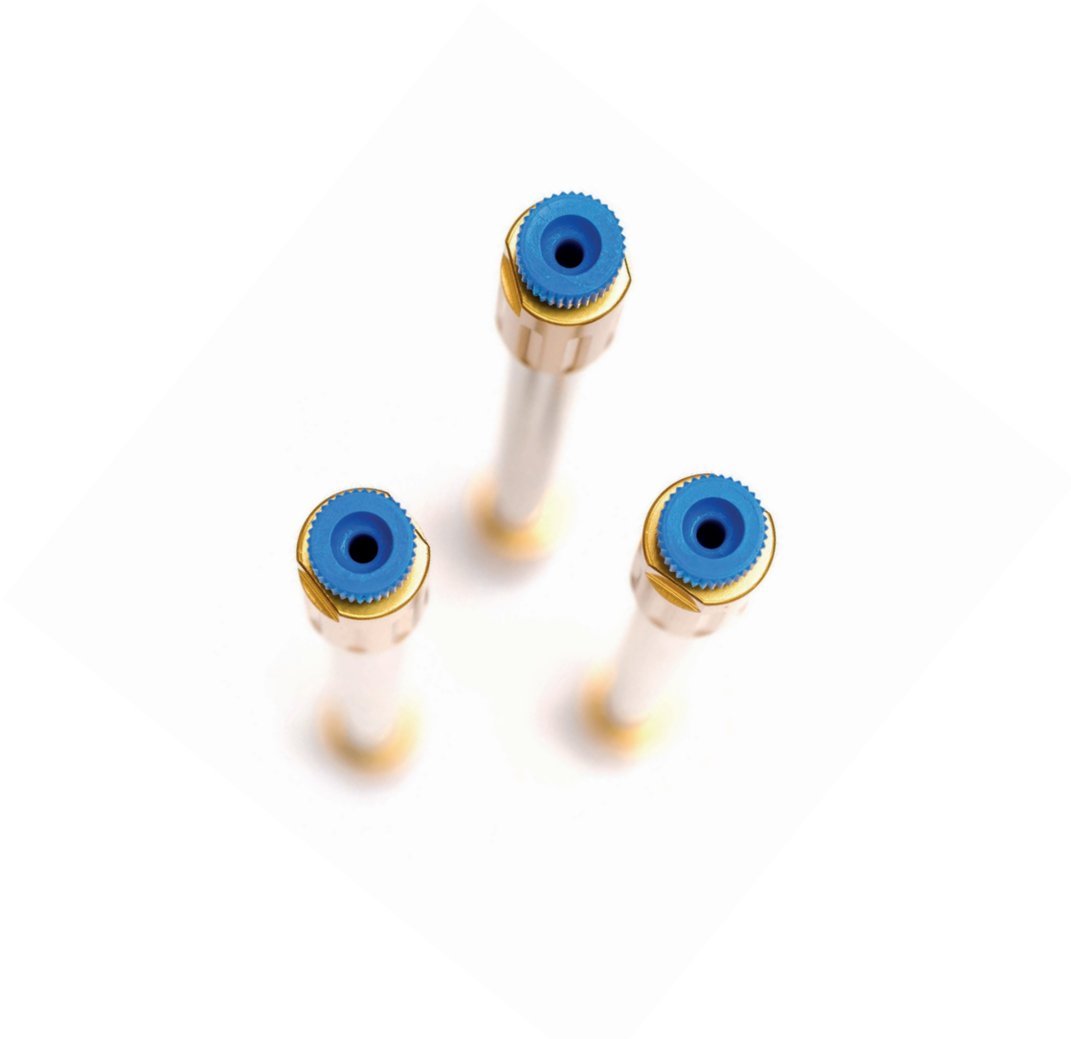
SVEA™

SWEDISH EXCELLENCE IN NANOPORUS SILICA
SVEA™ (U)HPLC Columns

APPLICATION GUIDE



NANOLOGICA

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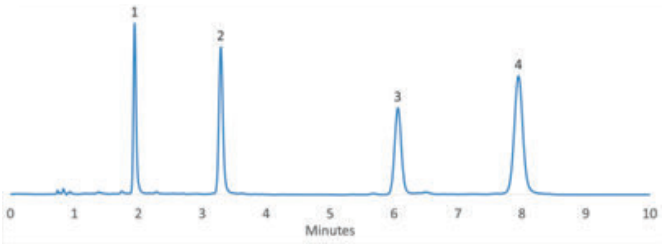
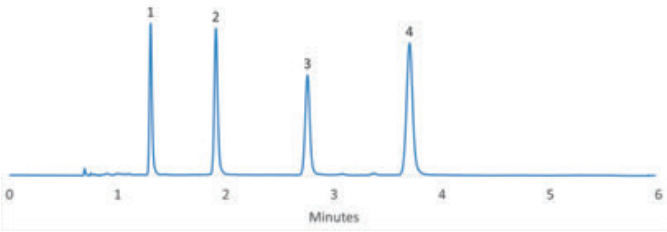
Experimental

Column:	SVEA Core C18, 2.6µm 110Å 4.6*100mm
Instrument:	HPLC
Flow rate:	1.0 mL/min
Column temperature:	40 °C
Detector:	UV 260 nm
Sample:	1 Myricetin 2 Quercetin 3 Apigenin 4 Baicalein

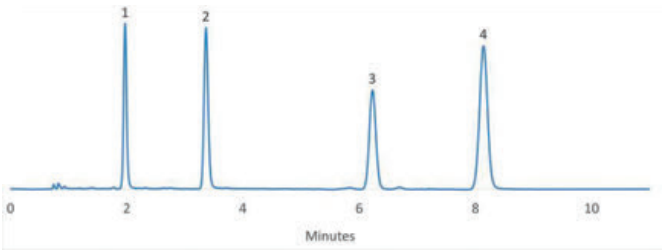
Mobile phase: Methanol/water/formic acid (50/50/0.1)



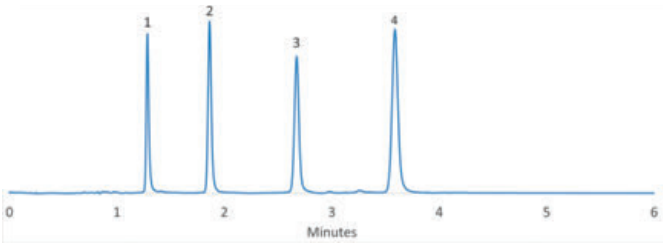
Mobile phase: Acetonitrile/10mM phosphoric acid (35/65)



Mobile phase: Methanol/10mM phosphoric acid (50/50)



Mobile phase: Acetonitrile/water/formic acid (35/65/0.1)



Determination of Catechins, Caffeine and Gallates in Oolong Tea

Experimental

Column: SVEA Core C18 2.6µm 110Å 4.6*75mm

Instrument: HPLC

Mobile phase: A) 0.1% Phosphoric acid B) CH3CN

Gradient program:

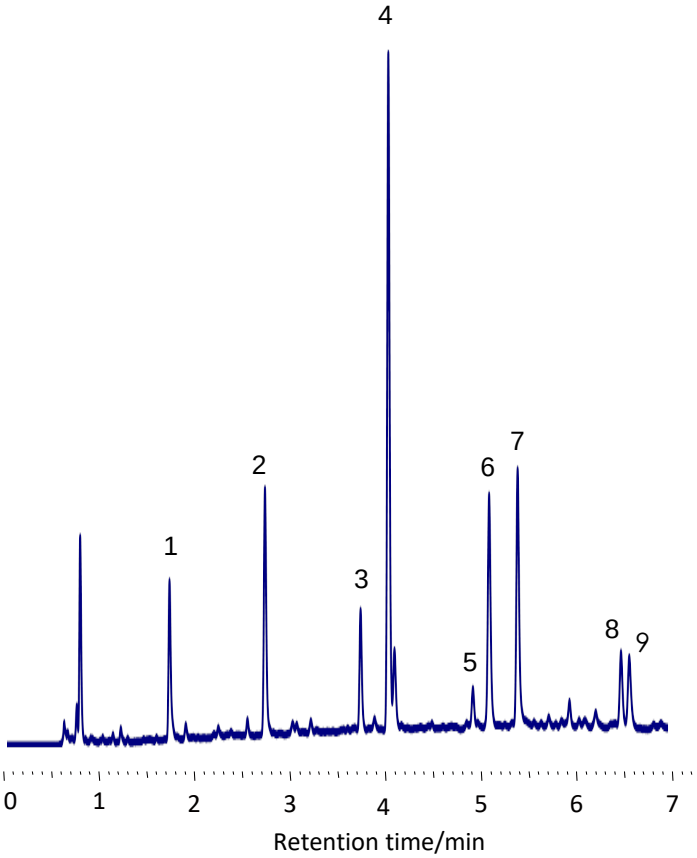
Time	0 min	7.5 min	10 min
%B	2%	25%	25%

Flow rate: 1.0 mL/min

Column temperature: 25 °C

Detector: UV 250 nm

Sample: Oolong Tea



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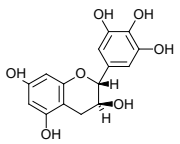
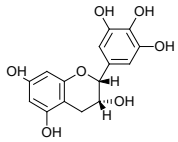

