SELECTRA® DA HPLC COLUMNS

INNOVATION THROUGH CHEMISTRY

SELECTRA®DA HPLC COLUMNS

Benefits:

- Unique polyaromatic stationary phase
- Excellent selectivity for a wide range of compounds including:

Therapeutic drugs	Pesticides
Drugs of abuse	Mycotoxins
Drug metabolites	

- Alternative selectivity versus C18 for aromatic compounds.
- Ability to retain compounds that can be difficult on C18.
- Can retain compounds based on pi-pi interactions.
- Available in 1.8, 3 µm and 5 µm spherical particle sizes.
- Significant selectivity changes with choice of acetonitrile or methanol as the organic solvent.
- Conforms to USP L11

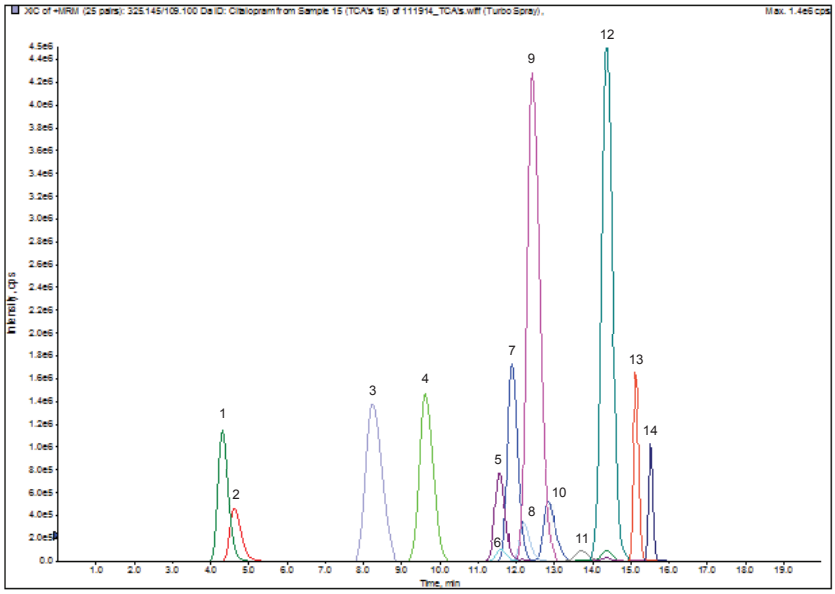
The Selectra® DA column can show substantial increases in retention; especially for dipolar, unsaturated, or conjugated analytes. This phase is ideal for increasing sensitivity and selectivity in LC/MS analyses.

The unique chemistry of the Selectra® DA stationary phase provides similar hydrophobic type interactions as a traditional C18 (alkyl phase), but also offers a high degree of retention and selectivity for aromatic compounds.

SELECTRA® DA HPLC Columns		
Dimensions	**Particle Size**	**Part Numbers**
50 x 2.1 mm	1.8 µm	SLDA50ID21-18UM
100 x 2.1 mm	1.8 µm	SLDA100ID21-18UM
50 x 4.6 mm	1.8 µm	SLDA50ID46-18UM
100 x 4.6 mm	1.8 µm	SLDA100ID46-18UM
10 x 2.1 mm guard (sold as a 2 pack)	1.8 µm	SLDAGDC20-18UM
10 x 4.6 mm guard (sold as a 2 pack)	1.8 µm	SLDAGDC46-18UM
50 x 2.1 mm	3 µm	SLDA50ID21-3UM
100 x 2.1 mm	3 µm	SLDA100ID21-3UM
50 x 4.6 mm	3 µm	SLDA50ID46-3UM
100 x 4.6 mm	3 µm	SLDA100ID46-3UM
10 x 2.1 mm guard (sold as a 2 pack)	3 µm	SLDAGDC21-3UM
10 x 4.6 mm guard (sold as a 2 pack)	3 µm	SLDAGDC46-3UM
50 x 2.1 mm	5 µm	SLDA50ID21-5UM
100 x 2.1 mm	5 µm	SLDA100ID21-5UM
50 x 4.6 mm	5 µm	SLDA50ID46-5UM
100 x 4.6 mm	5 µm	SLDA100ID46-5UM
150 x 4.6 mm	5 µm	SLDA150ID46-5UM
250 x 4.6 mm	5 µm	SLDA250ID46-5UM
10 x 2.1 mm guard (sold as a 2 pack)	5 µm	SLDAGDC21-5UM
10 x 4.6 mm guard (sold as a 2 pack)	5 µm	SLDAGDC46-5UM

HPLC Guard Holder	
HPLC Guard Cartridge Holder	SLGRDHLDR
UHPLC Guard Cartridge Holder	SLGRDHLDR-HP
Replacement Peek Tip for Holder	SLGRDHLDR-TIP (2/pk)

