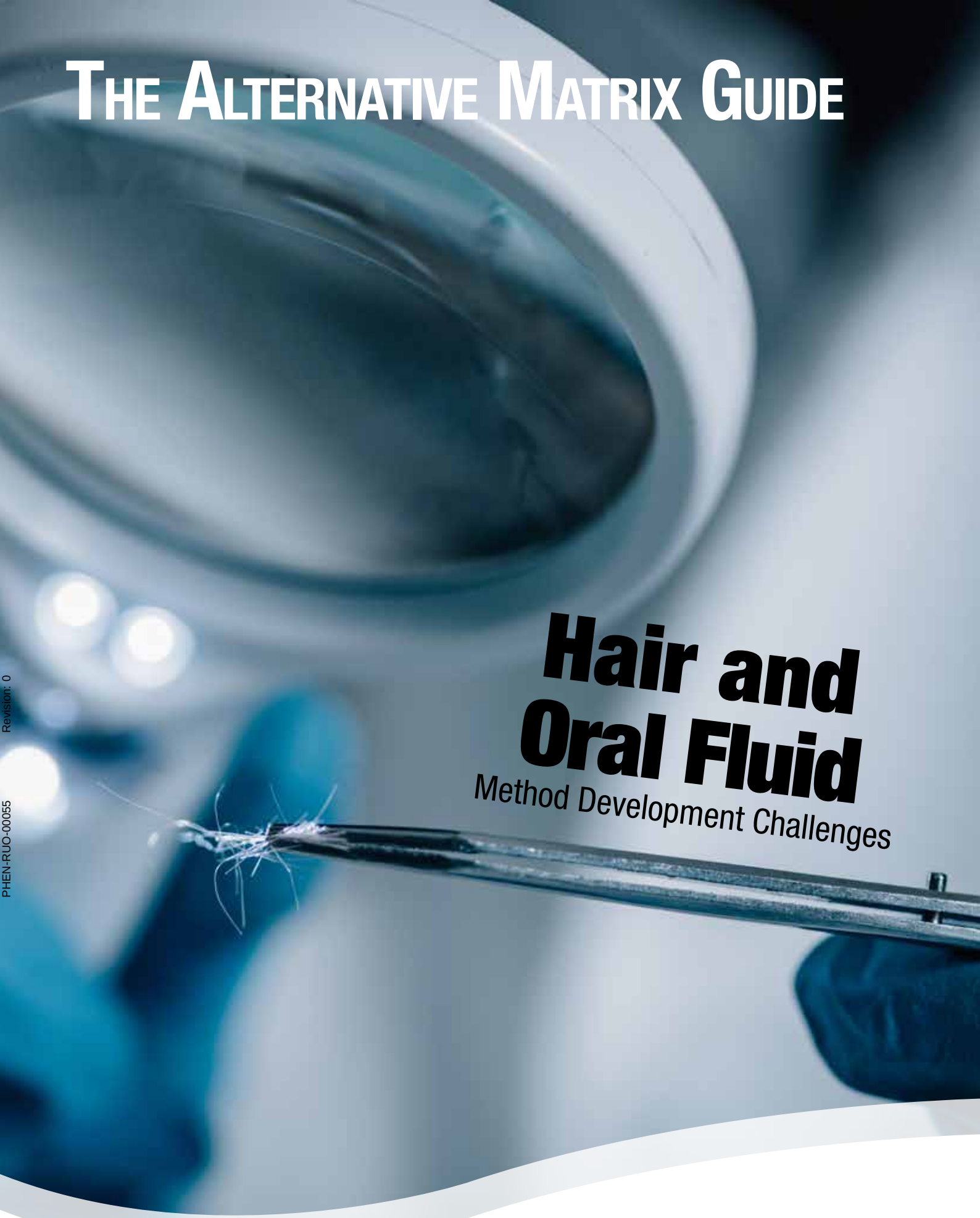
The Alternative Matrix Guide



Hair and Oral Fluid

Method Development Challenges

Revision: 0

PHEN-RUO-00055

phenomenex®

. . . breaking with tradition℠

www.phenomenex.com/AlternativeMatrix

To our fellow method developers,

Let us introduce ourselves. Here at PhenoLogix® we are a full-service analytical support laboratory within Phenomenex that exists specifically to assist in method development.

Like many of you, we have been investigating alternative matrices in our lab such as hair and oral fluid. And while we found a lot of answers, we had to learn a lot along the way.

The following guide is representative of some of the method development challenges that we have encountered. Our hope is by sharing challenges we've overcome, your method development will be less complicated and less frustrating, freeing your time up for more important things.

Questions?

Call us and we'll be happy to help you out!

-PhenoLogix Application Scientists

► Chat Now! ◄

www.phenomenex.com/chat

A Phenomenex Technical Specialist is here to help nearly 24 hours a day!

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guarantee

If Phenomenex products in this brochure do not provide at least an equivalent separation as compared to other products of the same phase and dimensions, return the product with your comparative data within 45 days for a FULL REFUND.

Drugs of Abuse from Hair

Sample Preparation Method Recommendations

Hair Preparation

1. Wash hair several times with methanol and water
2. Allow hair to dry completely
3. Clip hair into very small segments (~1 mm)

Extraction, Screening, and Confirmation of Drugs of Abuse

Combine:	20 mg hair and 1 mL Acetone in a scintillation vial
Add:	50 µL internal standard
Shake:	Vial on a rotator overnight at room temperature (~14 hours)
Transfer:	Acetone to a tube for drying (leaving hair behind)
Add:	1-2 mL of acetone to the vial and wash the walls then transfer the solvent to same drying tube
Evaporate:	Acetone to dryness under Nitrogen at 40-50 °C
Reconstitute:	Dry residue with 100 µL of mobile phase A

Confirmation of THC-COOH

Pre-treatment

1. To a glass test tube, weigh out 20 mg hair
2. Add 1 mL 1N Sodium hydroxide
3. Add 50 µL internal standard
4. Incubate 1 hr @ 75-80 °C
5. Dilute sample with 1 mL Methanol/Water (50:50)
6. Centrifuge for 7 minutes @ 3000-3500 rpm at room temperature
7. Collect supernatant and proceed to SPE procedure

Alternative THC-COOH extraction method on pages 8-9

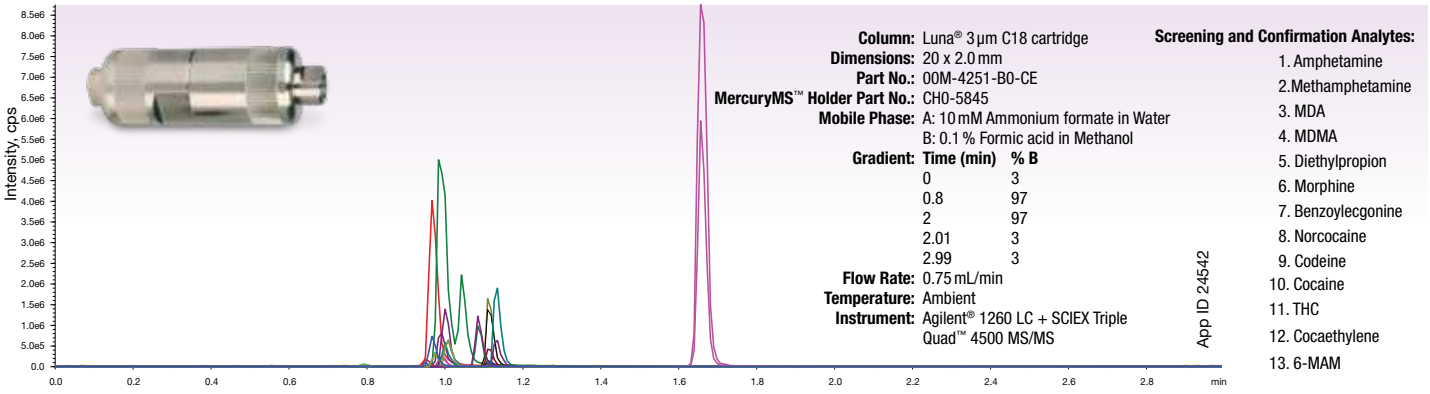
Solid Phase Extraction (SPE) Protocol

96-Well Plate:	Strata®-X-A, 10 mg/well
Part No.:	8E-S123-AGB
Condition:	1 mL Methanol
Equilibrate:	1 mL Methanol/Water (25:75)
Load:	Supernatant from pre-treatment
Wash 1:	1 mL Methanol/Water (25:75)
Wash 2:	1 mL Methanol
Wash 3:	1 mL Methylene Chloride
Dry:	Cartridge at max vacuum for 4-5 minutes
Elute:	2x 500 µL 5 % Formic Acid in Methanol, transfer the eluates to glass tubes for drying step
Dry Down:	Evaporate to dryness under a gentle stream of Nitrogen at 40-45 °C
Reconstitute:	Residue with 100 µL of Methanol/Water (40:60)