Gallocatechin

2

Epigallocatechin

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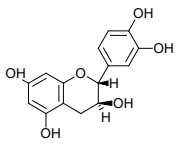
Catechin

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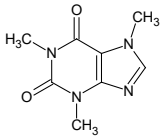
Caffeine

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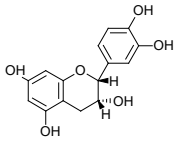
Epicatechin

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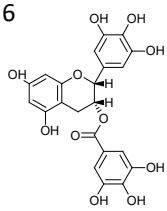
Epigallocatechin gallate I

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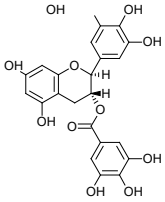
Gallocatechin gallate

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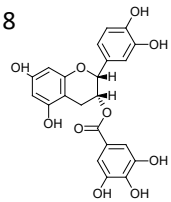
Epicatechin gallate

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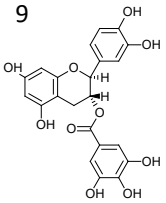
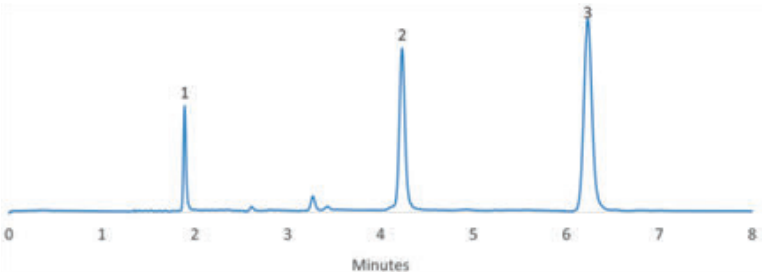

Catechin gallate

Anthraquinone dye

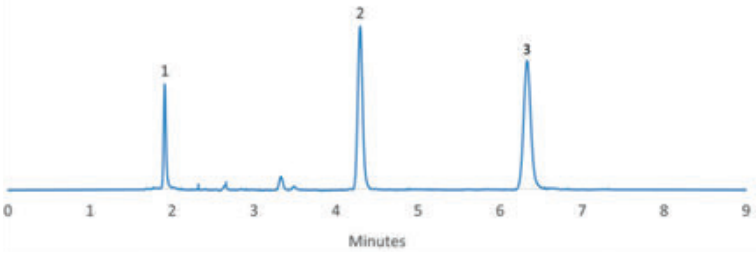
Experimental

Column:	SVEA Core C18, 2.6µm 110Å 4.6*100mm
Instrument:	HPLC
Flow rate:	1.0 mL/min
Column temperature:	40 °C
Detector:	UV 250 nm
Sample:	1 Alizalin 2 Chrysazin 3 Anthrarufin

Mobile phase: Methanol/20mM phosphate buffer pH 2.(75/25)



Mobile phase: Methanol/0.1% formic acid (75/25)



Cresols

Experimental

Instrument: HPLC

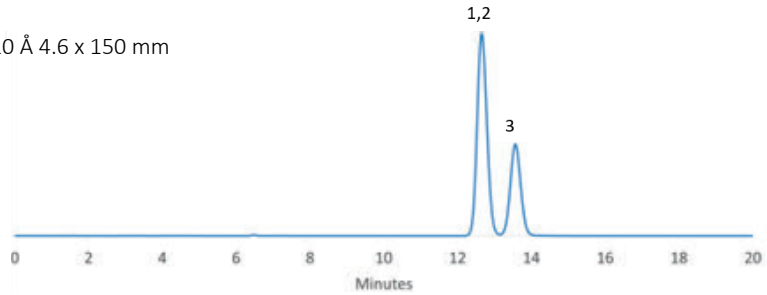
Mobile phase: Methanol/water (40/60)

Flow rate: 1.0 mL/min

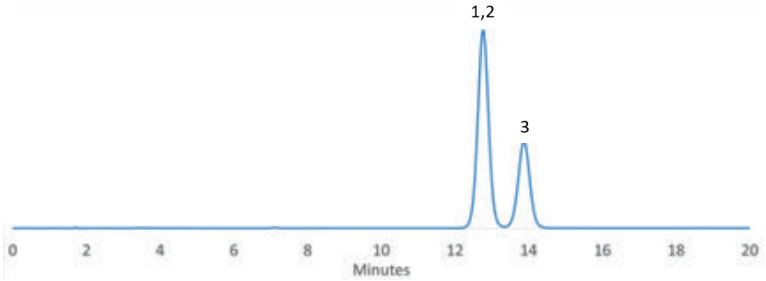
Detector: UV 210 nm

Sample: 1 m-cresol
2 p-cresol
3 o-cresol

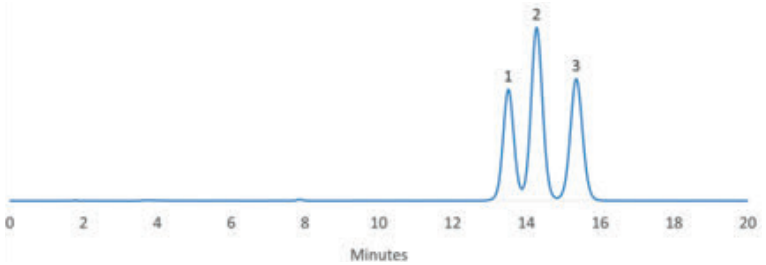
Column: SVEA C18 Gold, 5 µm 110 Å 4.6 x 150 mm
Column temperature: 20 °C



Column: SVEA PhHex, 5 µm 110 Å 4.6 x 150 mm
Column temperature: 20 °C



Column: SVEA PFP, 5 µm 110 Å 4.6 x 150 mm
Column temperature: 25 °C



Due to its different selectivity SVEA PFP is able to separate all three regioisomers.

Phenols

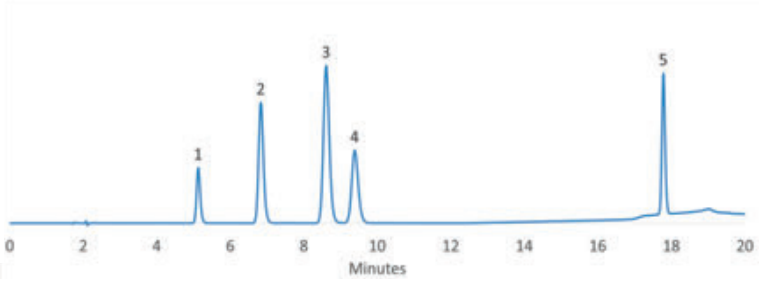
Experimental

Instrument: HPLC
Flow rate: 1.0 mL/min
Column temperature: 30 °C

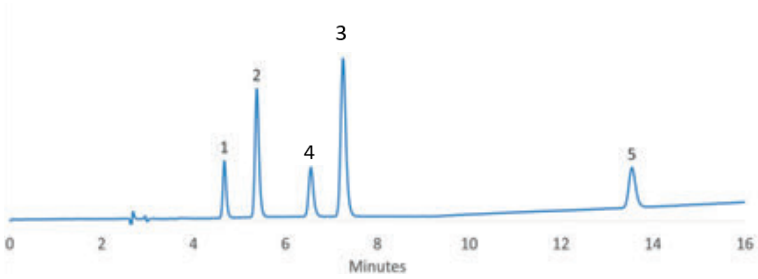
Detector: UV 280 nm

Sample:
1. Phenol
2. 4-Nitrophenol
3. 2-Nitrophenol
4. 2-Chlorophenol
5. 2,4-Dichlorophenol

Column: SVEA C8, 5 µm 110 Å 4.6 x 150 mm
Mobile phase: A: 1% Acetic acid in water, B: 1% Acetic acid in methanol.
Gradient: 45-90% B in 20 minutes



Column: SVEA C18 Gold, 5 µm 110 Å 4.6 x 250 mm
Mobile phase: A: 1% Acetic acid in water, B: 1% Acetic acid in methanol.
Gradient: 60-90% B in 22 minutes



The less lipophilic SVEA C8 can exhibit slight different selectivity as compared to SVEA C18 Gold, shown by the reversed retention order of the phenolic compounds 3 and 4.