14 Tricyclic Antidepressants



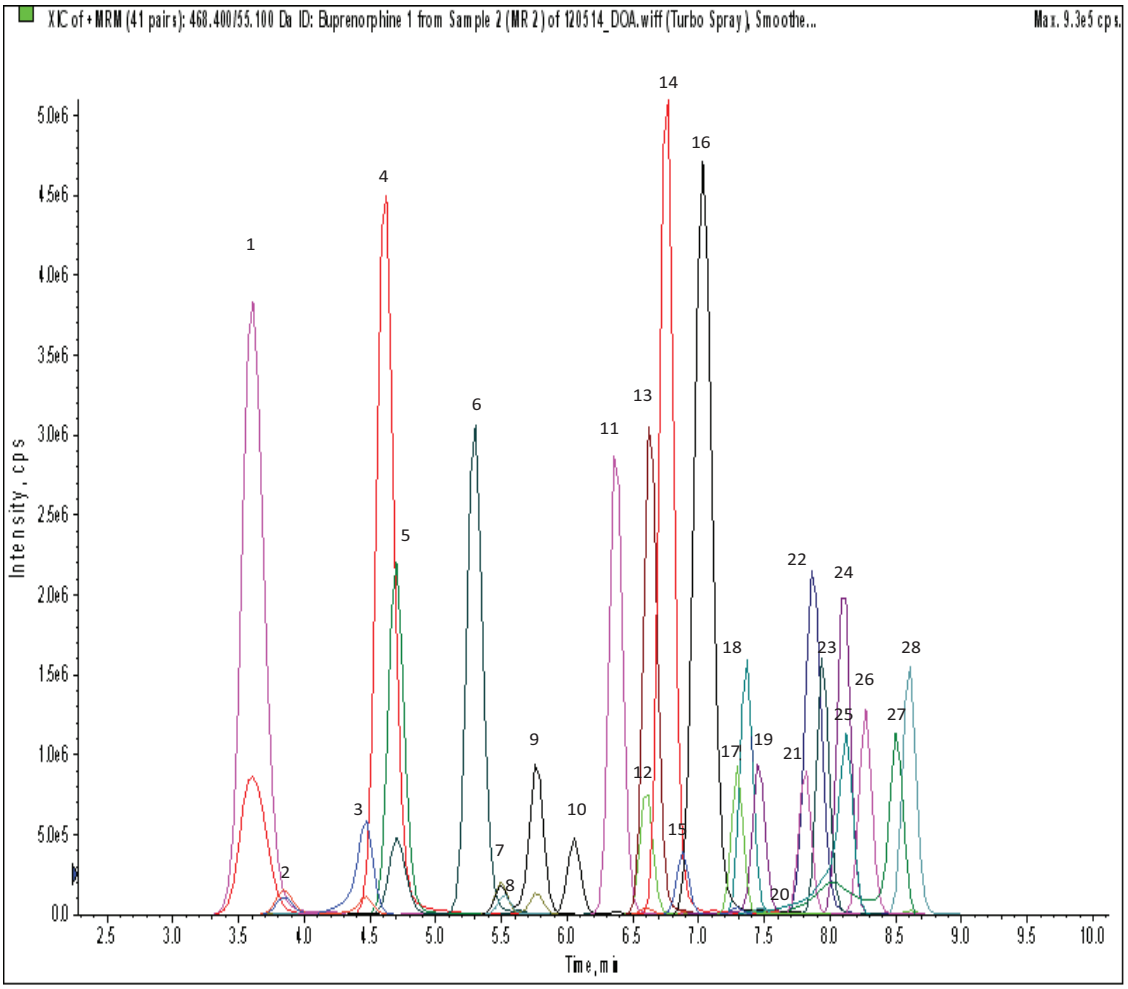
HPLC Conditions

Instrument: Agilent 1200 Binary Pump SL
Detector: AB Sciex API 4000 Qtrap MS/MS
HPLC Column: Selectra® DA, 100 x 2.1 mm, 3 µm
(p/n: SLDA100ID21-3UM)
Ionization mode: ESI+
Reconstitute: 100 µL
Flow Rate: 0.3 mL/minute
Injection Volume: 5 µL
Mobile Phase A: 0.1% formic acid in water
Mobile Phase B: 0.1% formic acid in MeOH
Gradient:

Time	%A	%B
0.0	60	40
5.00	60	40
6.00	50	50
10.00	50	50
13.00	0	100
16.00	0	100
16.20	60	40
20.00	STOP	

Analyte		Relative Retention Time (minutes)	MRM Transitions	
			Q1	Q3
1.	Venlafaxine	4.31	278.2	58.2
2.	Mirtazepine	4.61	266.1	72.1
3.	Citalopram	8.24	325.1	109.1
4.	Trazadone	9.61	372.1	176.1
5.	Dothepin	11.56	296.1	225.1
6.	Duloxetine	11.60	297.1	203.1
7.	Nortriptyline	11.88	264.1	190.9
8.	Maprotiline	12.23	278.4	250.3
9.	Imipramine	12.41	280.9	85.9
10.	Protriptyline	12.84	264.1	91.2
11.	Amitriptyline	13.71	278.2	105.1
12.	Trimipramine	14.38	295.1	100.2
13.	Sertraline	15.13	306.1	275.1
14.	Ariprazole	15.52	448.1	285.2

Drugs of Abuse Panel



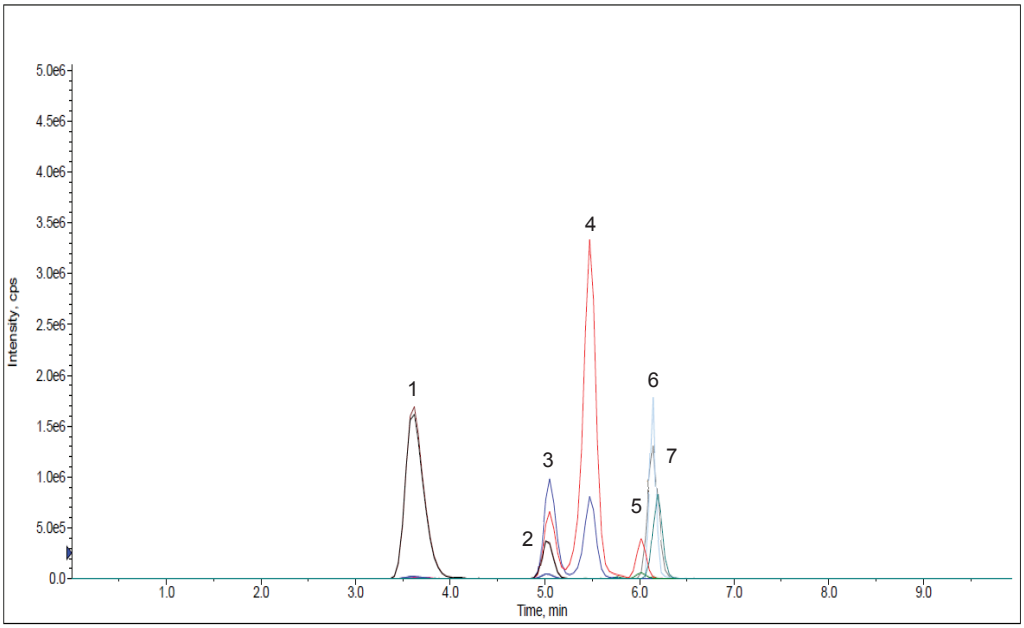
HPLC Conditions

Instrument: Agilent 1200 Binary Pump SL
Detector: AB Sciex API 4000 Qtrap MS/MS
HPLC Column: Selectra® DA, 100 x 2.1 mm, 3 µm (p/n: SLDA100ID21-3UM)
Ionization mode: ESI+
Injection Volume: 10 µL
Flow Rate: 0.4 mL / minute
Mobile Phase A: 0.1% formic acid in water
Mobile Phase B: 0.1% formic acid in MeOH
Gradient:

Time	%A	%B
0.0	40	60
8.00	40	60
8.01	5	95
9.01	5	95
9.50	40	60
13.00	STOP	

Analyte		Relative Retention Time (minutes)	MRM Transitions	
			Q1	Q3
1.	Amphetamine	3.59	136.1	91.2
2.	Morphine	3.84	286.0	152.0
3.	Hydromorphone	4.47	286.0	185.0
4.	Methamphetamine	4.61	150.1	91.2
5.	MDA	4.69	180.2	105.0
6.	MDMA	5.28	194.2	105.1
7.	Codeine	5.49	300.0	152.0
8.	6-MAM	5.53	328.0	165.1
9.	Hydrocodone	5.76	300.0	199.0
10.	Norketamine	6.05	224.0	207.0
11.	Ketamine	6.36	238.1	125.0
12.	7-Aminoclonazepam	6.60	286.0	222.3
13.	Benzoylecgonine	6.63	290.1	168.0
14.	Cocaine	6.75	304.1	182.0
15.	Norbuprenorphine	6.88	414.2	83.1
16	Cocaethylene	7.01	318.2	196.0
17.	Buprenorphine	7.29	468.4	55.1
18.	PCP	7.36	244.0	159.0
19.	Midazolam	7.45	326.0	291.0
20.	Alpha-hydroxymidazolam	7.57	342.0	324.0
21.	Lorazepam	7.81	321.0	303.3
22	Oxazepam	7.86	287.0	241.3
23.	Clonazepam	7.94	316.1	270.2
24.	Alpha-hydroxyalprazolam	8.12	325.1	297.1
25.	Nordiazepam	8.10	271.0	140.1
26.	Temazepam	8.27	301.1	255.2
27.	Alprazolam	8.50	309.1	205.3
28.	Diazepam	8.60	285.1	193.2