Drugs of Abuse from Hair

LC-MS/MS Method Conditions

Screening Method



Column: Luna® 3 µm C18 cartridge
Dimensions: 20 x 2.0 mm
Part No.: 00M-4251-B0-CE
MercuryMS™ Holder Part No.: CH0-5845
Mobile Phase: A: 10 mM Ammonium formate in Water
B: 0.1 % Formic acid in Methanol

Gradient:

Time (min)	% B
0	3
0.8	97
2	97
2.01	3
2.99	3

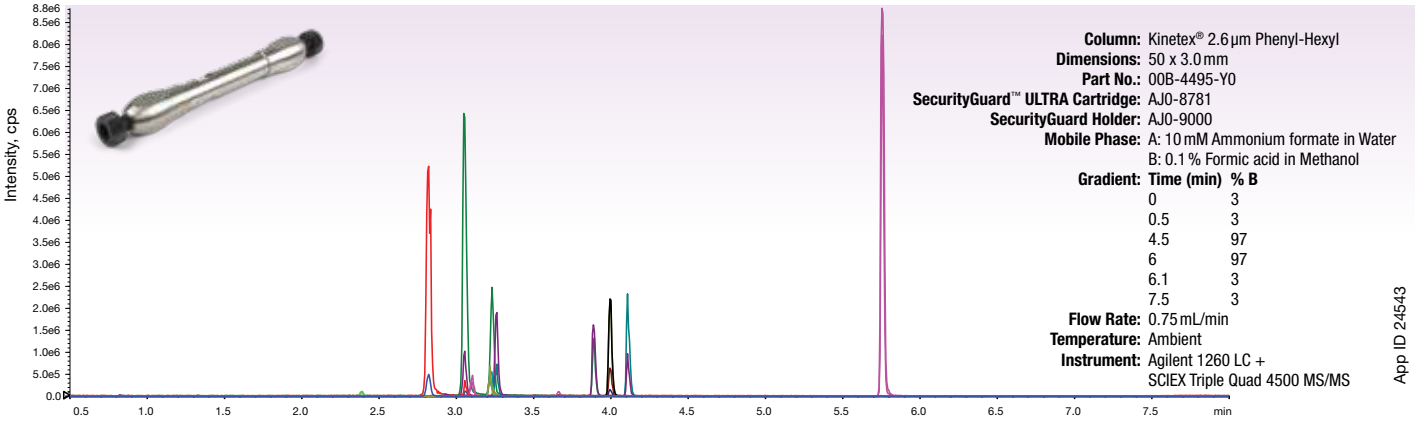
Flow Rate: 0.75 mL/min
Temperature: Ambient
Instrument: Agilent® 1260 LC + SCIEX Triple Quad™ 4500 MS/MS

App ID 24542

Screening and Confirmation Analytes:

1. Amphetamine
2. Methamphetamine
3. MDA
4. MDMA
5. Diethylpropion
6. Morphine
7. Benzoylecgonine
8. Norcocaine
9. Codeine
10. Cocaine
11. THC
12. Cocaethylene
13. 6-MAM

Confirmation Method



Column: Kinetex® 2.6 µm Phenyl-Hexyl
Dimensions: 50 x 3.0 mm
Part No.: 00B-4495-Y0
SecurityGuard™ ULTRA Cartridge: AJ0-8781
SecurityGuard Holder: AJ0-9000
Mobile Phase: A: 10 mM Ammonium formate in Water
B: 0.1 % Formic acid in Methanol

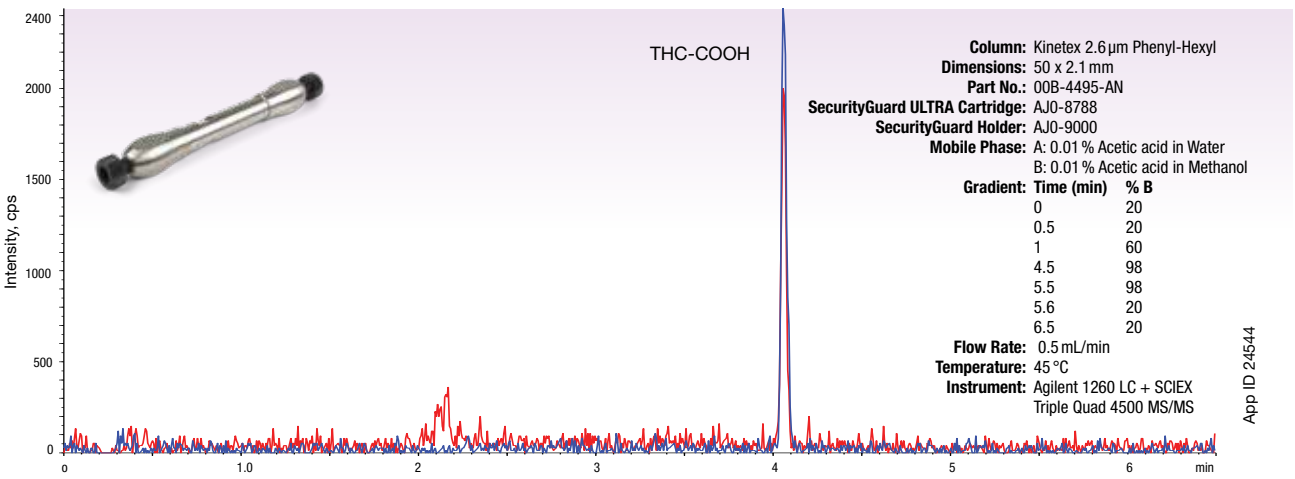
Gradient:

Time (min)	% B
0	3
0.5	3
4.5	97
6	97
6.1	3
7.5	3

Flow Rate: 0.75 mL/min
Temperature: Ambient
Instrument: Agilent 1260 LC + SCIEX Triple Quad 4500 MS/MS

App ID 24543

THC-COOH Confirmation Method



Column: Kinetex 2.6 µm Phenyl-Hexyl
Dimensions: 50 x 2.1 mm
Part No.: 00B-4495-AN
SecurityGuard ULTRA Cartridge: AJ0-8788
SecurityGuard Holder: AJ0-9000
Mobile Phase: A: 0.01 % Acetic acid in Water
B: 0.01 % Acetic acid in Methanol

Gradient:

Time (min)	% B
0	20
0.5	20
1	60
4.5	98
5.5	98
5.6	20
6.5	20

Flow Rate: 0.5 mL/min
Temperature: 45 °C
Instrument: Agilent 1260 LC + SCIEX Triple Quad 4500 MS/MS

App ID 24544

Challenge

Creating a Quality Control Material for Drug-Positive Hair

Countermeasure

Create QC Samples for Different Types of Hair

Positive quality control samples are needed to evaluate a method during development and to monitor assay performance. Developing an internal quality control for hair can be more difficult than for other biological matrices. Unlike with blood or urine where analytes can be spiked into the matrix, analytes need to be incorporated into the hair to create a representative positive sample. Drug-negative hair was soaked in an organic solvent mixture spiked with analytes. Initial batches of QC material were prepared with 2 hair colors to test how hair texture and porosity would affect analyte uptake, however a pooled QC could be used for assay monitoring.

Example of QC Material Preparation

1.	**Wash** red hair and black hair samples several times in Water and Methanol then pulverize	
2.	**Prepare** spiked Dimethyl sulfoxide (DMSO), 20 µg/mL for all standards, except THC-COOH at 2 µg/mL	
3.	82.7 mg red hair 2 mL spiked DMSO 2 mL Water	261.2 mg black hair 3 mL spiked DMSO 3 mL purified Water
4.	**Incubate** at room temperature for 7 days and shield from light	
5.	**Remove** and wash with 1 mL Water followed by 1 mL Methanol to remove any residual solvent	

The protocol used above was based on the NIST SRM 2380 method outlined in Analytical and Bioanalytical Chemistry (2003) 376 : 1205–1211.

Challenge

Selecting the Right Extraction Solvents for General Drugs of Abuse Methods

Countermeasure

Screen for Background Noise

Adopting the wrong solvent can lead to dirty extracts, undissolved matrix, or low recoveries. In this experiment several different extraction solvents were examined and tested for cleanliness. Acidifying, basifying, or buffering this solvent can also influence extraction performance. Ultimately a 100 % Acetone extraction solvent was selected for the screening and confirmation of drugs of abuse because it produced the lowest background and is easily evaporated.