Components of explosive

Experimental

Instrument: HPLC

Flow rate: 1.0 mL/min

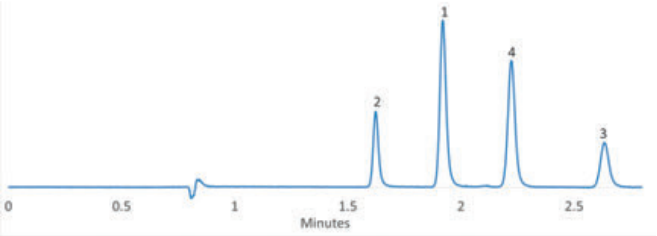
Column temperature: 40 °C

Detector: UV 250 nm

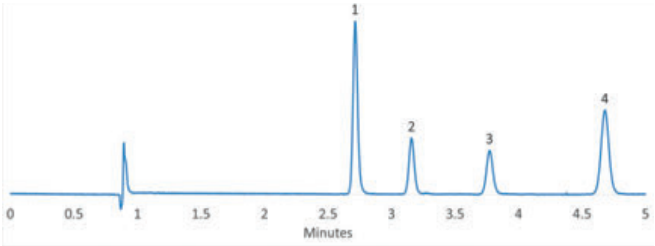
Sample:

1. 3-Dinitrobenzene
2. 1,3,5-Trinitrobenzene
3. 2,4-Dinitrotoluene
4. 2,4,6-Trinitrotoluene

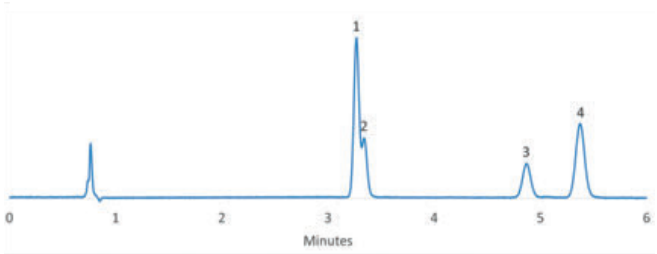
Column: SVEA Core C18, 2.6 µm 110 Å 4.6 x 100 mm
Mobile phase: Methanol/water (60/40)



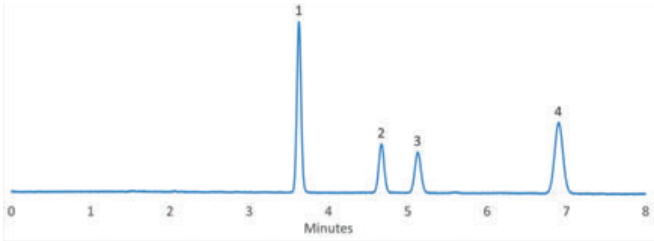
Column: SVEA Core PhHex, 2.6 µm 110 Å 4.6 x 100
Mobile phase: Methanol/water (60/40)



Column: SVEA Core C18, 2.6 µm 110 Å 4.6 x 100 mm
Mobile phase: Acetonitrile/water (40/60)



Column: SVEA Core PhHex, 2.6 µm 110 Å 4.6 x 100 mm
Mobile phase: Acetonitrile/water (40/60)



Endocrine disruptors

Experimental

Column: SVEA Core C18, 2.6 µm 110 Å 4.6 x 100 mm

Instrument: HPLC

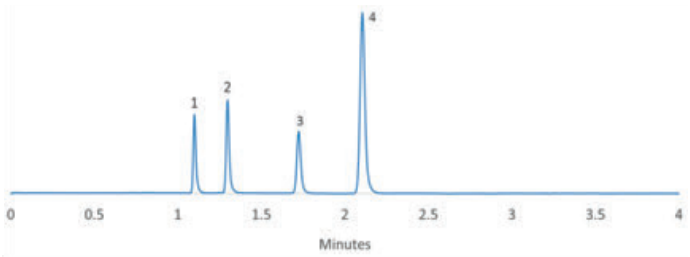
Flow rate: 1.0 mL/min

Column temperature: 40 °C

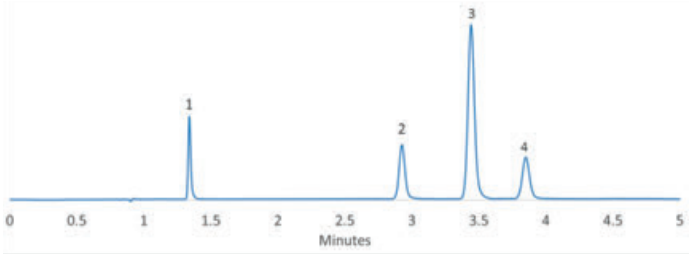
Detector: UV 280 nm

Sample:
1. Phenol
2. Bisphenol-A
3. 2,4-Dichlorophenol
4. Diethylphthalate

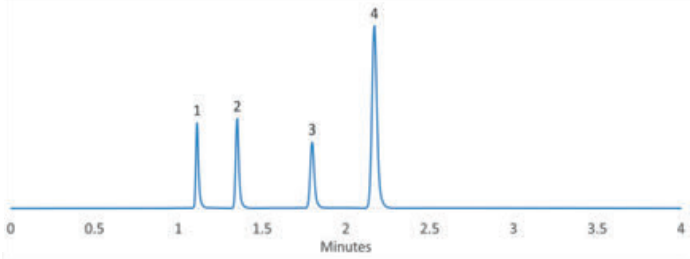
Mobile phase: Acetonitrile/20mM Potassium phosphate buffer pH 3.0 (60/40)



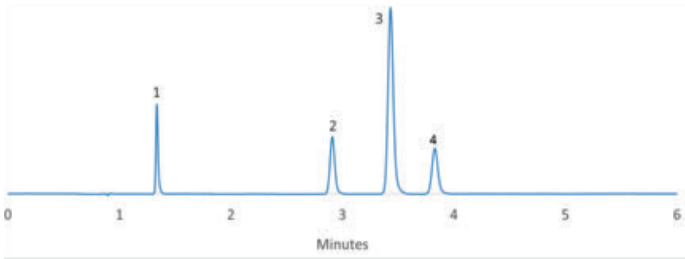
Mobile phase: Methanol/20mM Potassium phosphate buffer pH 3.0 (60/40)



Mobile phase: Acetonitrile/water/formic acid (60/40/0.04)



Mobile phase: Methanol/water/formic acid (60/40/0.04)



Alifatic acids

Separation of small alifatic acids

Experimental

Column:	SVEA C18 Gold, 5 µm 110 Å 4.6 x 150 mm
Instrument:	HPLC
Mobile phase:	Acetonitrile/0.1% phosphoric acid pH 2.1 (02/98; v/v)
Flow rate:	1.0 mL/min
Column temperature:	40 °C
Detector:	UV 210 nm
Sample:	1. Formic acid 2. Acetic acid 3. Propionic acid

Performance
Efficiency (3) =72087
Tailing (3) = 1.36

Small organic acids

Experimental

Instrument: HPLC

Mobile phase: 25mM Monobasic potassium phosphate buffer pH 2.5/methanol (97/03; v/v)

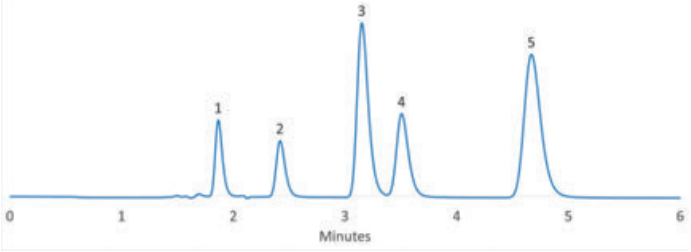
Flow rate: 1.0 mL/min

Column temperature: 25 °C

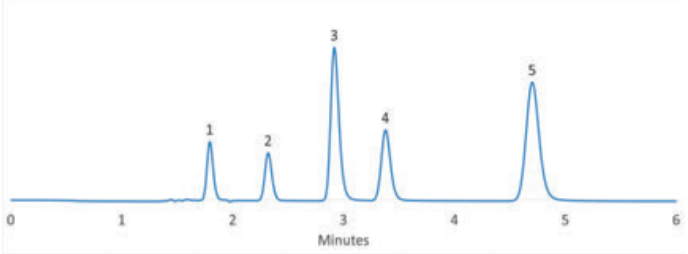
Detector: UV 220 nm

Sample:
1. Tartaric acid
2. Malic acid
3. Lactic acid
4. Maleic acid
5. Fumaric acid

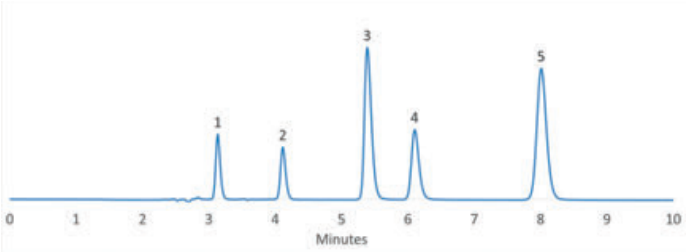
Column: SVEA C8, 5 µm 110 Å 4.6 x 150 mm



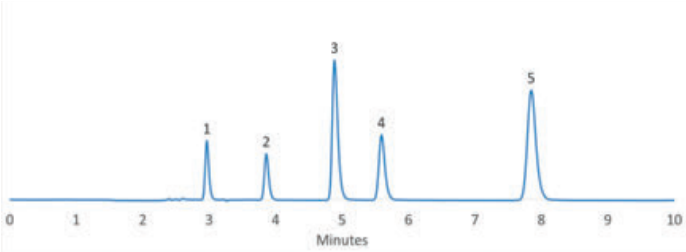
Column: SVEA C18 Gold, 5 µm 110 Å 4.6 x 150 mm



Column: SVEA C8, 5 µm 110 Å 4.6 x 250 mm



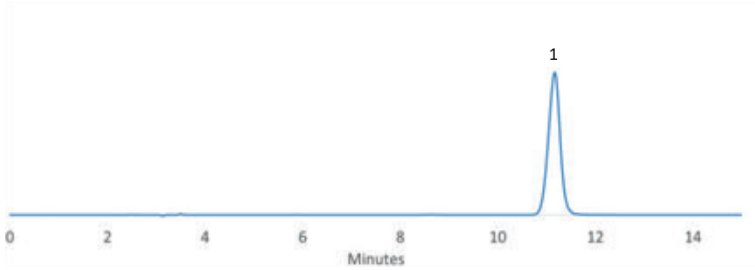
Column: SVEA C18 Gold, 5 µm 110 Å 4.6 x 250 mm