Free Opiates and Glucuronides's



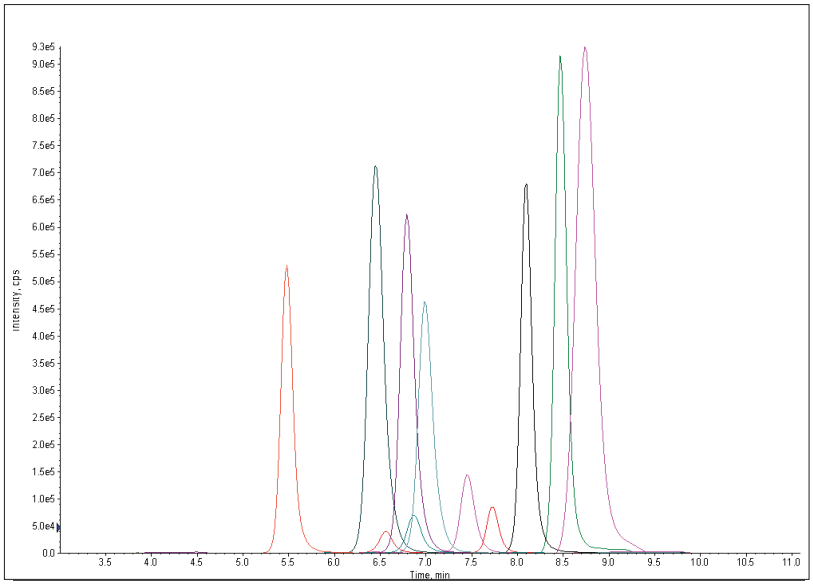
HPLC Conditions

Instrument: Agilent 1200 Binary Pump SL
Detector: API 4000 QTrap MS/MS
HPLC Column: Selectra® DA, 100 x 2.1 mm, 3 µm (p/n: SLDA100ID21-3UM)
Ionization mode: ESI+
Reconstitute: 100 µL
Injection Volume: 10 µL
Flow Rate: 0.3 mL/minute
Mobile Phase A: 0.1% formic acid in water
Mobile Phase B: 0.1% formic acid in MeOH
Gradient:

Time	%A	%B
0.0	90	10
3.0	25	75
7.0	25	75
7.5	90	10
11.00	STOP	

Analyte		Relative Retention Time (minutes)	MRM Transitions	
			Q1	Q3
1.	Morphine-3-Glucuronide	3.89	462.4	286.0
2.	Morphine-6-Glucuronide	5.14	462.4	286.0
3.	Morphine	5.18	286.0	152.0
4.	Hydromorphone	5.56	286.0	185.0
5.	Codeine-6-Glucuronide	6.06	476.0	300.0
6.	Codeine	6.19	300.0	152.0
7.	6-MAM	6.23	328.0	165.1

Spice / Cannabinoid Panel



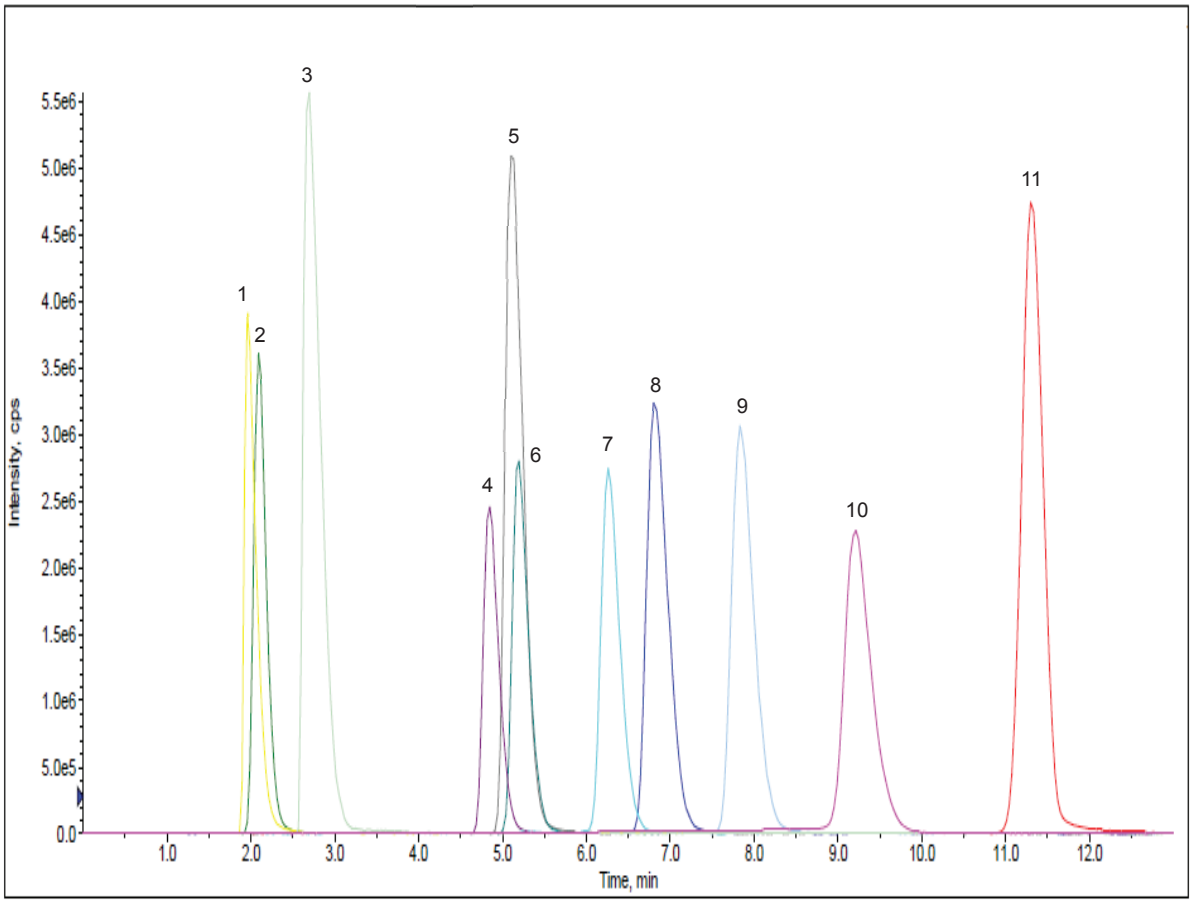
HPLC Conditions

Instrument: Agilent 1200 Series Binary Pump SL
Detector: API 4000 QTRAP MS/MS
Ionization mode: ESI+
HPLC column: Selectra® DA, 100 x 2.1 mm, 3 µm (p/n: SLDA100ID21-3UM)
Guard column: Selectra® DA, 10 x 2.0 mm, 3 µm (p/n: SLDAGDC21-3UM)
Injection volume: 10 µL
Flow rate: 0.3 mL/min
Column temp.: 50°C
Run time: 15 min
Autosampler temp.: 10°C
Mobile Phase A: 0.1% formic acid in water
Mobile Phase B: 0.1% formic acid in MeOH
Gradient:

Time	%A	%B
0	50	50
1	20	80
4	20	80
5	0	100
9.5	0	100
10	50	50
15	50	50

Analyte		MRM Transitions		Relative Retention Time (minutes)
		Q1	Q3	
1.	JWH-200	385.097	154.900	5.48
2.	THC-OH	331.135	313.300	6.45
3.	Cannabidiol	315.142	192.900	6.56
4.	JWH-073 N Butanoic Acid	358.118	155.00	6.79
5.	THC-COOH	345.101	327.100	6.87
6.	JWH-018 N Pentanoic Acid	372.108	154.900	6.99
7.	Cannabinol	311.051	223.000	7.46
8.	THC	315.200	193.000	7.73
9.	JWH-250	336.113	120.800	8.09
10.	JWH-073	328.082	155.000	8.47
11.	JWH-018	342.113	154.900	8.73