Conditions for all:

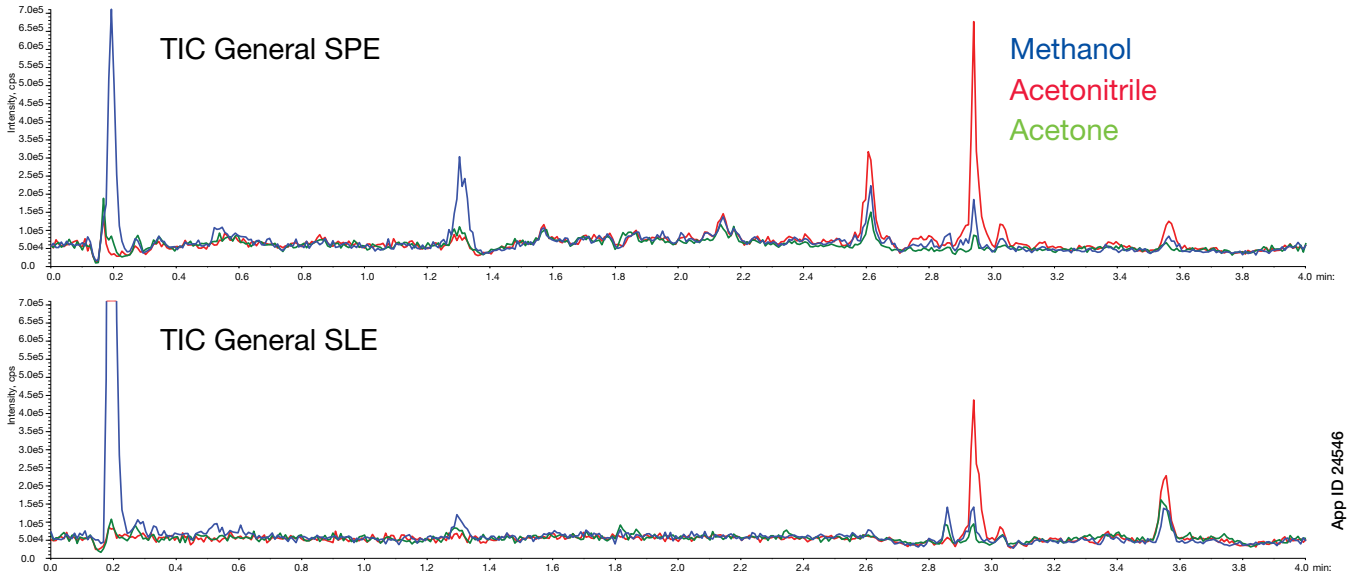
Column: Kinetex® 2.6 µm Phenyl-Hexyl
Dimensions: 50 x 3.0 mm
Part No.: 00B-4495-Y0
SecurityGuard™ ULTRA Cartridge: AJ0-8781
SecurityGuard Holder: AJ0-9000
Mobile Phase: A: 10 mM Ammonium formate in Water
B: 0.1 % Formic acid in Methanol

Gradient:

Time (min)	% B
0	5
0.5	5
2	95
3	95
3.01	5
4	5

Flow Rate: 0.6 mL/min
Temperature: 30 °C
Instrument: Agilent® 1260 LC + SCIEX Triple Quad™ 4500 MS/MS

Overlaid TICs of Background for Extraction Solvents



For Screening and Copnfirmation Method: Acetone was selected as the extraction solvent for low background.

HAIR

Challenge
Developing a Faster Extraction Procedure for THC-COOH

Countermeasure
Balance Clean-up and Time with SLE

For some analyses the selectivity and cleanliness of SPE may not be necessary to obtain results. Supported Liquid Extraction (SLE) is a fast and simple clean-up technique that results in high recoveries and low variation between samples. This sample preparation technique is an easier and cleaner way to perform tradition liquid-liquid extractions (LLE) and results in less background noise in the chromatographic region where THC-COOH elutes.

Experimental Pre-treatments

Weigh:	20 mg hair and add 1 mL 1N Sodium hydroxide
Add:	50 µL internal standard and incubate for 1 hr at 75-80°C.
Neutralize:	Sample with 1 mL 1N HCl and centrifuge for 7 min at 3000-3500 rpm and collect supernatant
Attempt 1:	Dilute with 1mL N HCl Result: Acid precipitates out THC-COOH, Low Recovery
Attempt 2:	Dilute with 1mL Ammonium formate, pH 3.0 Result: Precipitation, Low Recovery
√**Attempt 3:**	Dilute with 1mL Ammonium acetate Result: No precipitation, extraction solvents need to be tested to optimize recovery (SLE Protocol)

Ammonium acetate was selected for the pre-treatment dilution solvent due to high recoveries after SLE protocol.

SLE Protocol

Tube:	Novum™ SLE 12 cc Tube
Part Number:	8B-S138-KDG
Load:	2 mL of supernatant
Wait:	5 minutes
Elute:	**Attempt 1** 2x 5 mL Ethyl acetate √**Attempt 2** 2x 5 mL Hexane/Ethyl acetate (3:1)
Evaporate:	Supernatant to dryness under steady stream of Nitrogen at 40-45°C
Reconstitute:	Residue with 100 µL initial mobile phases

Hexane/Ethyl acetate (3:1)

Ethyl acetate

Selected elution solvent

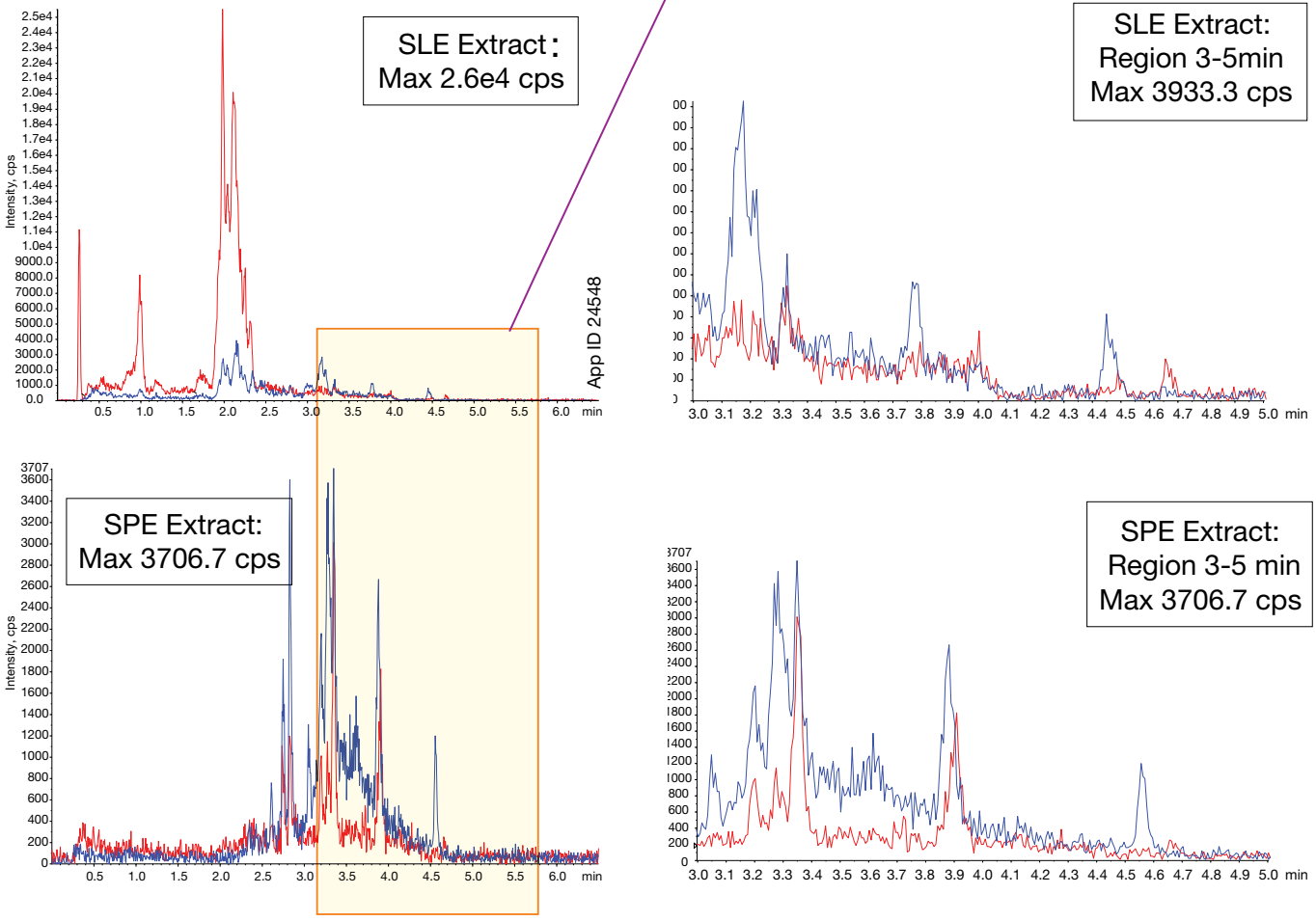
HAIR

Challenge
Developing a Faster Extraction Procedure for THC-COOH

Countermeasure
Balance Clean-up and Time with SLE

SLE vs. SPE Comparing THC-COOH Background

Background noise where THC-COOH elutes is reduced in SLE extract!