Amoxicillin

Experimental

Column:	SVEA C18 Gold, 5 µm 110 Å 4.6 x 250 mm
Instrument:	HPLC
Mobile phase:	50mM K-phosphate buffer pH 5.0/acetonotrile (96/04)
Flow rate:	1.5 mL/min
Column temperature:	30 °C
Detector:	UV 237 nm
Sample:	1. Amoxicillin



Performance	Pharmacopoeia
k´= 2.5	k´= 1.1-2.8
Efficiency (N) =10505	Efficiency (N) = NLT 1700
Tailing = 0.96	Tailing = NMT 2.5

Tetracyclines

Experimental

Column: SVEA Core C18, 2.6 µm 110 Å 4.6 x 100 mm

Instrument: HPLC

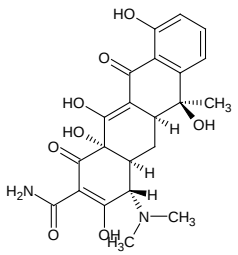
Flow rate: 1.0 mL/min

Column temperature: 40 °C

Detector: UV 350 nm

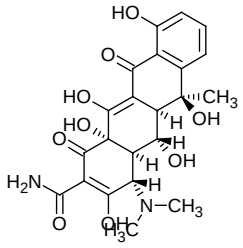
Sample:
1. Tetracycline
2. Oxytetracycline
3. Chlortetracycline

1



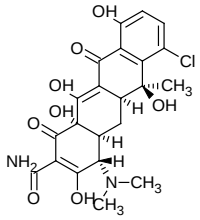
Tetracycline

2



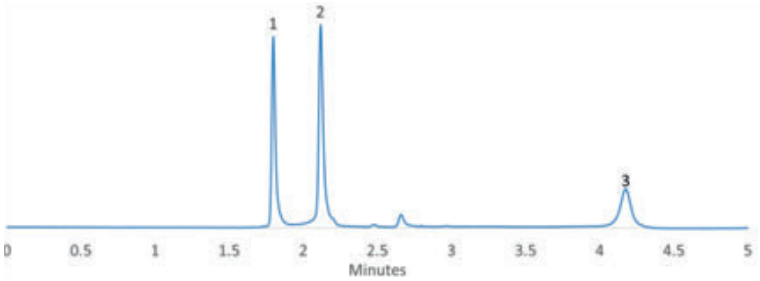
Oxytetracycline

3

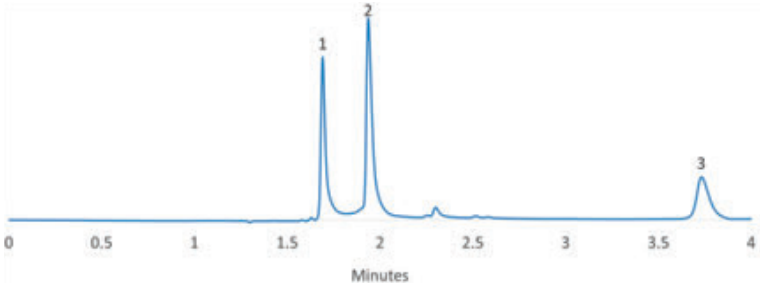


Chlortetracycline

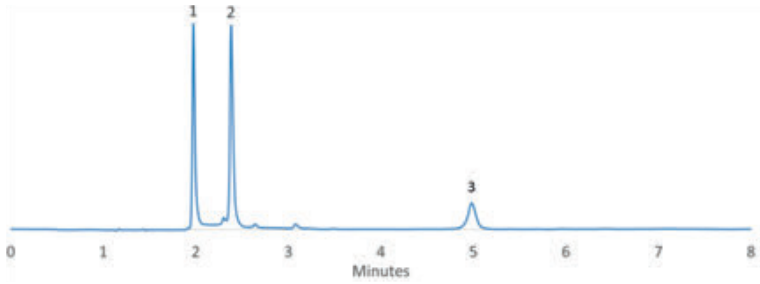
Mobile phase: Acetonitrile/0.1% phosphoric acid (20/80)



Mobile phase: Acetonitrile/0.1% formic acid (20/80)



Mobile phase: Acetonitrile/10mM oxalic acid (20/80)



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Tropisetron

Experimental

Column: SVEA C18 Gold, 5 µm 110 Å 4.6 x 150 mm

Instrument: HPLC

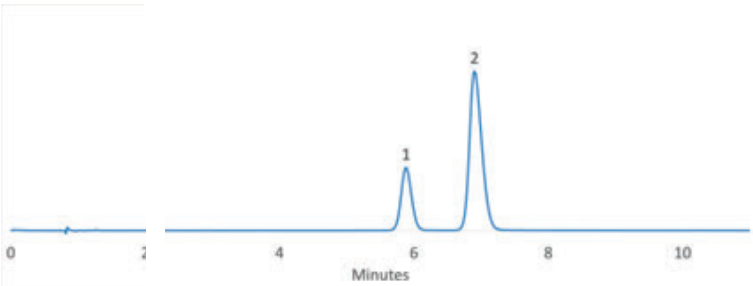
Flow rate: 2.0 mL/min

Column temperature: 30 °C

Detector: UV 254 nm

Sample:
1. Des-Me-Tropisetron
2. Tropisetron

Mobile phase: 0.1% TFA in water pH 1.9/methanol (65/35)



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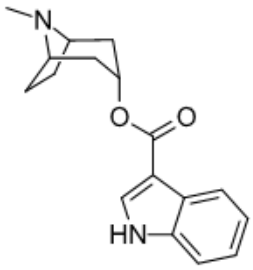
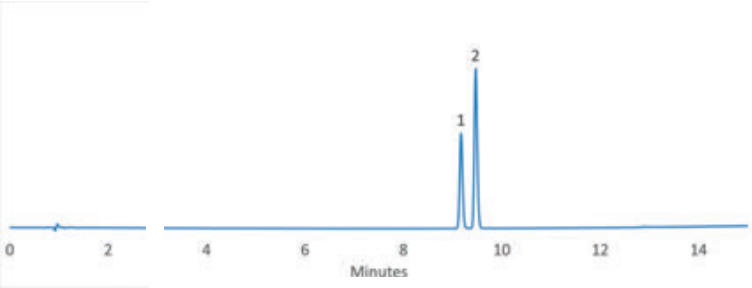


Tropisetron

Mobile phase: A: 0.1% TFA in water pH 1.9; B: Methanol.
Gradient: 5-95% B in 18 minutes



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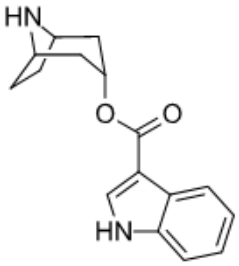


des-Me-Tropisetron

Clozapine

Experimental

Column: SVEA C8, 5 µm 110 Å 4.6 x 150 mm

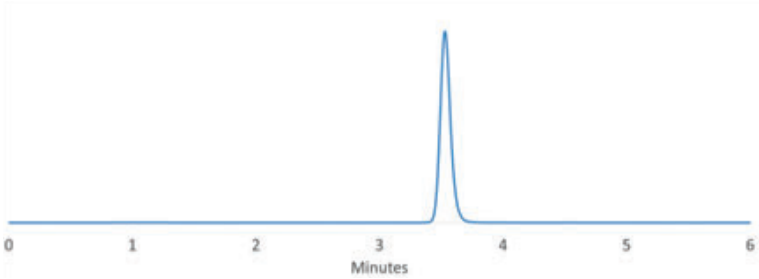
Instrument: HPLC

Mobile phase: Methanol/water/triethylamine (800/200/0.75)

Flow rate: 2.0 mL/min

Column temperature: 30 °C

Detector: UV 254 nm



Performance	Pharmacopoeia
Efficiency (N) = 8988	Efficiency (N) = NLT 1500
Injection RSD (%) = 0.15	Injection RSD (%) = NMT 2.0%

Clozapine resolution mixture
Degradation of Clozapine

Experimental

Column: SVEA C8, 5 µm 110 Å 4.6 x 150 mm

Instrument: HPLC

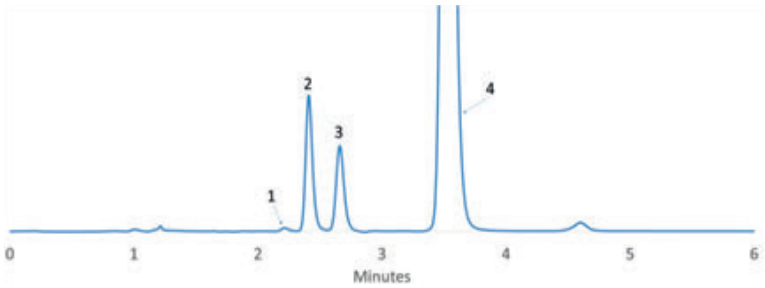
Mobile phase: Methanol/water/triethylamine (800/200/0.75)

Flow rate: 1.0 mL/min

Column temperature: 30 °C

Detector: UV 257 nm

Sample:
1. Impurity C
2. Impurity D
3. Impurity A
4. Clozapine



Performance	Pharmacopoeia
R_s 3,4 = 6.3	R_s 3,4 = x.x
Efficiency (N) = 8988	Efficiency (N) = NLT 1500
Injection RSD (%) = 0.15	Injection RSD (%) = NMT 2.0%

Clozapine resolution mixture
Degradation of Clozapine

Experimental

Instrument: HPLC

Mobile phase: A: 0.1% TFA in water; B: 0.1% TFA in acetonitrile.

