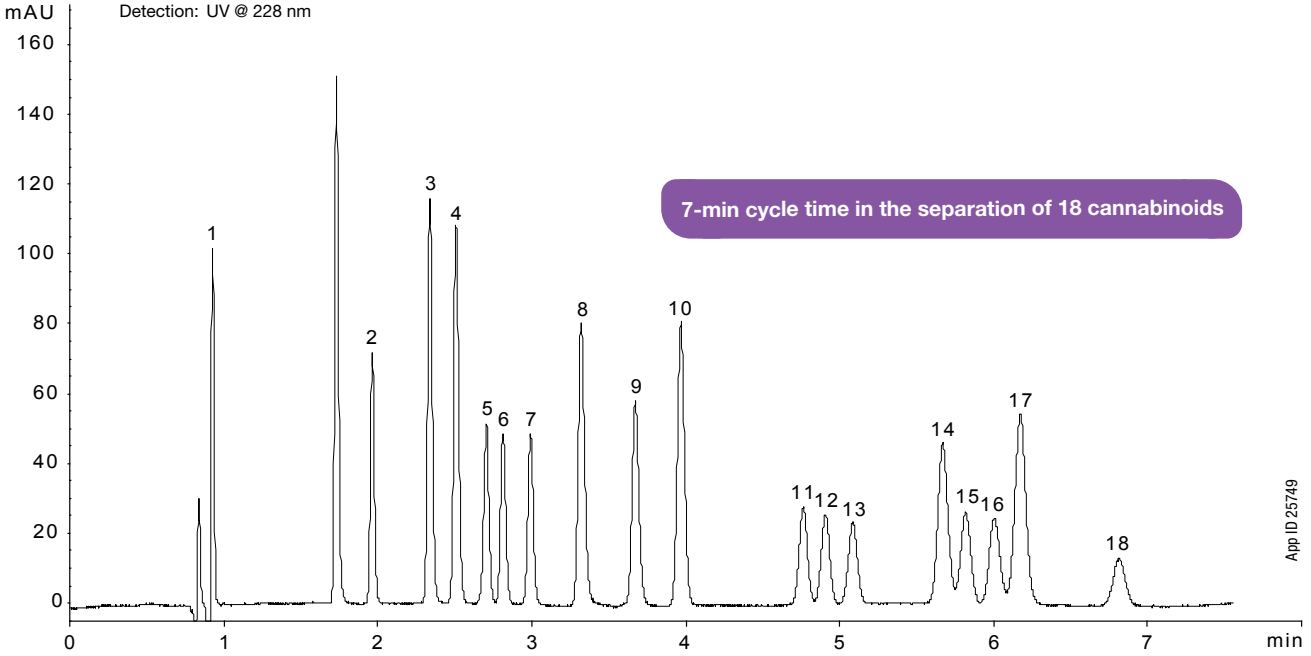
Cannabis Applications

18 Cannabinoids for Potency Testing by LC-UV

LC-UV Conditions

Column: Kinetex 2.6 µm C18
Dimensions: 150 x 4.6 mm
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
Flow Rate: 1.5 mL/min
Detection: UV @ 228 nm

Analytes:
1. **CBDVA** Cannabidivarinic acid
2. **CBDV** Cannabidivarin
3. **CBDA** Cannabidiolic acid
4. **CBGA** Cannabigerolic acid
5. **CBG** Cannabigerol
6. **CBD** Cannabidiol
7. **THCV** Tetrahydrocannabivarin
8. **THCVA** Tetrahydrocannabivarinic acid
9. **CBNA** Cannabinolic acid
10. **CBN** Cannabinol
11. **EXO-THC** Exo-tetrahydrocannabinol
12. **D9-THC** Δ9-Tetrahydrocannabinol
13. **D8-THC** Δ8-Tetrahydrocannabinol
14. **THCA-A** Tetrahydrocannabinolic acid A
15. **CBCA** Cannabichromenic acid
16. **CBL** Cannabicycol
17. **CBC** Cannabichromene
18. **CBLA** Cannabicyclolic acid