Mass Transitions

Blue 343.2 --> 245.3

Red 343.2 --> 191.1

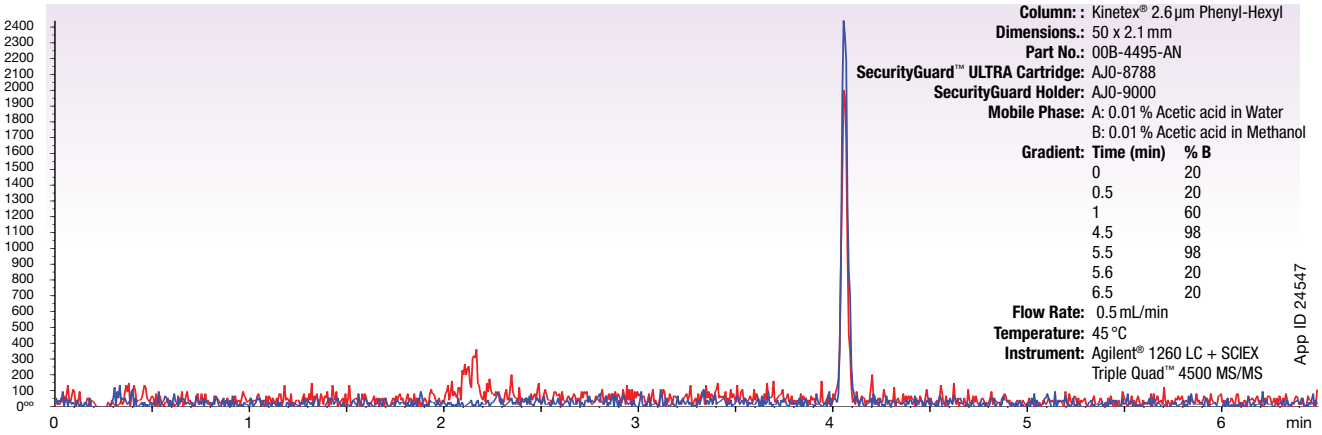
HAIR

Challenge
Variability of Hair Samples

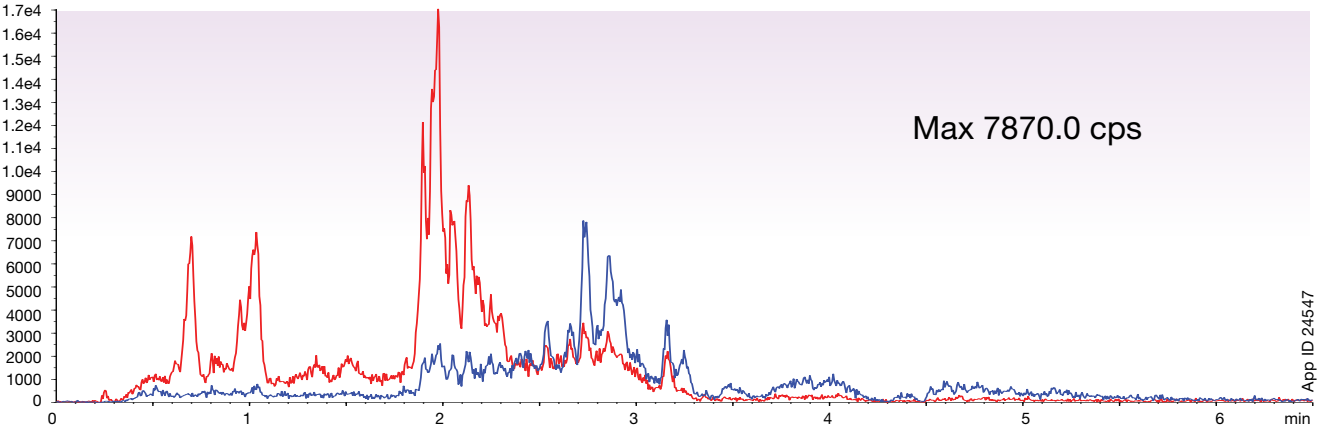
Countermeasure
Test Multiple Types of Hair

Incorporation of drugs into hair can vary by the type of hair and has been shown to be correlated to melanin content. In addition, some hair textures are more prone to absorption of environmental contaminants than others. Types of hair products and chemical treatments used on the hair can affect the quality of the sample. Since different types of hair can produce different background profiles, it was important to test on a variety of hair samples. The sample preparation goal was to minimize the background and chromatographically resolve any interference peaks in the region where THC-COOH elutes. (~4 min)