Gradient: 10-30% B in 4 min, 30-95% B in 4 min, 95% B for 2 min

Flow rate: 1.5 mL/min

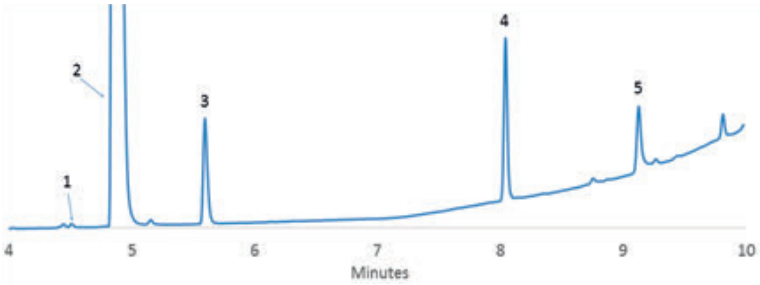
Column temperature: 30 °C

Detector: UV 254 nm

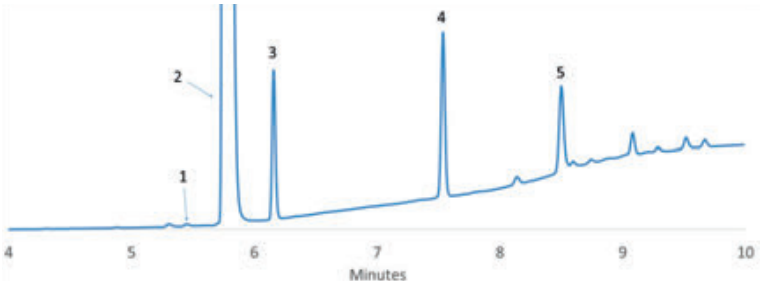
Sample:

1. Impurity C
2. Clozapine
3. Impurity D
4. Impurity A
5. Impurity B

Column: SVEA C18 Gold, 3.5 µm 110 Å 4.6 x 150 mm



Column: SVEA C18 Gold, 5 µm 110 Å 4.6 x 150 mm



Beta blockers

Experimental

Column: SVEA Core C18, 2.6 µm 110 Å 4.6 x 100 mm

Instrument: HPLC

Mobile phase: Methanol/25mM phosphate buffer pH 7.0 (50/50)

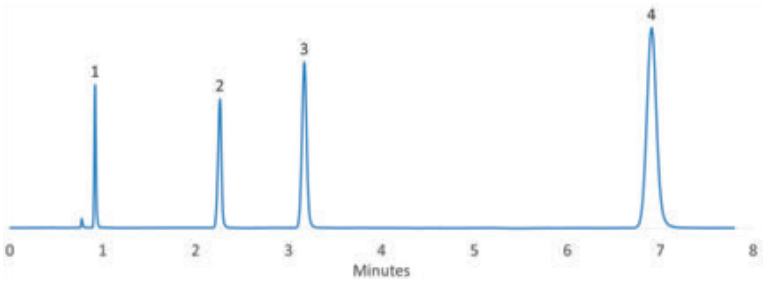
Flow rate: 1.0 mL/min

Column temperature: 40 °C

Detector: UV 280 nm

Sample:

1. Atenolol
2. Metropolol
3. Timolol
4. Propranolol

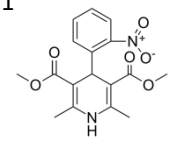


Calcium Antagonists

Experimental

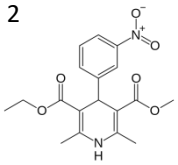
Column:	SVEA Core C18 and PhHex, 2.6µm 110Å 4.6*150mm
Instrument:	HPLC
Mobile phase:	Methanol:25 mM phosphate buffer pH7=70:30 or Methanol:10 mM ammonium acetate pH6.8=70:30
Flow rate:	1.0 mL/min
Column temperature:	40 °C
Detector:	UV 230 nm
Sample:	1 Nifedipine 2 Nitredipine 3 Diltiazem Hydrochloride 4 Verapamil Hydrochloride 5 Nicardipine Hydrochloride

1



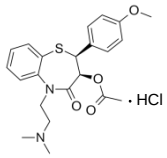
Nifedipine

2



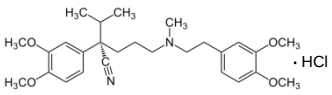
Nitredipine

3



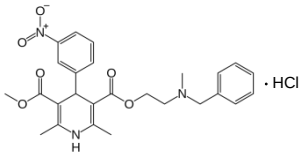
Diltiazem Hydrochloride

4



Verapamil Hydrochloride

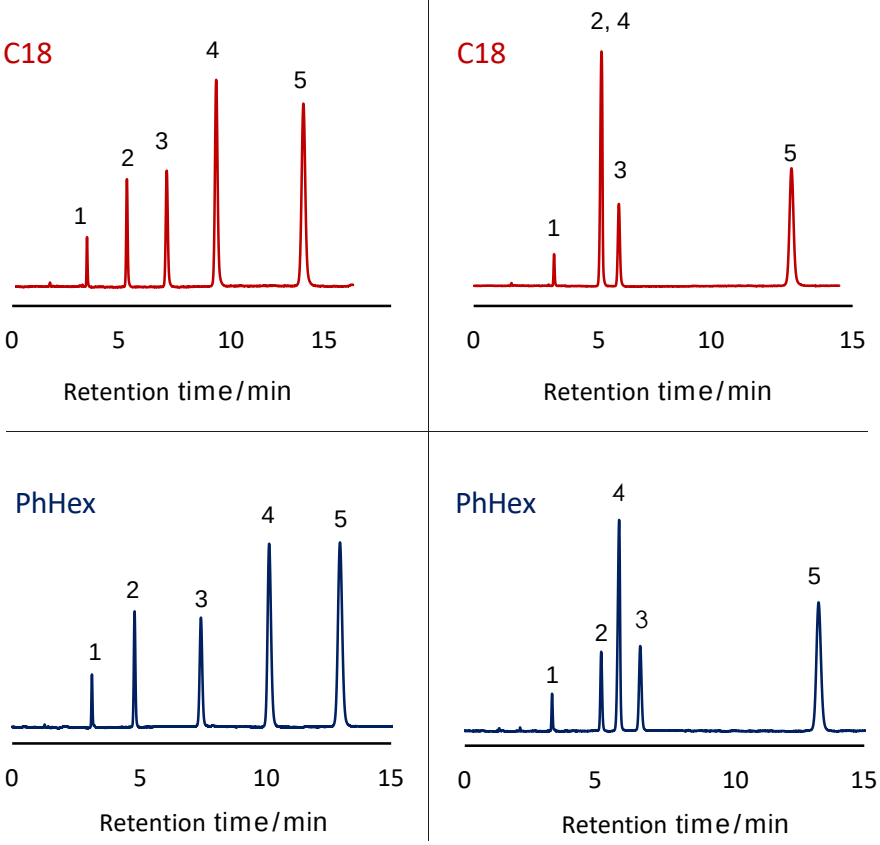
5



Nicardipine Hydrochloride

Mobile phase:
Methanol: 25 mM phosphate buffer pH7=70:30

Mobile phase:
Methanol: 10 mM ammonium acetate pH6.8=70:30

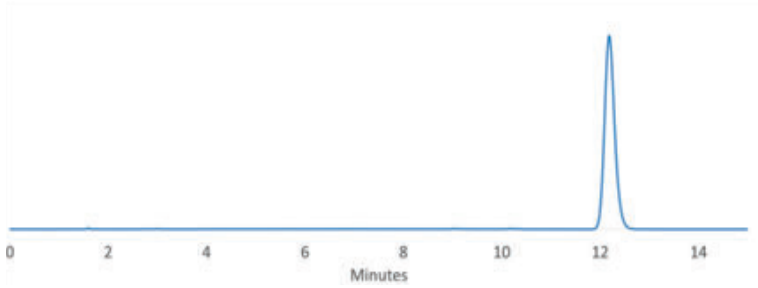


NANOLOGICA

Simvastatin

Experimental

Column:	SVEA C18 Gold, 5.0 µm 110 Å 4.6 x 250 mm
Instrument:	HPLC
Mobile phase:	28mM Monobasic Na-phosphate buffer pH 4.50/acetonitrile (35/65)
Flow rate:	1.5 mL/min
Column temperature:	45 °C
Detector:	UV 238 nm



Performance	Pharmacopoeia
k´= 6.6	k´= NLT 3.0
Efficiency (N) =17246	Efficiency (N) = NLT 4500
Tailing = 0.82	Tailing = NMT 2.0

Statins

Experimental

Column: SVEA Core C18, 2.6 µm 110 Å 4.6 x 100 mm

Instrument: HPLC

Mobile phase: Acetonitrile/0.1% formic acid (60/40)