Benzodiazepines & Buprenorphine and Norbuprenorphine



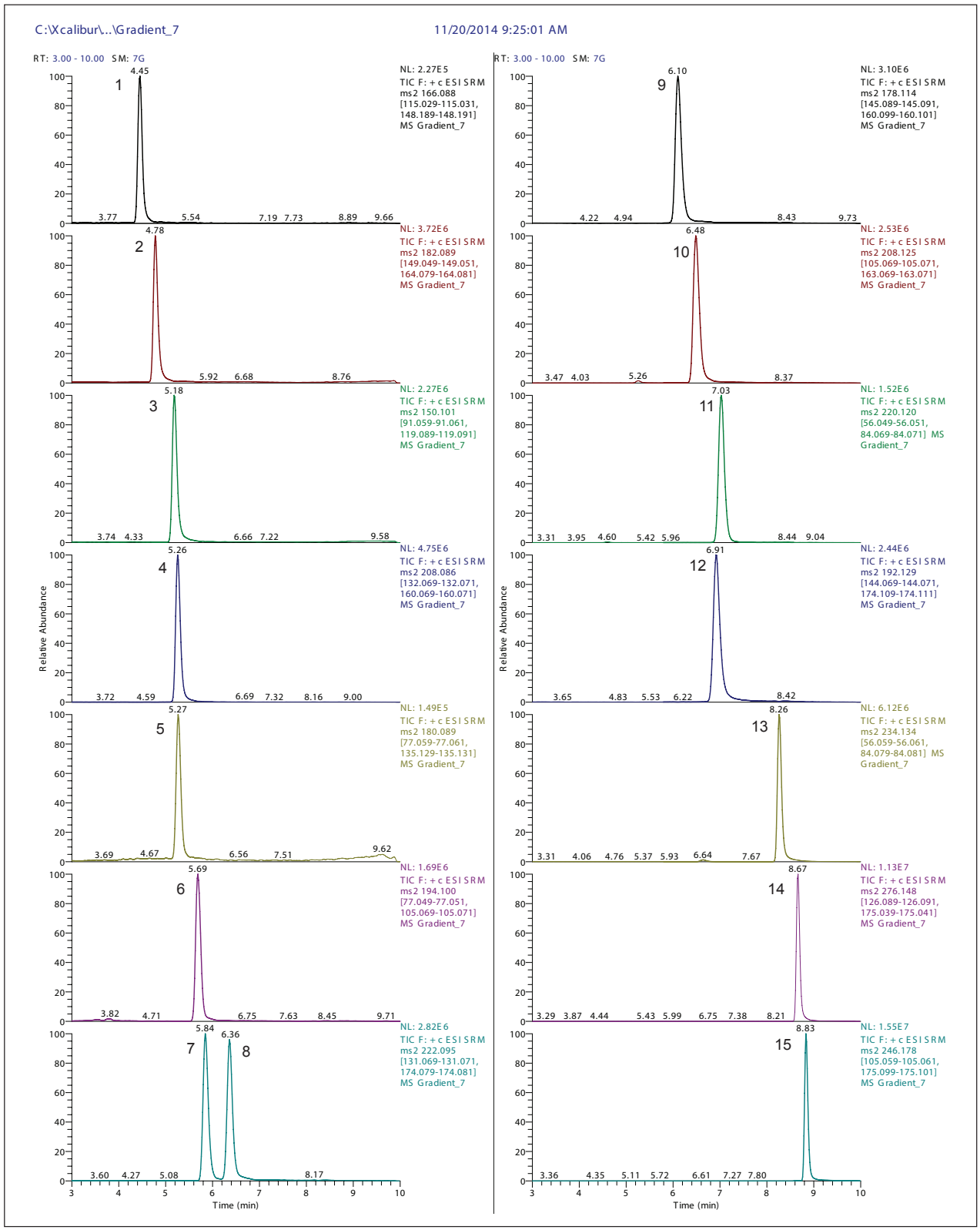
HPLC Conditions

Instrument: Agilent 1200 Binary Pump SL
Detector: AB Sciex API 4000 QTrap MS/MS
HPLC Column: Selectra® DA, 100 x 2.1 mm, 3 µm (p/n: SLDA100ID21-3UM)
Guard Column: Selectra® DA, 10 x 2.0 mm, 3 µm (p/n: SLDAGDC21-3UM)
Ionization mode: ESI+
Reconstitute: 100 µL
Column Temperature: 50 °C
Column Flow Rate: 0.3 mL/min
Injection Volume: 10 µL
Mobile Phase A: 0.1% formic acid in water
Mobile Phase B: 0.1% formic acid in MeOH
Gradient:

Time	%A	%B
0.0	40	60
8.00	40	60
8.01	5	95
9.01	5	95
9.50	40	60
13.00	STOP	

Analyte		MRM Transitions		Relative Retention Time (minutes)
		Q1	Q3	
1.	Norbuprenorphine	1.97	414.2	83.1
2.	7-Aminoclonazepam	2.09	286.0	222.3
3.	Buprenorphine	2.69	468.4	55.1
4.	Lorazepam	4.84	321.0	303.3
5.	Oxazepam	5.12	287.0	241.3
6.	Clonazepam	5.19	316.1	270.2
7.	Alpha-Hydroxy-Alprazolam	6.26	325.1	297.1
8.	Nordiazepam	6.82	271.0	140.1
9.	Temazepam	7.83	301.1	255.2
10.	Alprazolam	9.21	309.1	205.3
11.	Diazepam	11.31	285.1	193.2