Neat Standard



Blank Light Brown Hair Extract Background



HAIR

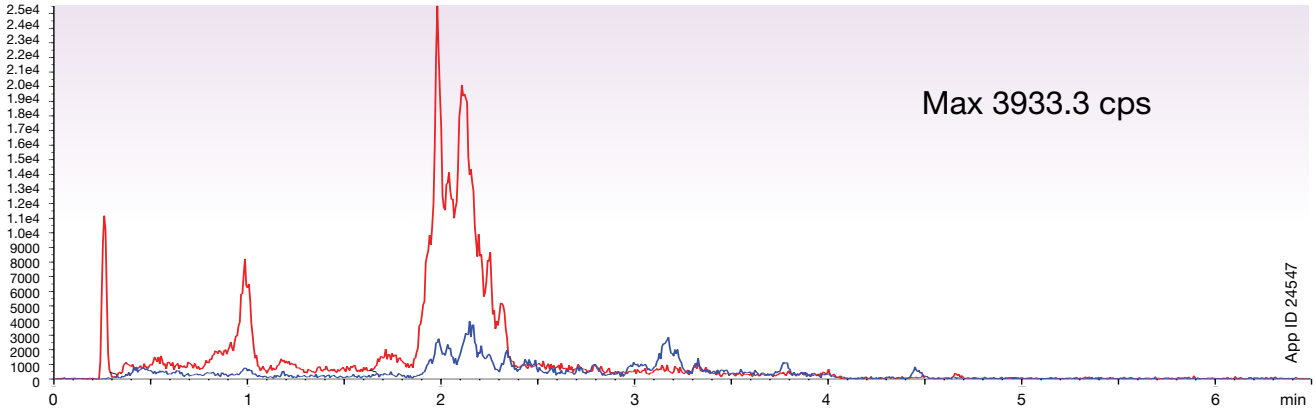
Challenge

Variability of Hair Samples

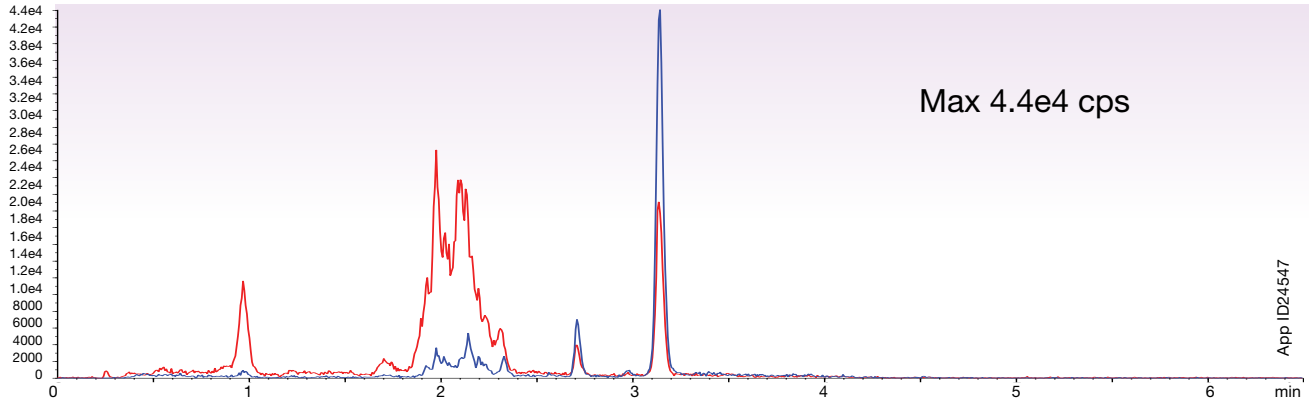
Countermeasure

Test Multiple Types of Hair

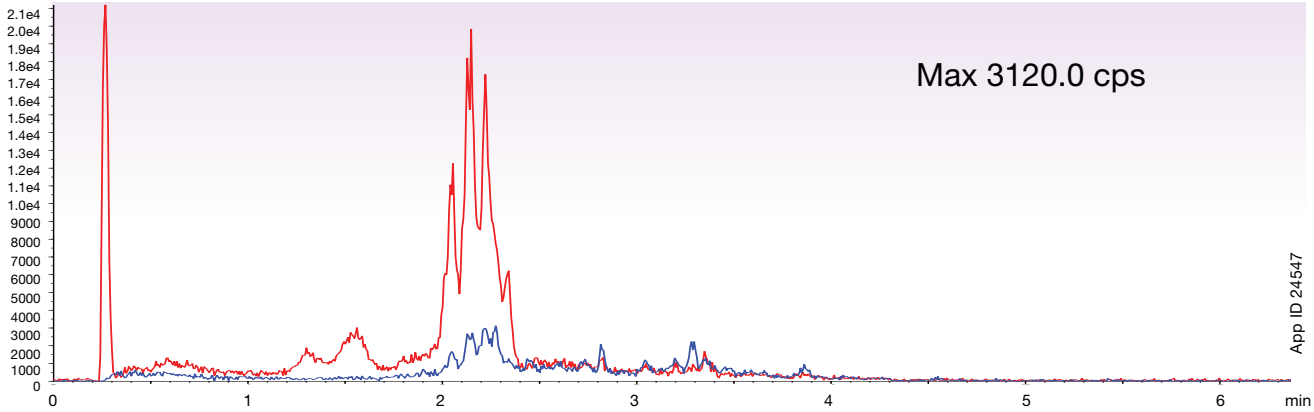
Blank Black Hair Extract Background



Blank Gray Hair Extract Background



Blank Red Hair Extract Background



HAIR

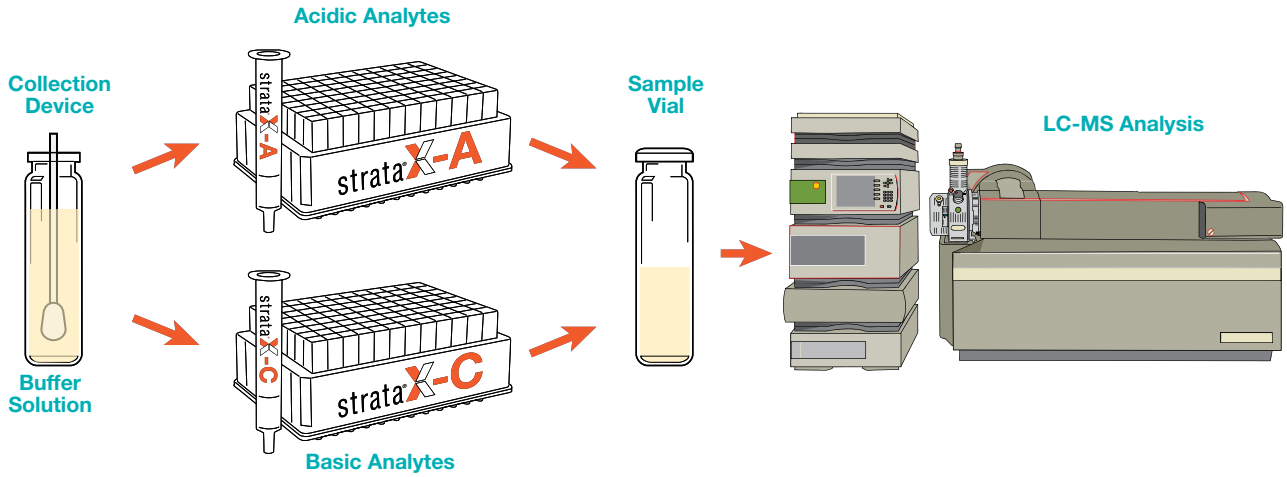
Drugs of Abuse from Oral Fluid

Method Recommendation

Buffer Effects Reduced for Accurate Results

Dirty Buffer Solution Interferences → Clean-up by Strata®-X SPE → Ready to Inject! → Collect Reliable Results

Analysis Workflow



Sample Pre-treatment

For Intercept® i2™ device	Remove plastic nipple at end of transport tube, place in centrifuge tube and centrifuge at 600 g for 15 min to collect the supernatant. Transfer 0.5 mL of it into a vial to perform SPE extraction as below.
For Quantisal® collection device	Gently vortex the transport tube for 5-10 seconds before transferring 0.5 mL to a vial for SPE extraction. If solution is left to settle for 1-2 minutes, centrifugation is not necessary.

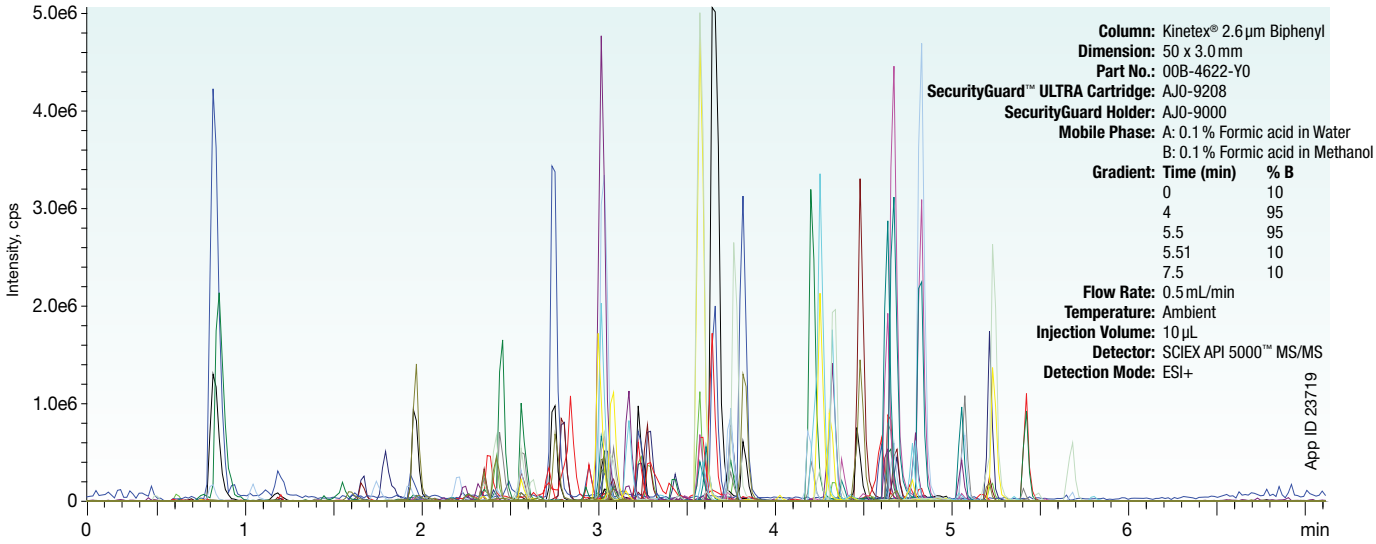
SPE Method

Step	Basic analyte extraction	Acidic analyte extraction
Cartridge:	Strata-X-C, 30 mg in 3 mL cartridge	Strata-X-A, 30 mg in 3 mL cartridge
Part No.:	8B-S029-TBJ	8B-S123-TBJ
Condition:	1 mL 100 % Methanol	1 mL 100 % Methanol
Equilibrate:	1 mL DI Water	1 mL DI Water
Load:	Combine 0.5 mL of pre-treated sample with 1 mL 1 % Formic acid, mix/vortex 5-10 sec and load on Strata-X-C	Combine 0.5 mL of pre-treated sample with 1 mL 1 % Ammonium hydroxide, mix/vortex 5-10 sec and load on Strata-X-A
Weak Wash:	1 mL DI Water	1 mL DI Water
Strong Wash:	1 mL Acetone/Water (50:50)	1 mL Acetone/Water (50:50)
Dry down:	3–4 minutes at maximum vacuum (15” Hg or higher)	3–4 minutes at maximum vacuum (15” Hg or higher)
Elute:	2x 500 µL Methanol/Acetonitrile/30% Ammonium hydroxide (5:5:2)	2x 500 µL Methanol/Acetonitrile/Formic acid (50:50:5)
Dry down:	Evaporate to dryness under a gentle stream of Nitrogen at 45-50 °C	Evaporate to dryness under a gentle stream of Nitrogen at 45-50 °C
Reconstitute:	With 125 µL initial Mobile Phase	With 125 µL initial Mobile Phase
	Combine into a single sample vial	

Drugs of Abuse from Oral Fluid

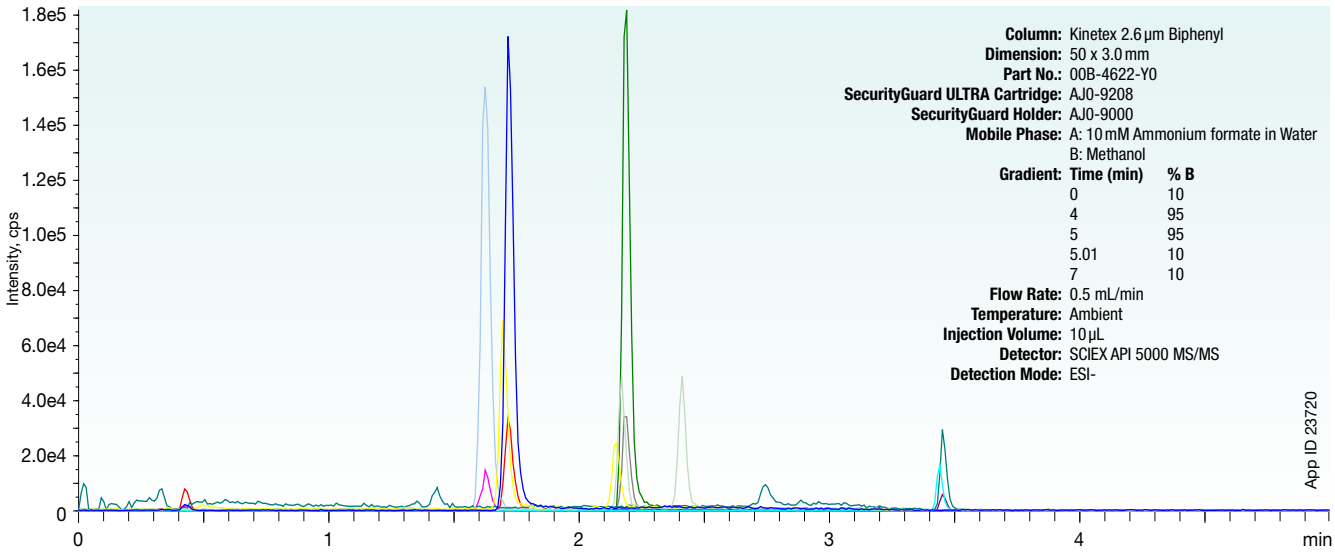
Method Recommendation

Representative TIC of ESI+ for Comprehensive Drug Research Panel



Read complete technical note and view list of analytes by searching TN-0100 on www.phenomenex.com