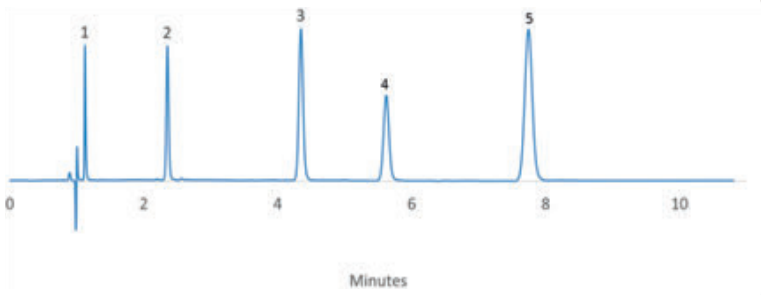
Flow rate: 0.8 mL/min

Column temperature: 40 °C

Detector: UV 240 nm

Sample:

1. Pravastatin
2. Fluvastatin
3. Mevastatin
4. Lovastatin
5. Simvastatin



H2 Blockers

Experimental

Column: SVEA Core C18, 2.6 µm 110 Å 4.6 x 100 mm

Instrument: HPLC

Flow rate: 1.0 mL/min

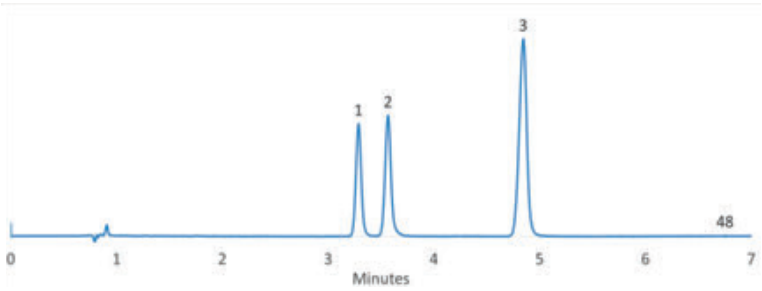
Column temperature: Ambient

Detector: UV 230 nm

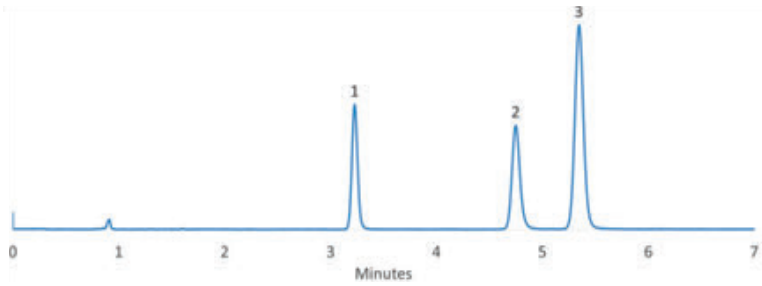
Sample:

1. Famotidine
2. Cimetidine
3. Ranitidine

Mobilephase: Acetonitrile/10mM ammonium acetate pH 6.8 (10/90)



Mobilephase: Acetonitrile/25mM phosphate buffer pH 7.0 (10/90)



Corticosteroids

Experimental

Instrument: HPLC
Column temperature: 40°C

Detector: UV 260 nm

Sample:
1. Prednisone
2. Cortisone
3. Prednisolone
4. Hydrocortisone

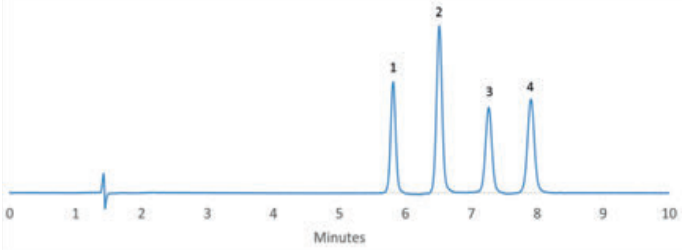
Column: SVEA Core C18, 2.6µm 110Å 4.6x250mm
Mobile phase: Acetonitrile/water/formic acid (30/70/0.1)
Flow rate: 0.7 mL/min

Performance

R_s 4,1 = 2.4

Efficiency (2) = 63800

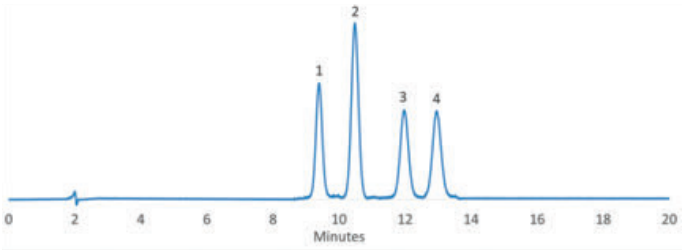
Column: SVEA Core C18, 2.6µm 110Å 4.6x150mm
Mobile phase: Tetrahydrofuran/water (20/80)
Flow rate: 1.0 mL/min



Performance

R_s 4,3= 3.3

Column: SVEA Core C18, 5µm 110Å 4.6x250mm
Mobile phase: Tetrahydrofuran/water (20/80)
Flow rate: 1.0 mL/min



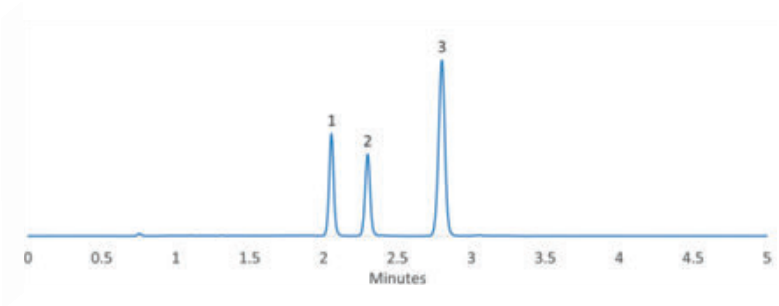
Performance

R_s 4,3 = 2.0

Ethynylestradiol and its metabolites

Experimental

Column:	SVEA Core C18, 2.6 µm 110 Å 4.6 x 100 mm
Instrument:	HPLC
Mobile phase:	Acetonitrile/water (30/70)
Flow rate:	1.0 mL/min
Column temperature:	40°C
Detector:	UV 230 nm
Sample:	1. 7beta-Estradiol 2. Estrone 3. Ethynylestradiol



Hypotensive diuretic

Experimental

Column: SVEA Core C18, 2.6 µm 110 Å 4.6 x 100 mm

Instrument: HPLC

Flow rate: 1.0 mL/min

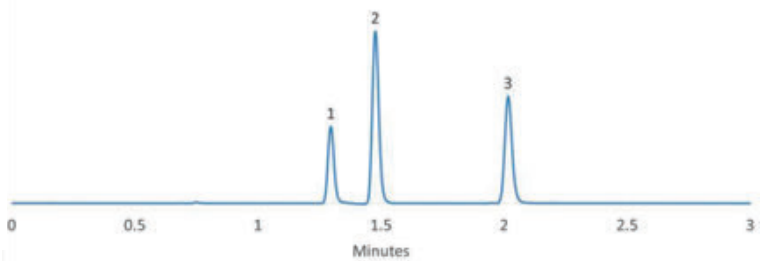
Column temperature: 40°C

Detector: UV 250 nm

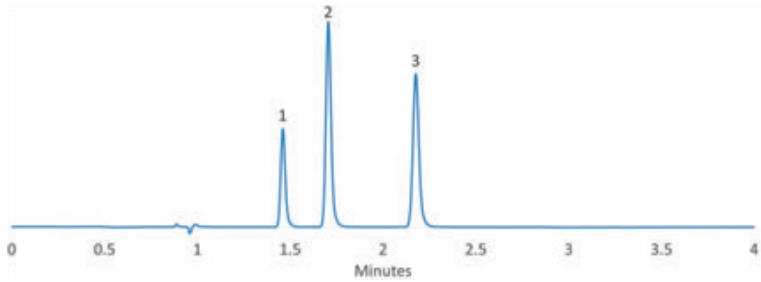
Sample:

1. 4-Amino-6-chloro-1,3-benzenedisulfon-amine
2. Hydrochlorothiazide
3. p-Aminoacetophenone

Mobilephase: Acetonitrile/100mM phosphate buffer pH 3.0 (20/80)



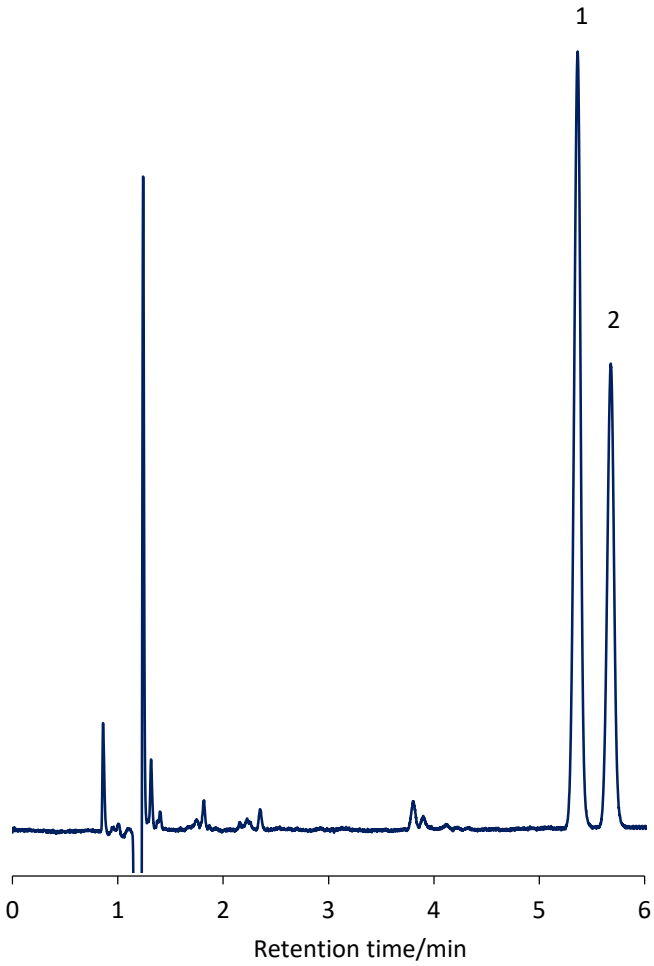
Mobilephase: Acetonitrile/0.1% formic acid (20/80)