Sympathomimetic Amines In Blood, Plasma / Serum, Urine, Or Tissue



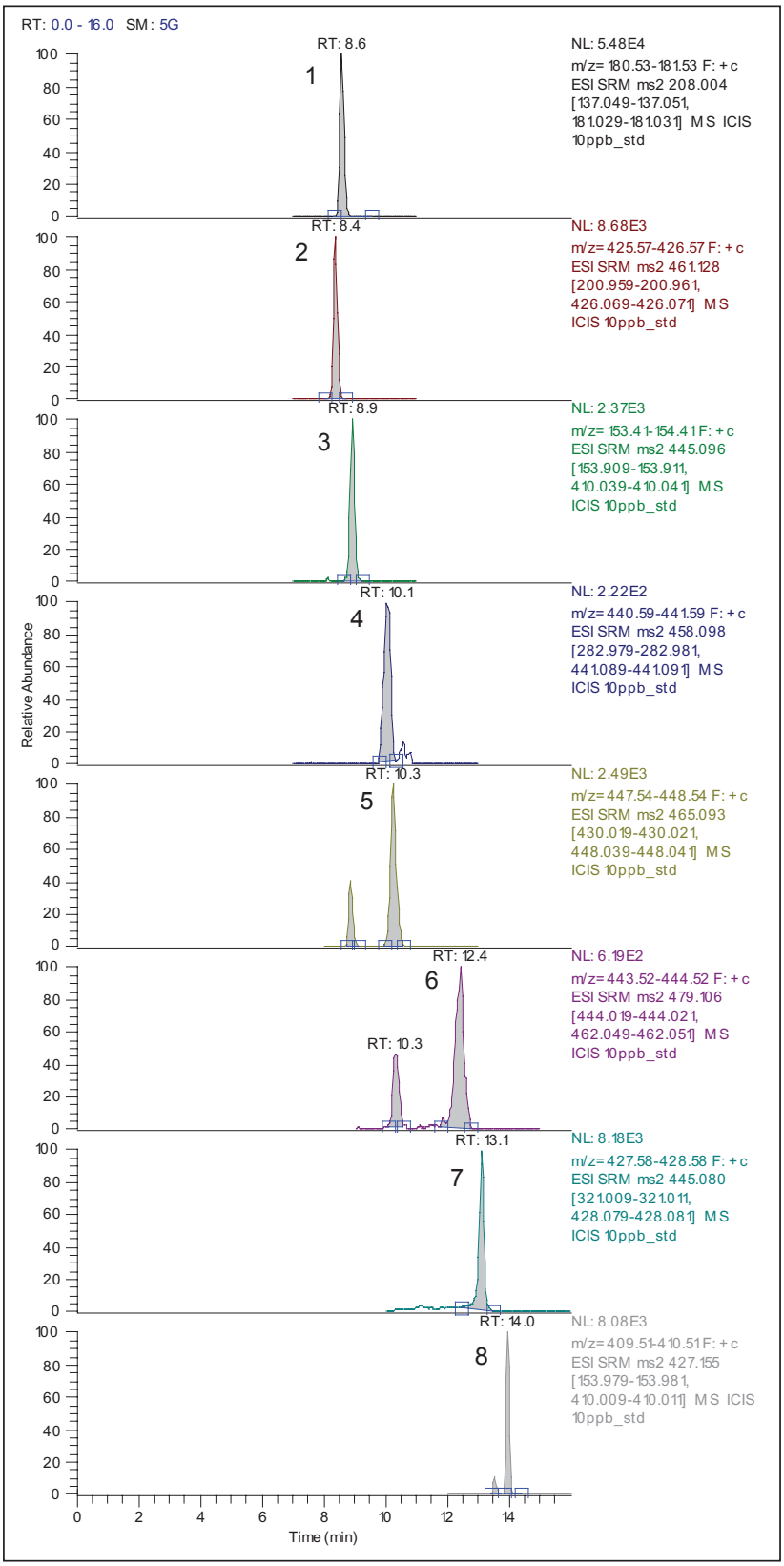
HPLC Conditions

Instrument: Thermo Scientific™ Dionex™ Ultimate™ 3000 LC
Detector: Thermo Scientific™ TSQ Vantage™ tandem mass spectrometer
HPLC Column: Selectra® DA, 100 x 2.1 mm, 3 µm (p/n: SLDA100ID21-3UM)
Ionization mode: ESI+
Reconstitute: 100 µL
Injection Volume: 10 µL
Flow Rate: 0.3 mL/minute
Mobile Phase A: 0.1% formic acid in water
Mobile Phase B: 0.1% formic acid in MeOH
Gradient:

Time	%A	%B
0.0	80	20
0.5	80	20
12.00	10	90
12.01	80	20
14.00	STOP	

Analyte		Relative Retention Time (minutes)	MRM Transitions	
			Q1	Q3
1.	Epedrine	4.45	166.0	115.0
2.	Flephedrone	4.78	182.0	149.0
3.	Methamphetamine	5.18	150.1	91.1
4.	Methylone	5.26	208.0	132.0
5.	MDA	5.27	180.1	77.0
6.	MDMA	5.69	194.1	77.0
7.	Butylone	5.84	222.0	131.0
8.	Ethylone	6.36	222.0	131.0
9.	Mephedrone	6.10	178.1	145.0
10.	MDEA	6.48	208.1	105.0
11.	Methcathinone	6.93	192.1	144.0
12.	Ritalinic Acid	7.03	220.1	56.0
13.	Methylphenidate	8.26	234.1	56.0
14.	MDPV	8.67	276.1	126.0
15.	Pyrovalerone	8.83	246.1	105.0

Tetracycline Antibiotics



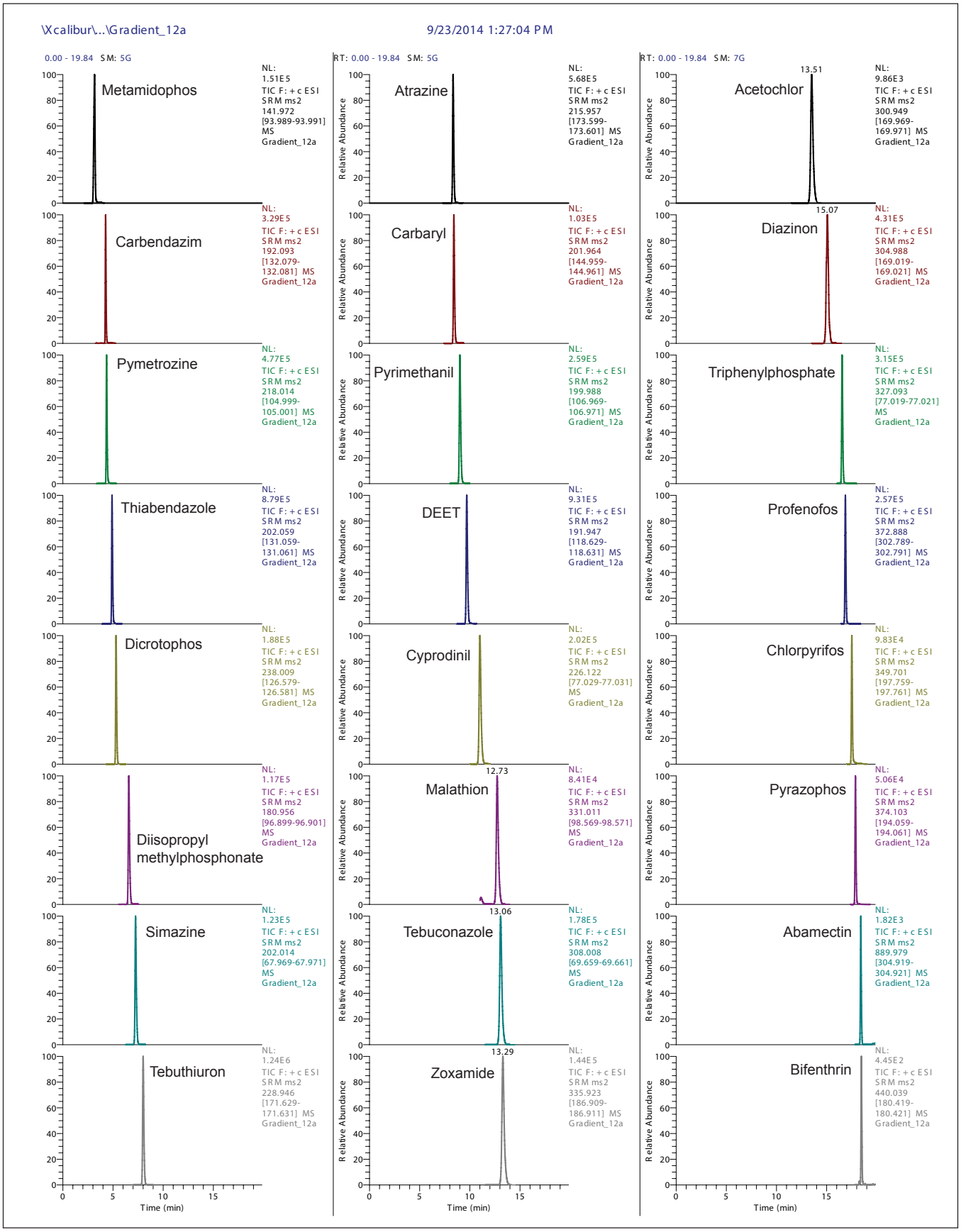
HPLC Conditions

Instrument: Thermo Scientific™ TSQ Vantage™ tandem mass spectrometer
Ionization mode: ESI+
HPLC column: Selectra® DA, 100 x 2.1 mm, 3 µm (p/n: SLDA100ID21-3UM)
Guard cartridge: Selectra® DA, 10 x 2.0 mm, 3 µm (p/n: SLDAGDC21-3UM)
Guard Cartridge Holder: p/n: SLGRDHLDR
Column temp.: 40 °C
Injection volume: 5 µL
Flow rate: 0.3 mL/min
Mobile Phase A: 1mM oxalic acid in water
Mobile Phase B: 1mM oxalic acid in MeOH
Gradient:

Time	%A	%B
0.0	95	5
1.0	95	5
5.0	60	40
10.0	60	40
12.0	0	100
16.0	0	100
16.2	95	5
21.0	95	5

Analyte		Relative Retention Time (minutes)	SRM Transitions		
			Precursor ion	Product ion 1	Product ion 2
1.	Thiabendazole-13C6 (I.S.)	8.6	208.00	137.05	181.03
2.	Oxytetracycline	8.4	461.13	426.07	200.96
3.	Tetracycline	9.0	445.10	410.04	153.91
4.	Minocycline	10.0	458.10	441.09	282.98
5.	Demeclocycline	10.3	465.10	448.04	430.02
6.	Chlortetracycline	12.5	479.10	462.05	444.02
7.	Doxycycline	13.2	445.08	428.08	321.01
8.	Anydrotetracycline	14.0	427.15	410.01	153.98