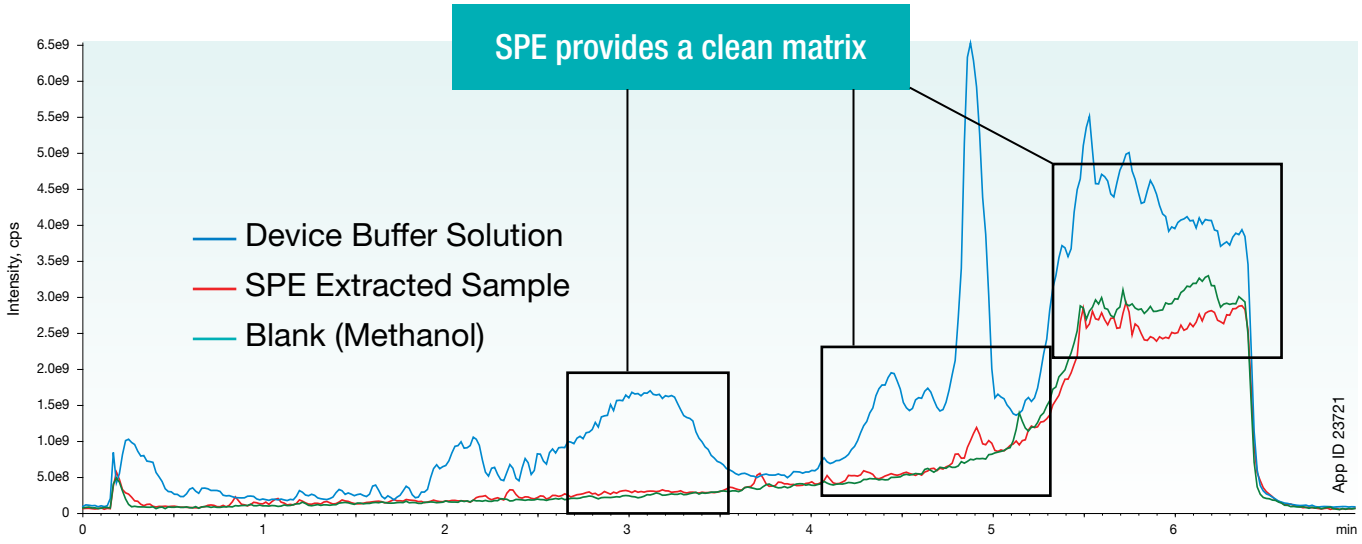
Representative TIC of ESI- for Comprehensive Drug Research Panel



Challenge
Device's Buffer Solution is Dirty

Countermeasure
Sample Preparation

To maintain the integrity of the results, oral fluid collection devices commonly contain a buffer solution that consists of a number of excipients, such as antibacterial agents and surfactants to prolong sample stability. When these interferences are injected onto a mass spec, they can cause ion suppression, decrease the sensitivity of your detector, and result in increased maintenance and downtime. Solid Phase Extraction (SPE) removes buffer matrix components to produce clean extracts with high recovery, decreased MS maintenance, and longer LC column lifetimes.

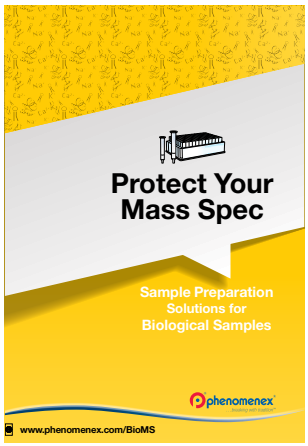


Without the proper sample preparation, the mass spec sensitivity can be decreased and results can become unreliable.

Protect Your MS with Sample Prep

- Save Time, Money and Your Sensitivity
- Improve the Performance of Your Mass Spec
- Reduce Downtime Due to Maintenance

Download at www.phenomenex.com/SP4MS



ORAL FLUID

Challenge

Need Faster Results

Countermeasure

Single Cartridge SPE Solution

A dual cartridge SPE method can take a significant amount of time and may not be necessary if analyzing a smaller panel or individual drug analytes. Simplifying the SPE method to a single cartridge when working with select analytes saves time and reduces cost. Some aspects of cleanliness are compromised by eliminating a secondary organic wash, however, with the Strata®-X-CW chemistry, water washes and a specifically designed elution scheme work to effectively remove indicator dye from solution.

SPE Protocol

96-Well Plate:	Strata-X-CW 33 µm, 30 mg / well
Part No.:	8E-S035-TGB
Condition:	1 mL of Methanol
Equilibrate:	1 mL of DI Water
Load:	1.5 mL Pre-treated sample (See pg. 12)
Wash 1:	1 mL 1 % Formic acid in DI Water
Wash 2:	1 mL DI Water
Dry:	5 to 10 minutes at max vacuum (or positive pressure)
Elute:	2x 500 µL Methylene chloride/Isopropanol/30 % Ammonium hydroxide (80:18:2)
Dry down:	Evaporate eluate to dryness @ 45-50 °C under a gentle stream of Nitrogen
Reconstitute:	200 µL of mobile phase A (0.1 % Formic acid in Water)

Analyte	% Recovery
6-MAM	79
α-Hydroxyalprazolam	88
Alprazolam	79
Amphetamine	94
Benzoylecgonine	89
Carisoprodol	95
Citalopram	81
Cocaine	84
Codeine	89
Diazepam	74
EDDP	72
Fentanyl	74
Hydrocodone	102
Hydromorphone	98
Meperidine	84
Mephedrone	84
Meprobamate	92
Methamphetamines	81
Naloxone	83
Norbuprenorphine	87
Nordiazepam	75
Norfentanyl	85
Norhydrocodone	89
Noroxycodone	85
Oxycodone	84
PCP	84
Phenobarbital	83
Secobarbital	82
Tapentadol	83
Temazepam	86
Tramadol	87

Develop a SPE method in less than 1 minute and request a FREE sample

www.phenomenex.com/mdtool

ORAL FLUID

Challenge

Low Detection Limits Required

Countermeasure

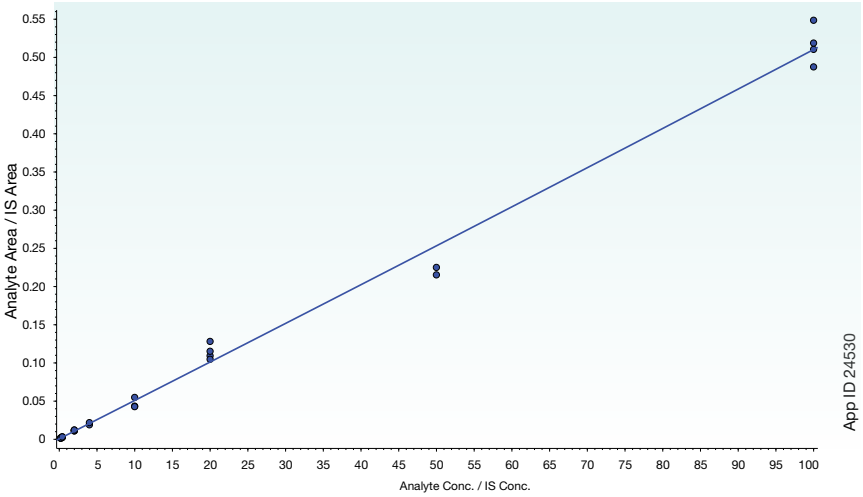
Sample Preparation

SPE can be used to concentrate samples, as well as to switch solvents and clean-up the matrix, which makes it ideal for determining accurate results at low detection levels. The precision and accuracy data below displays that all three QC levels of cocaine and its metabolites are comparable to acceptable industry standards.