Cis-trans isomers of 9-cotadecenoic acid

Experimental

Column:	SVEA Core C18, 2.6µm 110Å 4.6*150mm
Instrument:	HPLC
Mobile phase:	Acetonitrile/water/formic acid (90/10/0.05)
Flow rate:	1.0 mL/min
Column temperature:	40 °C
Detector:	UV 215 nm
Sample:	1 Oleic acid 2 Elaidic acid



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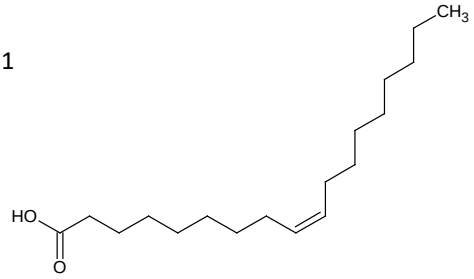
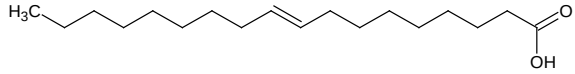


Oleic acid

2

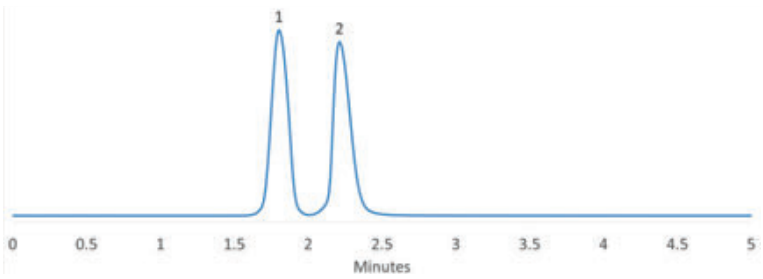


Elaidic acid

Maleic and fumaric acids

Experimental

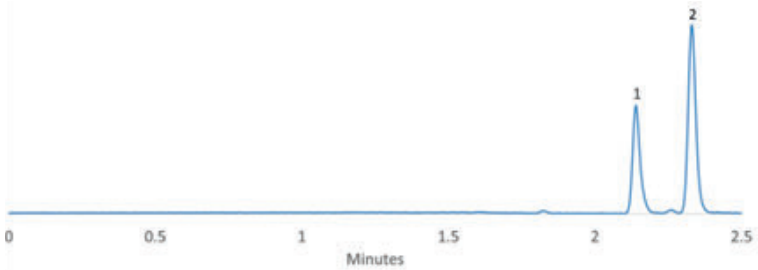
Column:	SVEA CN, 5 µm 110 Å 4.6 x 150 mm
Instrument:	HPLC
Mobile phase:	MeOH/20 mM ammonium acetate buffer pH 3.9 (03/97)
Flow rate:	1.0 mL/min
Column temperature:	40°C
Detector:	UV 210 nm
Sample:	1. Fumaric acid 2. Maleic acid



Naphthols

Experimental

Column:	SVEA Core C18, 2.6 µm 110 Å 4.6 x 100 mm
Instrument:	HPLC
Mobile phase:	Acetonitrile/water/formic acid (60/40/0.04)
Flow rate:	1.0 mL/min
Column temperature:	40°C
Detector:	UV 250 nm
Sample:	1. 2-Naphthol 2. 1-Naphthol



Acetylsalicylic acid

Separation of acetylsalicylic acid and related compounds

Experimental

Column: SVEA C18 Gold, 5 µm 110 Å 4.6 x 150 mm

Instrument: HPLC

Mobile phase: Water/acetonitrile/phosphoric acid (60/40/0.2; v/v/v)

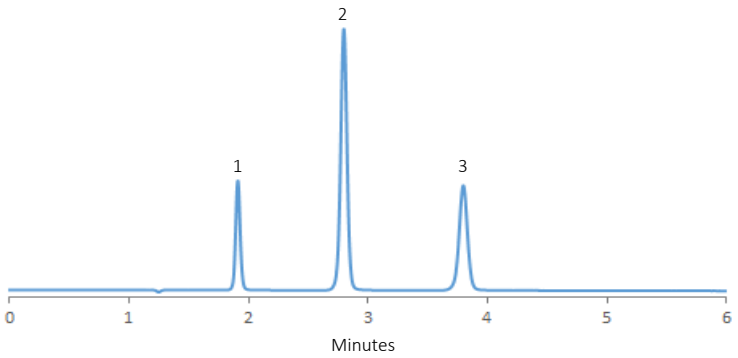
Flow rate: 1.0 mL/min

Column temperature: 30°C

Detector: UV 237 nm

Sample:

1. Hydroxy benzoic acid
2. Acetylsalicylic acid
3. Salicylic acid



Performance	Pharmacopoeia
R_s 2,3 = 9.67	R_s 2,3 = NLT 6.0

Ibuprofen

Separation of ibuprofen and valerophenone

Experimental

Column: SVEA C18 Gold, 5 µm 110 Å 4.6 x 150 mm

Instrument: HPLC

Mobile phase: Acetonitrile/25mM chloroacetic acid pH 3.0 (60/40; v/v)

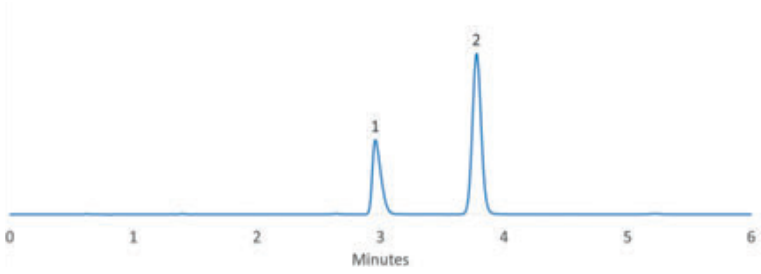
Flow rate: 2.0 mL/min

Column temperature: 30°C

Detector: UV 254 nm

Sample:

1. Valerophenone
2. Ibuprofen



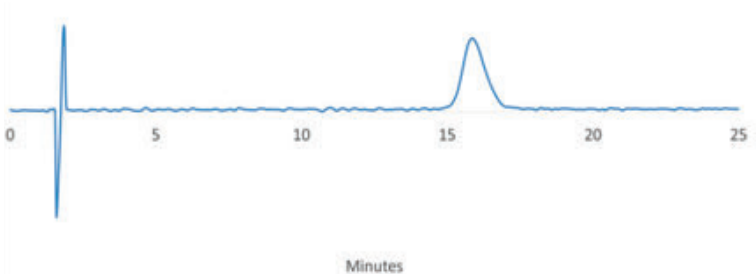
Performance	Pharmacopoeia
R_s 2,1 = 6.20	R_s 2,1= NLT 2.5
Tailing = 1.08	Tailing = NMT 2.5

Basic peptide

Peptide with 32 aminoacids and isoelectric point of 11.1

Experimental

Column:	SVEA C18 Gold, 5 µm 110 Å 4.6 x 150 mm
Instrument:	HPLC
Mobile phase:	A: 0.1% TFA in water; B: 0.085% TFA in acetonitrile. Gradient: 32-37% B in 40 minutes
Flow rate:	1.0 mL/min
Column temperature:	30°C
Detector:	UV 220 nm

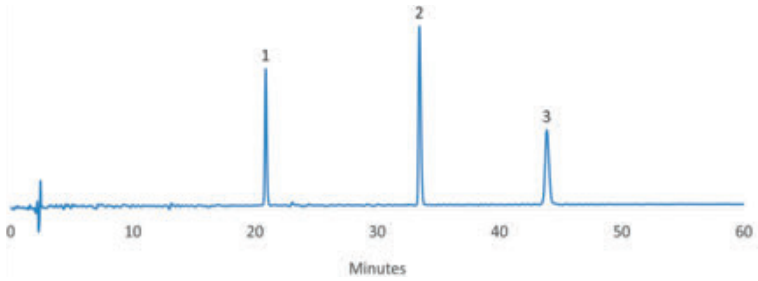


Peptide mix

Mixture of two basics and one acidic peptide

Experimental

Column:	SVEA C4, 5 µm 110 Å 4.6 x 150 mm
Instrument:	HPLC
Mobile phase:	A: 0.1% TFA in water; B: 0.085% TFA in acetonitrile. Gradient: 10-50% B in 60 minutes
Flow rate:	1.0 mL/min
Column temperature:	30°C
Detector:	UV 210 nm
Sample:	1. 14 aminoacids pI 4.5 2. 9 aminoacids pI 11.7 3. 32 aminoacids pI 11.1