7-min cycle time in the separation of 18 cannabinoids

10 Cannabinoids by LC-MS/MS

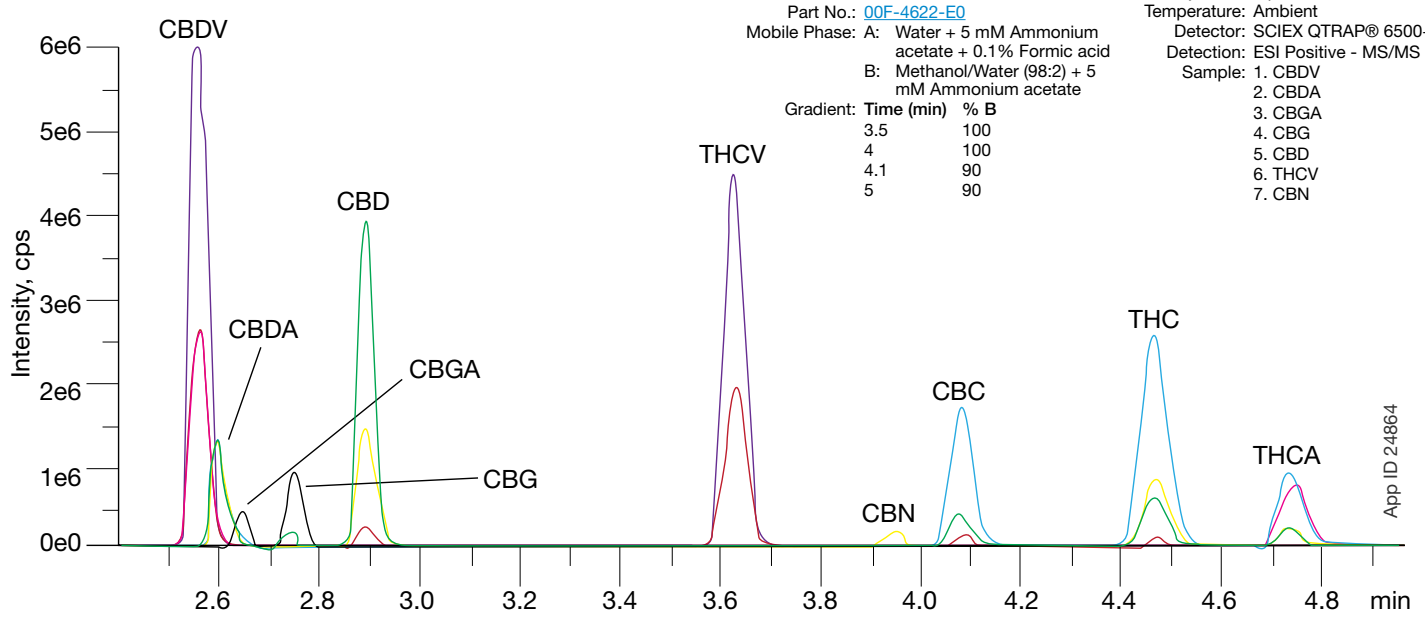
LC-MS/MS Conditions

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

Gradient:

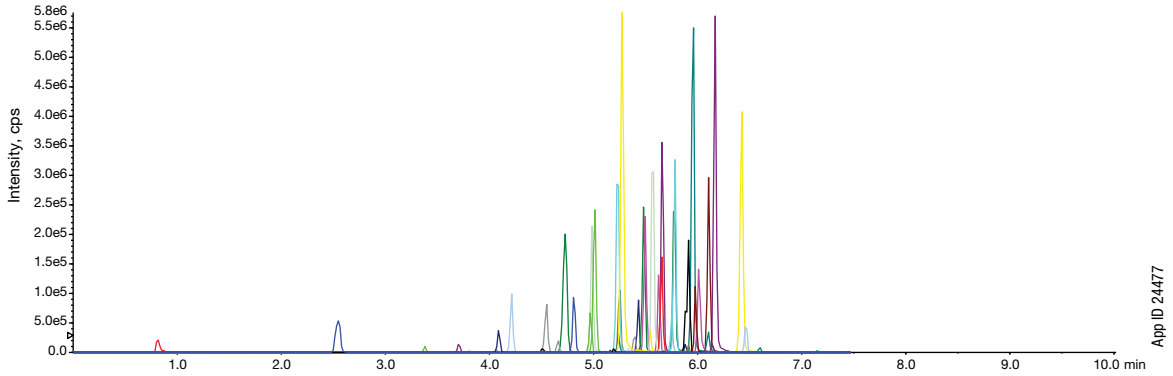
Time (min)	% B
3.5	100
4	100
4.1	90
5	90

Flow Rate: 1 mL/min
Injection: 2 µL
Temperature: Ambient
Detector: SCIEX QTRAP® 6500+
Detection: ESI Positive - MS/MS
Sample:
1. CBDV
2. CBDA
3. CBGA
4. CBG
5. CBD
6. THCV
7. CBN