SPE Protocol

96-Well Plate:	Strata®-X-C, 30 mg/well
Part No.:	8E-S029-TGB
Condition:	1 mL of Methanol
Equilibrate:	1 mL of DI Water
Load:	Combine 0.5 mL of pre-treated sample (See pg. 12) spiked with internal standards and 1 mL 1 % Formic acid in Water. Mix/vortex for 10-15 seconds and load onto Strata-X-C plate.
Wash 1:	1 mL DI Water
Wash 2:	1mL Acetone/Water (50:50)
Dry down:	5 minutes at maximum vacuum (15" Hg or higher)
Elute:	2x 500 µL Methanol/ Acetonitrile/30 % Ammonium hydroxide (5:5:2)
Dry down:	Evaporate to dryness under a gentle stream of Nitrogen at 45-50 °C
Reconstitute:	200 µL of initial mobile phase

Calibration Curve of Cocaine (0.2-100 ng/mL); R=0.9957



Precision, Accuracy, Linearity, and % CV

Analyte	R^2 (Linearity curve)	% Accuracy Low QC	% CV	% Accuracy Mid QC	% CV	% Accuracy High QC	% CV
Cocaine	0.9971	106.5	14.1	106.7	5.3	84.5	9.8
Norcocaine	0.9975	108.4	12.9	99.4	5.4	87	3
Benzoylecgonine	0.9956	115.2	7.3	110.4	7.7	94.6	1.5
Cocaethylene	0.9971	115.5	10.4	118.3	3.2	87.8	14.1
Levamisole	0.9971	111.2	7	94.2	6.5	86.1	2.7
Lidocaine	0.995	115	10.2	102.5	15	86.8	14.4
Procaine	0.9952	119.1	10.8	106.6	15.7	97.6	10.3
Benzocaine	0.9978	101.9	11.25	103.7	6.4	95.6	6.8

Low QC = 4 ng/mL for all analytes (0.8 ng/mL for cocaine, procaine and lidocaine)
Mid QC = 40 ng/mL (8 ng/mL for cocaine, procaine and lidocaine)
High QC = 150 ng/mL (30 ng/mL for cocaine, procaine and lidocaine)

Challenge

Low Detection Limits Required

Countermeasure

Sample Preparation

Using SPE combined with core-shell technology, it is possible to detect THC and its metabolites at the 2 ppb level, which is lower than the Substance Abuse and Mental Health Services Administration (SAMHSA) cutoff (15 ppb). The Coefficients of Variation (CV) were found to range from 3-15 % and accuracies were between 80 and 99 % for quality control samples.

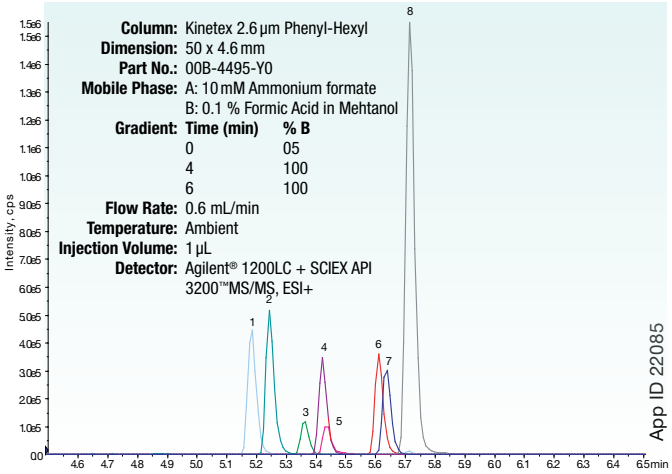
Sample Pre-treatment

Dilute 500 µL oral fluid spiked with analyte mix with 1 mL Acetonitrile/100 mM Sodium acetate buffer, pH 5.0 (30:70)

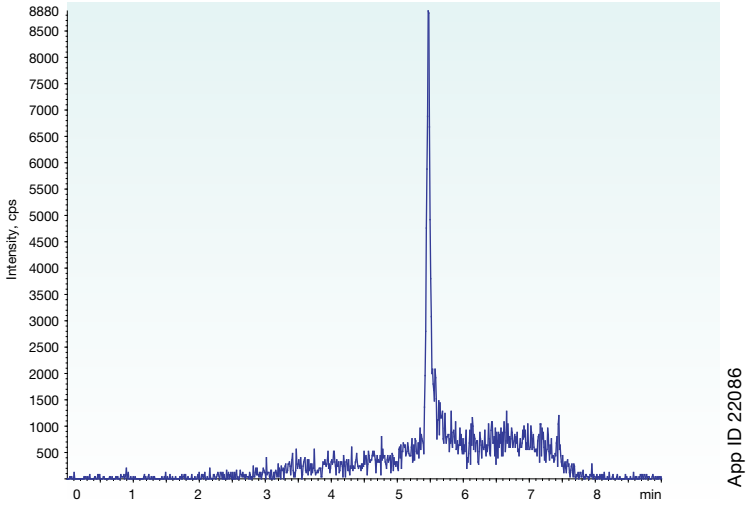
SPE Protocol

Cartridge:	Strata®-X-Drug B 30 mg/ 3 mL
Part No.:	8B-S128-TBJ
Condition:	1 mL of Methanol
Equilibrate:	1 mL Acetonitrile/100 mM Sodium acetate buffer (pH 5.0) (30:70)
Load:	Pre-treated sample
Wash 1:	1 mL 100 mM Sodium acetate buffer (pH 5.0)
Wash 2:	1mL Acetonitrile/100 mM Sodium acetate buffer (pH 5.0) (30:70)
Dry:	5 min under vacuum at 10 of Hg
Elute:	2x 0.5 mL Ethyl acetate/Isopropanol (85:15)
Dry down:	Evaporate under a gentle stream of Nitrogen at 45 °C for 20 min
Reconstitute:	In 500 µL of mobile phase (A/B, 55:45) spiked with 40 µL of internal standard at 1 µg/mL

THC, Metabolites, and Synthetic Cannabinoids Extracted from Oral Fluid



Low Concentration (2 ppb) of THC and THC-OH from Oral Fluid



Statistical Analysis of Quality Control (QC) Samples at 8 ppb

Analyte	Mean Concentration (ppb)	Standard Deviation	CV (%)	Accuracy (%)
AM694	6.4	0.2	3	80
JWH 018	7.4	0.6	8	92
JWH 018-(5-hp)	7.1	0.8	11	89
JWH 073	6.7	0.6	10	83
JWH 073-(3-hb)	6.9	0.7	10	86
THC	7.1	0.8	11	89
THC-OH	7.1	0.8	11	89
THC-COOH	7.5	0.4	5	93

Ordering Information

Sample Preparation

Ordering Information
Strata-X SPE Tubes

strata-X Polymeric SPE

Tubes	1 mL (100/box)		3 mL (50/box)			6 mL (30/box)		
Phase	30 mg	60 mg	60 mg	200 mg	500 mg	100 mg	200 mg	500 mg
Strata-X	8B-S100-TAK	8B-S100-UAK	8B-S100-UBJ	8B-S100-FBJ	8B-S100-HBJ	8B-S100-ECH	8B-S100-FCH	8B-S100-HCH
Strata-X-C	8B-S029-TAK	—	8B-S029-UBJ	8B-S029-FBJ	8B-S029-HBJ	8B-S029-ECH	8B-S029-FCH	8B-S029-HCH
Strata-X-CW	8B-S035-TAK	—	8B-S035-UBJ	8B-S035-FBJ	8B-S035-HBJ	8B-S035-ECH	8B-S035-FCH	8B-S035-HCH
Strata-X-A	8B-S123-TAK	—	8B-S123-UBJ	8B-S123-FBJ	8B-S123-HBJ	8B-S123-ECH	8B-S123-FCH	8B-S123-HCH
Strata-X-AW	8B-S038-TAK	—	8B-S038-UBJ	8B-S038-FBJ	8B-S038-HBJ	8B-S038-ECH	8B-S038-FCH	8B-S038-HCH
Strata-XL	8B-S043-TAK	—	8B-S043-UBJ	8B-S043-FBJ	8B-S043-HBJ	8B-S043-ECH	8B-S043-FCH	8B-S043-HCH
Strata-XL-C	8B-S044-TAK	—	8B-S044-UBJ	8B-S044-FBJ	8B-S044-HBJ	8B-S044-ECH	8B-S044-FCH	8B-S044-HCH
Strata-XL-CW	8B-S052-TAK	—	8B-S052-UBJ	8B-S052-FBJ	8B-S052-HBJ	8B-S052-ECH	8B-S052-FCH	8B-S052-HCH
Strata-XL-A	8B-S053-TAK	—	8B-S053-UBJ	8B-S053-FBJ	8B-S053-HBJ	8B-S053-ECH	8B-S053-FCH	8B-S053-HCH
Strata-XL-AW	8B-S051-TAK	—	8B-S051-UBJ	8B-S051-FBJ	8B-S051-HBJ	8B-S051-ECH	8B-S051-FCH	8B-S051-HCH

Strata-X SPE 96-Well Plates

96-Well Plates (2/Box)			
Phase	10 mg	30 mg	60 mg
Strata-X-AW	8E-S038-AGB	8E-S038-TGB	8E-S038-UGB
Strata-X-A	8E-S123-AGB	8E-S123-TGB	8E-S123-UGB
Strata-X	8E-S100-AGB	8E-S100-TGB	8E-S100-UGB
Strata-X-C	8E-S029-AGB	8E-S029-TGB	8E-S029-UGB
Strata-X-CW	8E-S035-AGB	8E-S035-TGB	8E-S035-UGB
Strata-XL-AW	–	8E-S051-TGB	–
Strata-XL-A	–	8E-S053-TGB	–
Strata-XL	–	8E-S043-TGB	–
Strata-XL-C	–	8E-S044-TGB	–
Strata-XL-CW	–	8E-S052-TGB	–