24 Pesticides

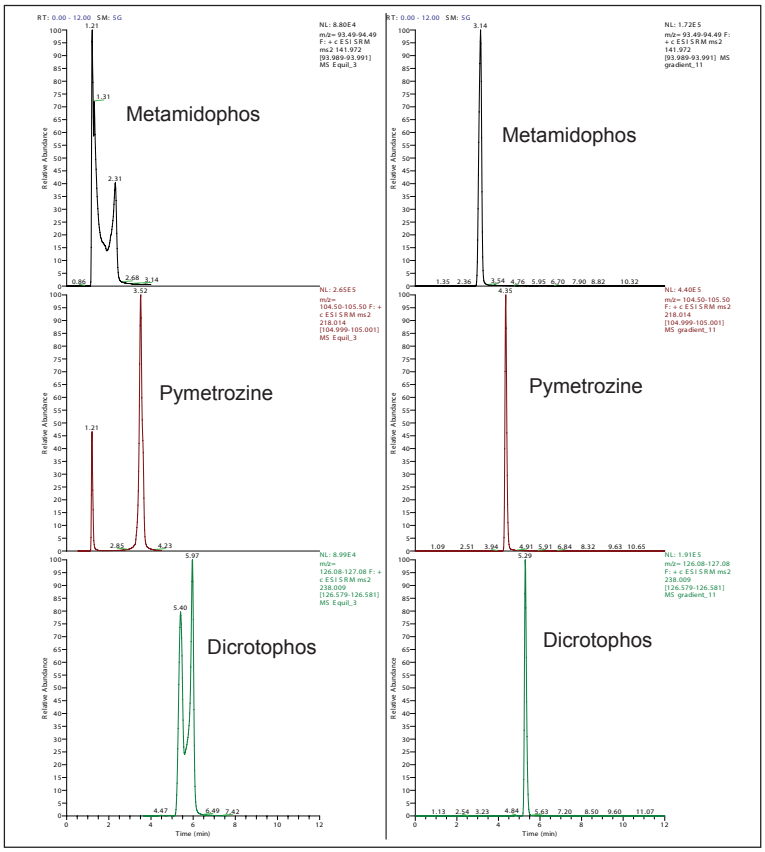


HPLC Conditions

Instrument: Thermo Scientific™ Dionex™ Ultimate™ 3000 LC system
MS Detector: Thermo Scientific TSQ Vantage tandem mass spectrometer (ESI mode)
HPLC column: Selectra® DA, 100 × 2.1 mm, 3 µm (p/n: SLDA100ID21-3UM)
Guard column: Selectra® DA, 10 × 2.0 mm, 3 µm (p/n: SLDAGDC21-3UM)
Guard column holder: p/n: SLDGRDHLDR
Sample solution: 100 ng/mL in MeOH
Column temp.: 40 °C
Flow rate: 0.3 mL/min
Injection volume: 5 µL
Mobile Phase A: 0.1% formic acid in water
Mobile Phase B: 0.1% formic acid in MeOH
Gradient:

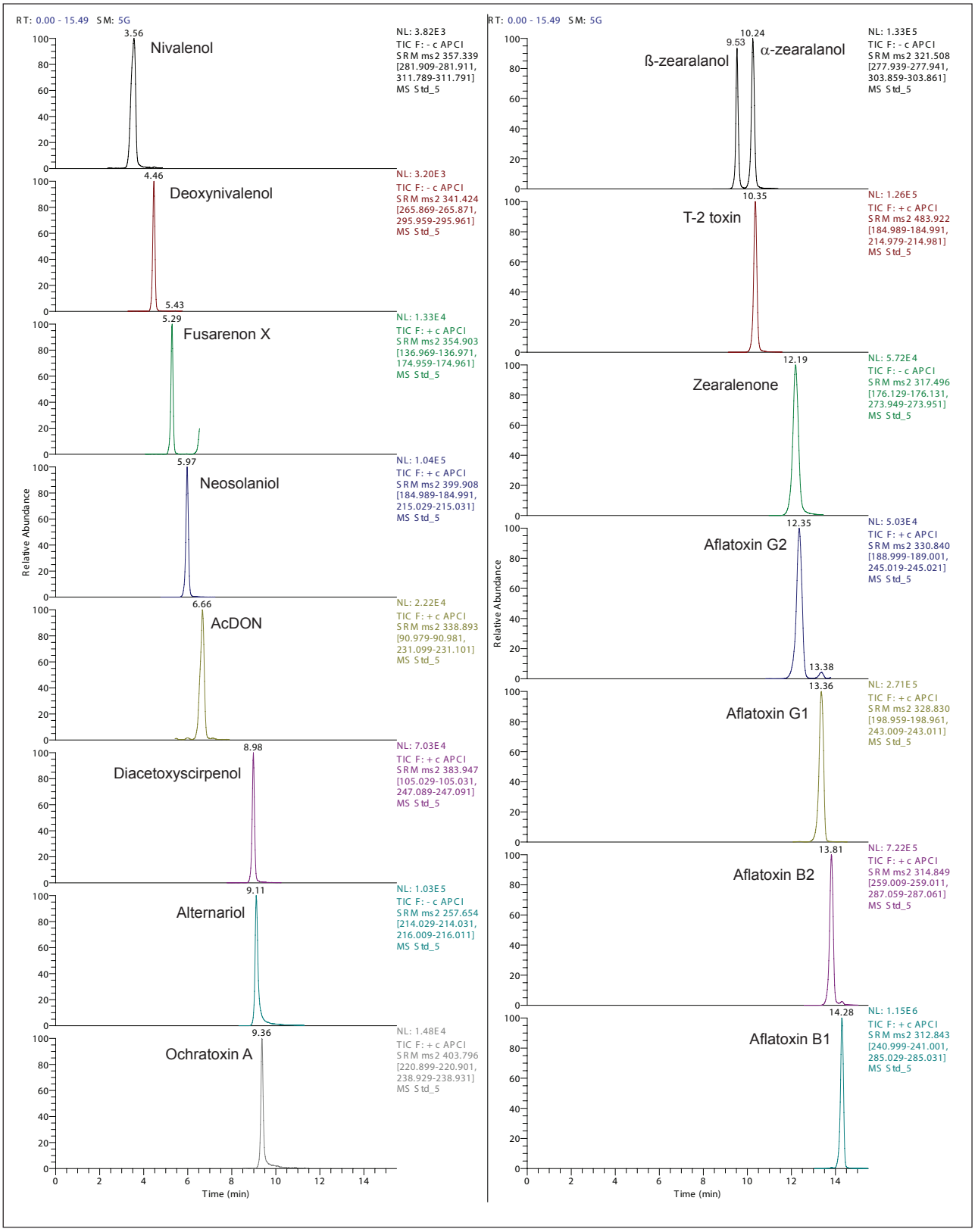
Time	%A	%B
0.0	98	2
1.0	50	50
4.0	50	50
6.0	65	65
11.0	40	60
16.0	0	100
20.0	0	100
20.2	98	2
25.0	98	2

Comparison: Selectra® DA vs a C18 column for problematic pesticides:



C18 Column **Selectra® DA Column**

Mycotoxin Residues in Grains by LC-MS/MS



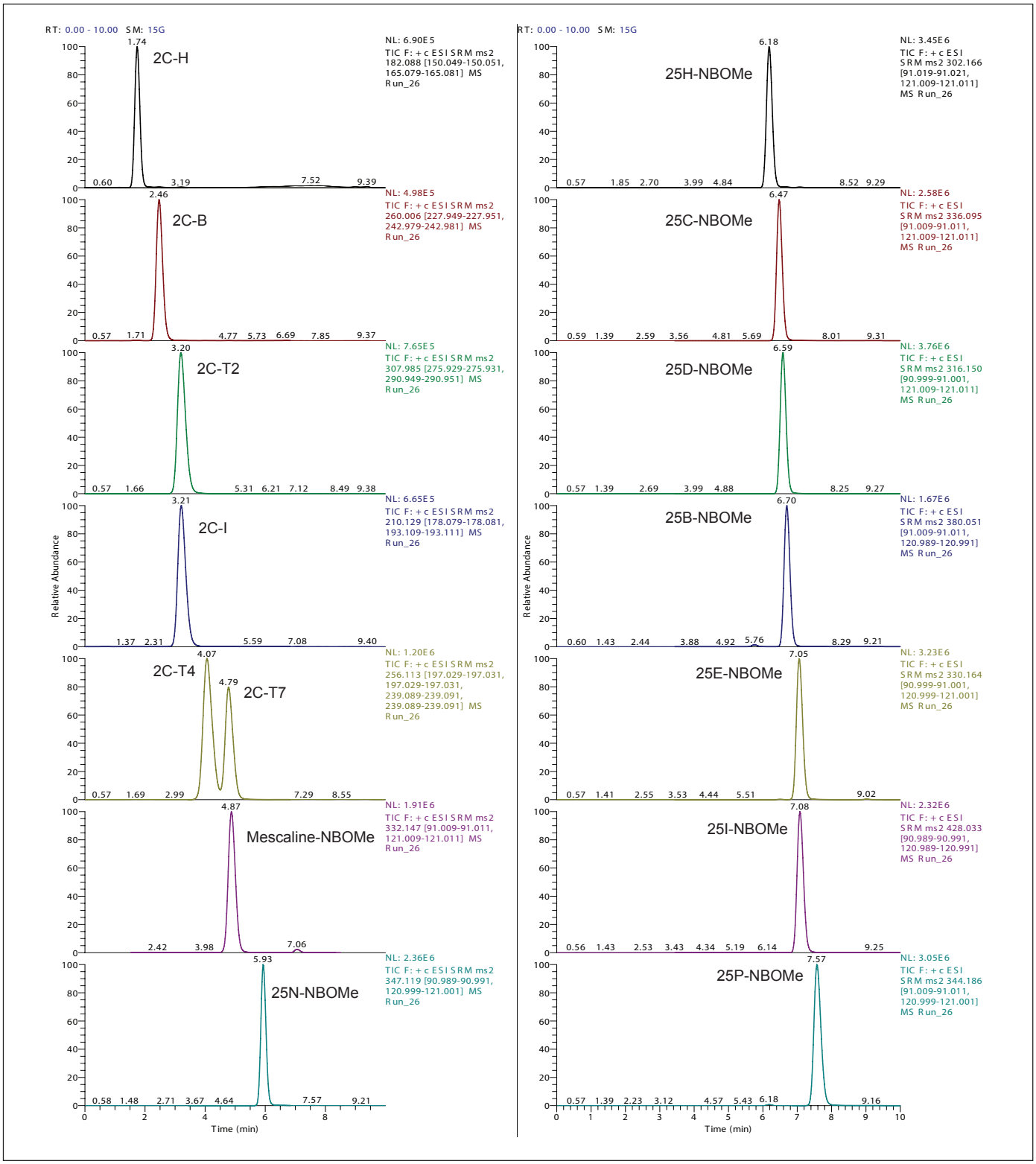
HPLC Conditions

Instrument: Thermo Scientific™ Dionex™ Ultimate™ 3000 LC system
Detector: Thermo Scientific™ TSQ Vantage™ tandem mass spectrometer
Ionization mode: APCI+ & APCI-
HPLC column: Selectra® DA, 100 × 2.1 mm, 3 µm (p/n: SLDA100ID21-3UM)
Guard column: Selectra® DA, 10 × 2.0 mm, 3 µm (p/n: SLDAGDC21-3UM)
Guard column holder: p/n: SLDGRDHLDR
Column temp.: 45 °C
Injection volume: 10 µL
Flow rate: 0.3 mL/min
Mobile phase A: 10 mM ammonium formate
Mobile phase B: MeOH
Gradient:

Time	%A	%B
0.0	98	2
2.0	60	40
5.0	60	40
5.5	35	65
10.5	35	65
11.5	5	95
16.0	5	95
16.2	98	2
21.0	98	2

Analyte		Relative Retention Time (minutes)	SRM Transitions			
			Precursor ion		Product ion 1	Product ion 2
1.	Nivalenol	3.56	357.34	$[M+HCOO]^-$	281.91	311.79
2.	Deoxynivalenol	4.46	341.42	$[M+HCOO]^-$	265.87	295.96
3.	Fusarenon X	5.29	354.90	$[M+H]^+$	136.97	174.96
4.	Neosolaniol	5.97	399.91	$[M+NH4]^+$	184.99	215.03
5.	AcDON	6.66	338.89	$[M+H]^+$	90.98	231.10
6.	Diacetoxyscirpenol	8.98	383.95	$[M+NH4]^+$	105.03	247.09
7.	Alternariol	9.11	257.65	$[M-H]^-$	214.03	216.01
8.	Ochratoxin A	9.36	403.80	$[M+H]^+$	220.90	238.93
9.	ß-zearalanol	9.53	321.51	$[M-H]^-$	277.94	303.86
10.	α-zearalanol	10.24	321.51	$[M-H]^-$	277.94	303.86
11.	T-2 toxin	10.35	483.92	$[M+NH4]^+$	184.99	214.99
12.	Zearalenone	12.19	317.50	$[M-H]^-$	176.13	273.95
13.	Aflatoxin G2	12.35	330.84	[M+H]+	189.00	245.02
14.	Aflatoxin G1	13.36	328.83	$[M+H]^+$	198.96	243.01
15.	Aflatoxin B2	13.81	314.85	$[M+H]^+$	259.01	287.06
16.	Aflatoxin B1	14.28	312.84	$[M+H]^+$	241.02	285.03

Psychedelic Phenethylamine "2C" Series Compounds



HPLC Conditions

Instrument: Thermo Scientific™ Dionex™ Ultimate™ 3000 LC system
Detector: Thermo Scientific™ TSQ Vantage™ tandem mass spectrometer
Ionization mode: ESI+
HPLC column: Selectra® DA, 100 × 2.1 mm, 3 µm (p/n: SLDA100ID21-3UM)
Guard column: Selectra® DA, 10 × 2.0 mm, 3 µm (p/n: SLDAGDC21-3UM)
Guard column holder: p/n: SLDGRDHLDR
Column temp.: 40 °C
Injection volume: 10 µL
Flow rate: 0.3 mL/min
Mobile Phase A: 0.1% formic acid in water
Mobile Phase B: 0.1% formic acid in MeOH
Gradient:

Time	%A	%B
0	60	40
1.5	60	40
3.5	35	65
5.0	35	65
5.5	5	95
7.0	5	95
7.1	60	40
11.0	60	40

Analyte		Relative Retention Time (minutes)	MRM Transitions (ESI+, 50 ms dwell time)		
			Precursor ion	Product ion 1	Product ion 2
1.	2C-H	1.74	182.088	165.080	150.050
2.	2C-B	2.46	260.006	242.980	227.950
3.	2C-T2	3.18	242.102	225.070	91.040
4.	2C-I	3.20	307.985	290.950	275.930
5.	2C-E	3.21	210.129	178.080	193.110
6.	2C-T4	4.07	256.113	239.090	197.030
7.	2C-T7	4.79	256.113	239.090	197.030
8.	Mescaline-NBOMe	4.87	332.147	91.010	121.010
9.	25N-NBOMe	5.93	347.119	90.990	121.000
10.	25H-NBOMe	6.18	302.166	91.020	121.010
11	25C-NBOMe	6.47	336.095	91.010	121.010
12.	25D-NBOMe	6.59	316.150	91.000	121.010
13.	25B-NBOMe	6.70	380.051	91.010	120.990
14.	25E-NBOMe	7.05	330.164	91.000	121.000
15.	25I-NBOMe	7.08	428.033	90.990	120.990
16.	25P-NBOMe	7.57	344.186	91.010	121.000

Column Care & Usage

Each UCT, LLC high performance liquid chromatography (HPLC) column is individually packed and tested to ensure superior performance. A HPLC CoA is included with each column. It contains a chromatogram, the column serial number, and the lot number of the packing material. Retain this information for as long as you have the column; it may be useful if troubleshooting is ever required.