Cannabis Applications

Pesticides on Kinetex 2.6 µm Biphenyl 50 x 4.6 mm



LC-MS/MS Method Parameters

Column: Kinetex 2.6 µm Biphenyl 50 x 4.6 mm
Part No.: 00B-4662-E0 (Kinetex)
00B-4760-E0 (Luna Omega)
Mobile Phase: A: A: 5mM Ammonium formate + 0.1 % Formic acid in Water
B: 5mM Ammonium formate + 0.1 % Formic acid in 98:2

Gradient:

Time (min)	% B
0	10
1	10
4.3	80
8.7	95
10.5	95
10.6	10
14	10

Injection: 10 µL
Flow Rate: 0.4 mL/min
Temperature: 40 °C
Detection: MS/MS (ESI+)
Instrument: SCIEX® API 4000™
Detector: SCIEX 3500 Triple Quad
Note: The 16 minute LC gradient chromatographically separates all pesticide residues of interest as well as observed endogenous cannabis flower interferences, and the same gradient and run-time can be used on 150mm length columns for greater capacity and lifetime.

Analytes:

1. Acephate	11. Carbaryl	21. Dimethoate	31. Hexythiazox
2. Acequinocyl	12. Carbofuran	22. Ethoprophos	32. Imazalil
3. Acetamiprid	13. Chlorantraniliprole	23. Etofenprox	33. Imidacloprid
4. Aldicarb	14. Chlorpyrifos	24. Etoxazole	34. Kresoxim-methyl
5. Avermectin B1a	15. Clofentezine	25. Fenoxycarb	35. Malathion A
6. Avermectin B1b	16. Cyfluthrin	26. Fenpyroximate	36. Metalaxyl
7. Azoxystrobin	17. Cypermethrin	27. Fipronil	37. Methiocarb
8. Bifenazate	18. Daminozide	28. Fipronil NH4	38. Methomyl
9. Bifenthrin	19. Diazinon	29. Flonicamid	
10. Boscalid	20. Dichlorvos	30. Fludioxinil	

Click Each!

Guide
Cannabis Testing Guide

Tech Note
Comprehensive Cannabis Analysis from One Extract Using One Column and One Solvent System

Tech Note
7 Primary Terpenes in Cannabis by LC-MS/MS

Tech Note
Determination of Pesticide Residues in Cannabis by LC-MS/MS

For more applications go to www.phenomenex.com/cannabis

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3. SecurityGuard™ and SecurityGuard ULTRA: Increase LC column lifetime

SecurityCAP™

Protect Any U/HPLC Solvent from Contamination and Staff from Hazardous Solvents Vapors.

The SecurityCAP mobile phase safety filters prevent hazardous solvent vapors and gases from leaving the solvent reservoir negatively impacting the health of laboratory workers and visitors. The integrated filter membrane captures dust and other contaminants preventing solvent contamination or bacterial growth, which could negatively impact both your chromatography and HPLC/UHPLC system.

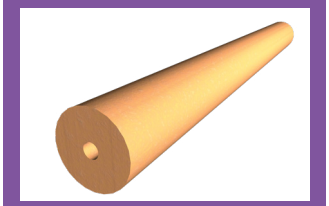
SafetyCAP is also available for mobile phases used in PFAS analysis

SecurityLINK™

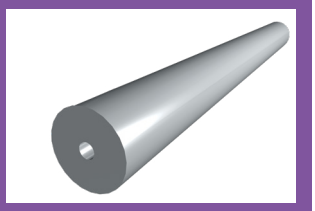
Simplify Your System and Column Connections with SecurityLINK Fingertight Connections

The SecurityLINK fingertight fitting connector simplifies your system and column connections using Torque Limiting Technology that prevents column damaging overtightening.

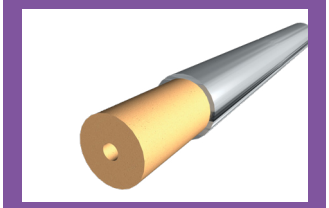
Tubing Options



PEEKsil™



Stainless Steel



PEEK-Lined Stainless Steel

Fingertight
Easy fingertight installation in a CLICK and up to 19,000 psi

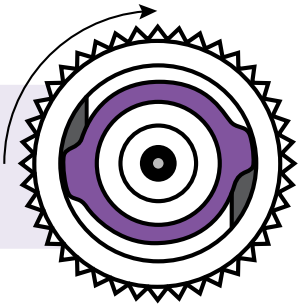
Click'n Done
Torque limiting technology prevents overtightening or undertightening

Zero Dead-Volume
Sealing technology eliminates extra internal volume

Tubing Options
Multiple materials and dimensions are available

What is Torque Limiting Technology?