Strata-X Microelution SPE Plates

96-Well Plates (ea)	
Phase	2 mg / well
Strata-AW	8M-S038-4GA
Strata-A	8M-S123-4GA
Strata-X	8M-S100-4GA
Strata-X-C	8M-S029-4GA
Strata-X-CW	8M-S035-4GA

novum™ simplified liquid extraction

Novum SLE 96-Well Plates

Novum SLE Well Plates		
Part No.	Description	Unit
8E-S138-FGA	Novum SLE MINI 96-Well Plate	1/pk
8E-S138-5GA	Novum SLE MAX 96-Well Plate	1/pk

Novum SLE Tubes

Novum Simplified Liquid Extraction (SLE) Tubes		
Part No.	Description	Unit
8B-S138-FAK	Novum SLE 1 cc Tubes	100/pk
8B-S138-5BJ	Novum SLE 3 cc Tubes	50/pk
8B-S138-JCH	Novum SLE 6 cc Tubes	30/pk
8B-S138-KDG	Novum SLE 12 cc Tubes	20/pk

Don't forget your accessories!

Square Well Collection Plates (polypropylene)

Part No.	Well Bottom	Well Volume	Unit	Sealing Mats
AH0-7192	Conical	350 µL	50/pk	AH0-8597 AH0-8598 AH0-8199 AH0-7195
AH0-7193	Conical	1 mL	50/pk	AH0-8597 AH0-8598 AH0-8199 AH0-7195
AH0-7194	Conical	2 mL	50/pk	AH0-8597 AH0-8598 AH0-8199 AH0-7195
AH0-8635	Round-Conical	2 mL	50/pk	AH0-8597 AH0-8598 AH0-8199 AH0-7195

Vacuum Manifold

Vacuum Manfolds		
Part No.	Description	Unit
AH0-6023	12-Position Vacuum Manifold Set	ea
AH0-6024	24-Position Vacuum Manifold Set	ea
AH0-8950	96-Well Plate Manifold, Universal with Vacuum Gauge	ea

Round Well Collection Plates (polypropylene)

Part No.	Well Bottom	Well Volume	Unit	Sealing Mats
AH0-7279	Round	1 mL	50/pk	AH0-8631 AH0-8632
AH0-8636	Round	2 mL	50/pk	AH0-8633 AH0-8634

Round Well Sealing Mats

Part No.	Description	Material	Unit
AH0-8631	Pierceable, 7 mm diameter	Silicone	50/pk
AH0-8632	Pre-Slit, 7 mm diameter	Silicone	50/pk
AH0-8633	Pierceable, 8 mm diameter	Silicone	50/pk
AH0-8634	Pre-Slit, 8 mm diameter	Silicone	50/pk
AH0-7362	Sealing Tap Pad	—	10/pk

Square Well Sealing Mats

Part No.	Description	Material	Unit
AH0-8597	Pierceable	Silicone	50/pk
AH0-8598	Pre-Slit	Silicone	50/pk
AH0-8199	Pierceable	Santoprene™	100/pk
AH0-7195	Pierceable	Ethylene Vinyl Acetate (EVA)	50/pk
AH0-7362	Sealing Tap Pad	—	10/pk

Ordering Information

Liquid Chromatography

Kinetex

KINETEX® Core-Shell Technology

2.6 µm Minibore Columns (mm)						SecurityGuard™ ULTRA Cartridges‡
Phases	30 x 2.1	50 x 2.1	75 x 2.1	100 x 2.1	150 x 2.1	3/pk
EVO C18	00A-4725-AN	00B-4725-AN	—	00D-4725-AN	00F-4725-AN	AJ0-9298
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
C8	00A-4497-AN	00B-4497-AN	00C-4497-AN	00D-4497-AN	00F-4497-AN	AJ0-8784
HILIC	00A-4461-AN	00B-4461-AN	00C-4461-AN	00D-4461-AN	00F-4461-AN	AJ0-8786
Phenyl-Hexyl	00A-4495-AN	00B-4495-AN	00C-4495-AN	00D-4495-AN	00F-4495-AN	AJ0-8788
						for 2.1 mm ID

2.6 µm MidBore™ Columns (mm)						SecurityGuard ULTRA Cartridges‡
Phases	30 x 3.0	50 x 3.0	75 x 3.0	100 x 3.0	150 x 3.0	3/pk
EVO C18	—	00B-4725-Y0	—	00D-4725-Y0	00F-4725-Y0	AJ0-9297
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
C8	00A-4497-Y0	00B-4497-Y0	00C-4497-Y0	00D-4497-Y0	00F-4497-Y0	AJ0-8777
HILIC	00A-4461-Y0	—	—	—	00F-4461-Y0	AJ0-8779
Phenyl-Hexyl	—	00B-4495-Y0	—	00D-4495-Y0	00F-4495-Y0	AJ0-8781
						for 3.0 mm ID

Luna

Luna 3 µm C18 (2) Cartridge (mm)
20 x 2.0
00M-4251-B0-CE

MercuryMS™ Holder	
Part No.	Description
CH0-5845	20 mm standard holder

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
C18	00B-4742-A0	00D-4742-A0	00F-4742-A0

explore LUNA®

1.6 µm Minibore Columns (mm)					SecurityGuard ULTRA Cartridges‡
Phases	30 x 2.1	50 x 2.1	100 x 2.1	150 x 2.1	3/pk
Polar C18	00A-4748-AN	00B-4748-AN	00D-4748-AN	00F-4748-AN	AJ0-9505
PS C18	00A-4752-AN	00B-4752-AN	00D-4752-AN	00F-4752-AN	AJ0-9508
C18	00A-4742-AN	00B-4742-AN	00D-4742-AN	00F-4742-AN	AJ0-9502
					for 2.1 mm ID

3 µm Minibore and MidBore™ Columns (mm)								SecurityGuard Cartridges (mm)
Phases	30 x 2.1	50 x 2.1	100 x 2.1	150 x 2.1	50 x 3.0	100 x 3.0	150 x 3.0	4 x 2.0*
								/10 pk
Polar C18	00A-4760-AN	00B-4760-AN	00D-4760-AN	00F-4760-AN	00B-4760-Y0	00D-4760-Y0	00F-4760-Y0	AJ0-7600
PS C18	00A-4758-AN	00B-4758-AN	00D-4758-AN	00F-4758-AN	00B-4758-Y0	00D-4758-Y0	00F-4758-Y0	AJ0-7605
								for ID: 2.0-3.0 mm

3 µm Analytical Columns (mm)					SecurityGuard Cartridges (mm)
Phases	50 x 4.6	100 x 4.6	150 x 4.6	250 x 4.6	4 x 3.0*
					/10 pk
Polar C18	00B-4760-E0	00D-4760-E0	00F-4760-E0	00G-4760-E0	AJ0-7601
PS C18	00B-4758-E0	00D-4758-E0	00F-4758-E0	00G-4758-E0	AJ0-7606
					for ID: 3.2-8.0 mm

‡SecurityGuard ULTRA Cartridges require holder, Part No.: AJ0-9000

guarantee

If Phenomenex products in this brochure do not provide at least an equivalent separation as compared to other products of the same phase and dimensions, return the product with your comparative data within 45 days for a FULL REFUND.

The Alternative Matrix Guide

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

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

Belgium
t: +32 (0)2 503 4015 (French)
t: +32 (0)2 511 8666 (Dutch)
beinfo@phenomenex.com

Canada
t: +1 (800) 543-3681
info@phenomenex.com

China
t: +86 400-606-8099
cninfo@phenomenex.com

Denmark
t: +45 4824 8048
nordicinfo@phenomenex.com

Finland
t: +358 (0)9 4789 0063
nordicinfo@phenomenex.com

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

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

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

Ireland
t: +353 (0)1 247 5405
eireinfo@phenomenex.com

Italy
t: +39 051 6327511
italiainfo@phenomenex.com

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

Mexico
t: 01-800-844-5226
tecnicomx@phenomenex.com

The Netherlands
t: +31 (0)30-2418700
nlinfo@phenomenex.com

New Zealand
t: +64 (0)9-4780951
nzinfo@phenomenex.com

Norway
t: +47 810 02 005
nordicinfo@phenomenex.com

Portugal
t: +351 221 450 488
ptinfo@phenomenex.com

Singapore
t: +65 800-852-3944
sginfo@phenomenex.com

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

Sweden
t: +46 (0)8 611 6950
nordicinfo@phenomenex.com

Switzerland
t: +41 61 692 20 20
swissinfo@phenomenex.com

United Kingdom
t: +44 (0)1625-501367
ukinfo@phenomenex.com

USA
t: +1 (310) 212-0555
info@phenomenex.com

All other countries
Corporate Office USA
t: +1 (310) 212-0555
info@phenomenex.com

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