Guard Columns & Filters

In-line filters and/or guard cartridges can extend the life of an analytical column. They are connected in-line prior to the analytical column.

• Pressure Recommendation

UCT, LLC HPLC columns are silica based. To ensure optimal column life, operating pressures of 3000psi or lower are recommended. Column pressures may increase as the column ages as particulates from the system accumulate on the column. Sudden increases in pressure are usually a result of a blocked frit. Pressure will vary with different mobile phases. For example water/methanol mixtures will generally give higher back pressure than water/acetonitrile mobile phases (see Table I).

• Guard Cartridges

Guard cartridges are used to capture impurities that may otherwise lodge on the HPLC column. Guard cartridges are especially useful with samples from biological sources as these may contain lipids and proteins that pass through frits can quickly block columns. Guard cartridges should have the same phase as the column they are protecting. Guard cartridges should be replaced when the chromatography begins to deteriorate or when the guard cartridge contributes excessive back pressure to the HPLC system.

Mobile Phase

When shipped, the column contains the storage solvent listed on its HPLC CoA. Before use the first time, ensure that your initial planned mobile phase is compatible with this solvent (see Table II). If it is not, you must flush the column with an intermediate solvent that is compatible with both the storage solvent and your planned mobile phase. Be especially cognizant if you are using buffers; the storage solvent for most columns contains greater than 50% organic solvent, and contact with a buffer could cause a salting out effect. The resulting precipitate can plug the column.

Flow Direction & Flow Rate

The arrows on the column label indicate the recommended flow direction.

Begin by connecting the inlet end of the column to the injector or autosampler and allow mobile phase to flow from the outlet end of the column into a beaker for 10–15 minutes. Gradually increase the flow rate. For recommended flow rates refer to Table III. Then, stop the mobile phase flow and connect the column to your detector. Because every LC system is unique, especially when used in gradient mode, your results may slightly differ from those obtained in our laboratory. UCT, LLC Technical Service can assist you in optimizing your separations. Be sure to record the operating pressure before calling.

Increasing Column Lifetime

Silica based UCT, LLC HPLC column packing materials have a pH operating range of 2-8. Extended use of any column at extreme pH can shorten column lifetime.

The upper temperature limit for silica based HPLC columns is 80 °C. Elevated temperatures can improve efficiency by lowering solvent viscosity, but column lifetime may be compromised.

Use of HPLC-Grade solvents is strongly recommended. Residue and chemical contaminants in non-HPLC grade solvents can alter a column's selectivity and, potentially plug the inlet frit leading to an increased system pressure. Mobile phase filtering and degassing (either off-line or in-line) is highly recommended.

Column lifetime is also governed by stationary phase type. Hydrocarbon phases, such as C18, are relatively chemically inert. Polar phases, such as cyano or amino, require somewhat more care as they can be chemically active.

Column Maintenance

Columns should not be subjected to mechanical or pressure shock. This can cause irreversible damage to the column.

Columns should be run in the flow direction as marked on the column. The one exception is for column cleaning. The flow can be reversed to back-flush frits if blockages occur.

Do not store the column in an aqueous buffer, this will promote microbiological contamination. First flush the column with water and then with 50/50 organic solvent/water prior to storage.

Washing Procedure for Reverse-Phase Columns

Washing the column successively with non-polar eluents will usually remove accumulated impurities. Follow the washing sequence below, using 30 mL of each solvent, to thoroughly clean the column.

1. Distilled water 90%, 10% Methanol
2. 0.5M H_3P0_4 90%, 10% Methanol (Optional)*
3. Distilled water 90%, 10% Methanol (Optional)*
4. Methanol
5. Methanol/Chloroform (1:1) (Optional)
6. Methanol or Acetonitrile (Optional)
7. Distilled water 90%, 10% Methanol
8. Eluent to recondition column

*NOTE: Whenever step 2 is used, it must be followed by step 3.

It is recommended that columns be dedicated for the specific method when ion pairing reagents are used. This is because it is difficult to remove all of the ion pairing reagent.

- Protein Contamination

Proteins can adsorb onto columns causing loss of performance. In this situation rinse the column overnight with 20% 0.1M nitric acid/80% isopropanol at a flow rate of 1/5th the usual flow rate (i.e. at 0.2 mL/min for 4.6mm ID columns). Ensure that the rinse solution is directed directly to solvent waste and not through the detector.

- Lipid Contamination

If lipids or other highly hydrophobic compounds have contaminated the column use the full washing procedure except replace step 5 with 100% chloroform or dichloromethane.

Table I: Mobile Phase Viscosity Comparison

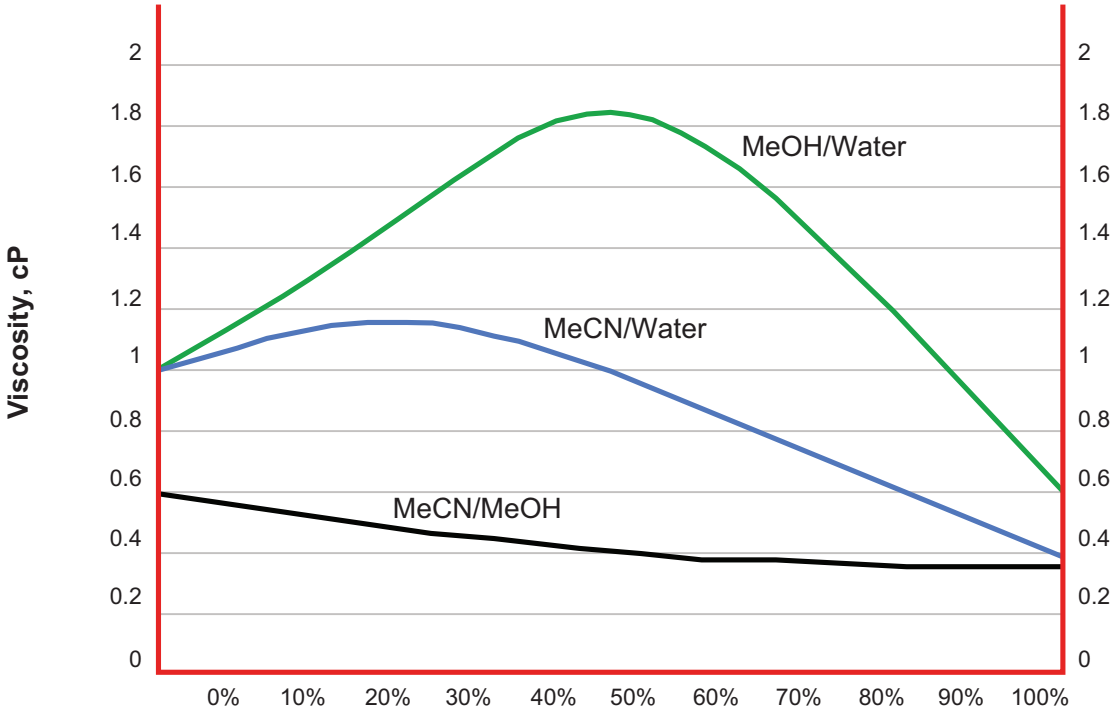


Table II: Solvent Miscibility Chart