Once the perfect connection has been made through finger tightening, the SecurityLINK fitting offers a haptic "click" to confirm that optimum torque has been reached. This ensures a consistent connection each and every time and prevents over or under tightening that may cause column or performance issues.



Order now at
www.phenomenex.com/SecurityLINK

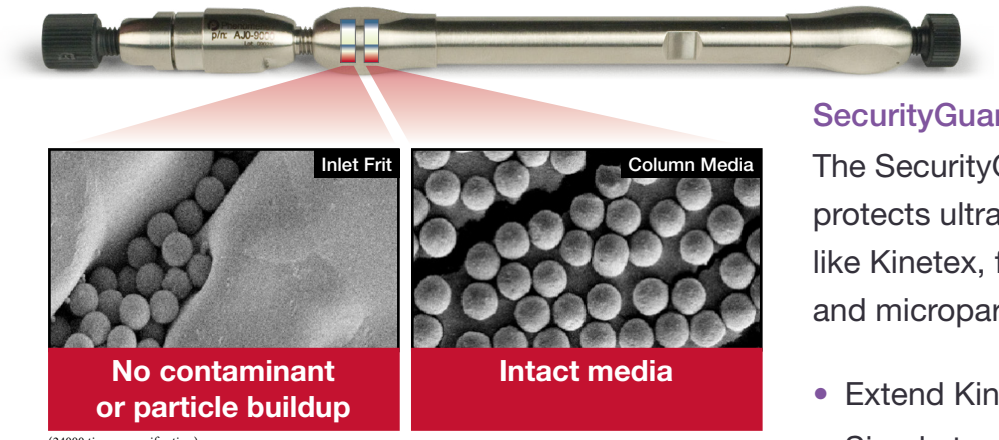
SecurityGuard™ and SecurityGuard ULTRA

Protect your LC column. Protect your research outcomes.

SecurityGuard is a cost convenient universal column protection system that effectively protects your U/HPLC columns from the damaging effects of chemical contaminants without altering your chromatographic results.

- Protects chromatographic results
- Extends UHPLC, HPLC and PREP column lifetime
- Does not alter chromatography
- Simple to use
- Saves time and money
- Compatible with most U/HPLC columns

***With* SecurityGuard ULTRA**



(24000 times magnification)

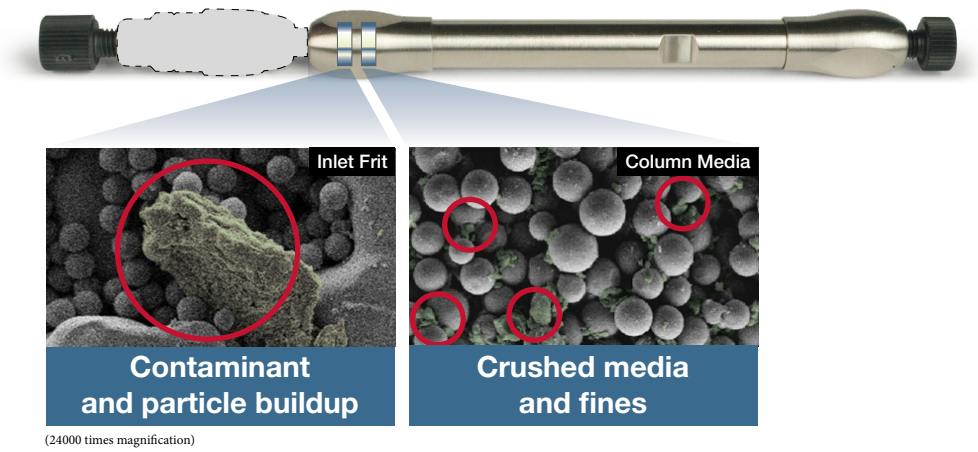
SecurityGuard ULTRA Cartridge System

The SecurityGuard ULTRA cartridge system protects ultra-high performance columns, like Kinetex, from damaging contaminants and microparticulates.

High Pressure Rated Format

- Extend Kinetex column lifetime
- Simple to use
- Pressure rated to 20000 psi (1378 bar)
- Fits virtually all manufacturers' columns 2.1 to 4.6 mm ID

***Without* SecurityGuard ULTRA**



(24000 times magnification)

Shop Online in 6 Quick Steps

Kinetex™ Core-Shell Technology

BE-HAPPY™ GUARANTEE

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www.phenomenex.com/behappy

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t: +32 (0)2 511 8666 (Dutch)
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