Resorcinol and related compounds

Experimental

Column: SVEA Core C18, 2.6 µm 110 Å 4.6 x 100 mm

Instrument: HPLC

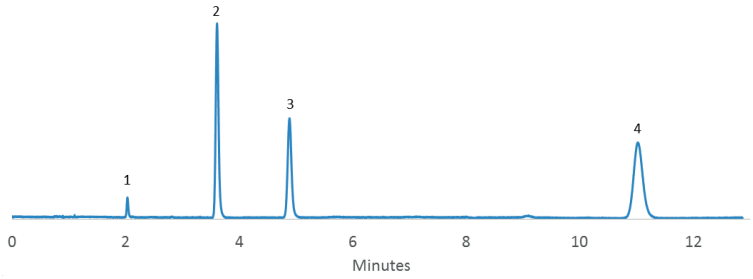
Mobile phase: Methanol/0.1% formic acid (10/90)

Flow rate: 1.0 mL/min

Column temperature: 30°C

Detector: UV 280 nm

Sample:
1. Hydroquinone
2. Resorcinol
3. Pyrocatechol
4. Phenol

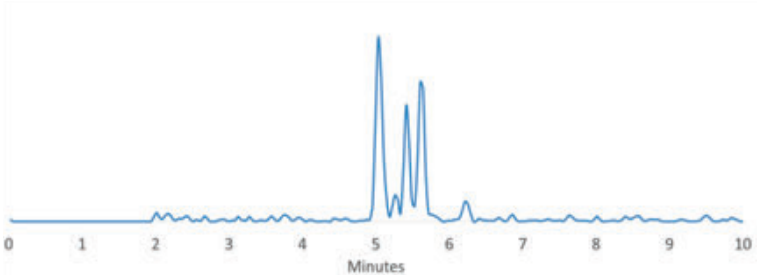


Enoxacin

Detection of Enoxacin in an extract of chicken meat

Experimental

Column:	SVEA Core C18, 2.6 µm 110 Å 4.6 x 100 mm
Instrument:	HPLC
Mobile phase:	A: Methanol; B: 0.1% Formic acid in water.
	Gradient: 0-10% A in 2 min; 10-90% A in 4 min; 90% A for 3 min; 90-10% A in 2 min
Flow rate:	0.35 mL/min
Column temperature:	25°C
Detector:	MS/MS



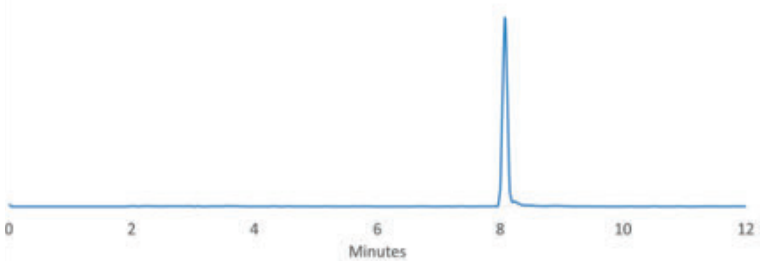
Data kindly provided by: Animal, Plant and Food Inspection Center-APFIC, Jiangsu Entry-Exit Inspection and Quarantine Bureau of People's Republic of China

Nalidixic acid

Detection of nalidixic acid in an extract of chicken meat

Experimental

Column:	SVEA Core C18, 2.6 µm 110 Å 4.6 x 100 mm
Instrument:	HPLC
Mobile phase:	A: Methanol; B: 0.1% Formic acid in water.
	Gradient: 0-10% A in 2 min; 10-90% A in 4 min; 90% A for 3 min; 90-10% A in 2 min
Flow rate:	0.35 mL/min
Column temperature:	Ambient
Detector:	MS/MS



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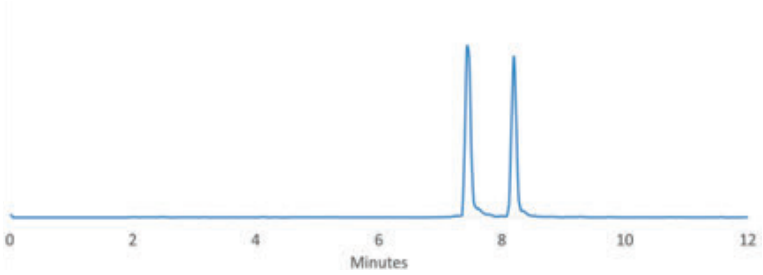
Quinolones

Detection of various quinolones in an extract chicken meat

Experimental

Column:	SVEA Core C18, 2.6 µm 110 Å 4.6 x 100 mm
Instrument:	HPLC
Mobile phase:	A: Methanol; B: 0.1% Formic acid in water.
	Gradient: 0-10% A in 2 min; 10-90% A in 4 min; 90% A for 3 min; 90-10% A in 2 min
Flow rate:	0.35 mL/min
Column temperature:	25°C
Detector:	MS/MS



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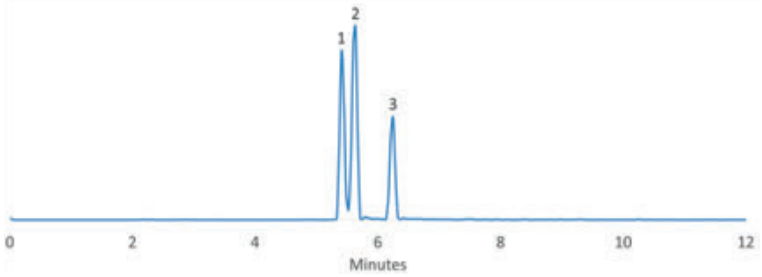
Sulfonamides

Detection of sulfonamides in an extract of chicken meat

Experimental

Column:	SVEA Core C18, 2.6 µm 110 Å 4.6 x 100 mm
Instrument:	HPLC
Mobile phase:	A: Methanol; B: 0.1% Formic acid in water. Gradient: 0-10% A in 2 min; 10-90% A in 4 min; 90% A for 3 min; 90-10% A in 2 min
Flow rate:	0.35 mL/min
Column temperature:	25°C
Detector:	MS/MS
Sample:	1. Sulfamethoxipyridazine 2. Sulfameter 3. Sulfamonomethoxine



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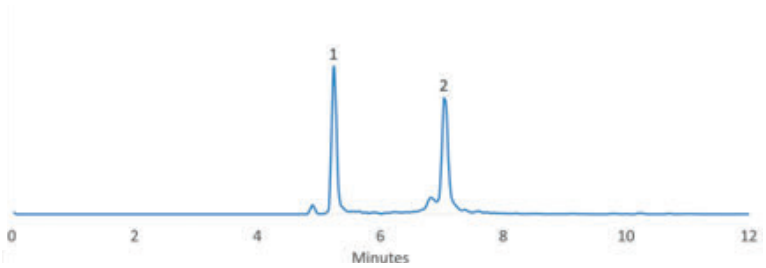
Tetracyclines

Detection of tetracyclines in an extract of chicken meat

Experimental

Column:	SVEA Core C18, 2.6 µm 110 Å 4.6 x 100 mm
Instrument:	HPLC
Mobile phase:	A: Methanol; B: 0.1% Formic acid in water. Gradient: 0-10% A in 2 min; 10-90% A in 4 min; 90% A for 3 min; 90-10% A in 2 min
Flow rate:	0.35 mL/min
Column temperature:	25°C
Detector:	MS/MS
Sample:	1. Terramycin 2. Doxycycline



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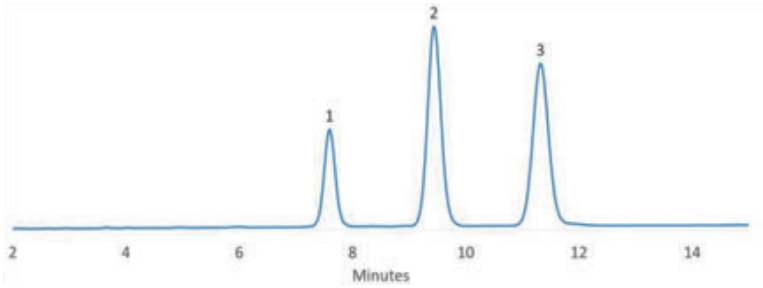
Tocopherols

Experimental

Column:	SVEA C18 Gold, 5 µm 110 Å 4.6 x 150 mm
Instrument:	HPLC
Mobile phase:	Methanol/water (95/05)
Flow rate:	2 mL/min
Column temperature:	30°C
Detector:	UV 210 nm
Sample:	1. Delta-tocopherol 2. Gamma-tocopherol 3. Alfa-tocopherol



Performance
R_s 2,1 = 4.58
Tailing (2) = 1.07

Water soluble vitamins

Experimental

Column: SVEA C18 Gold, 5 µm 110 Å 4.6 x 150 mm

Instrument: HPLC

Mobile phase: A: 25mM Potassium-phosphate buffer pH 3.6; B: Acetonitrile.
Gradient: 5-30% B in 8 minutes

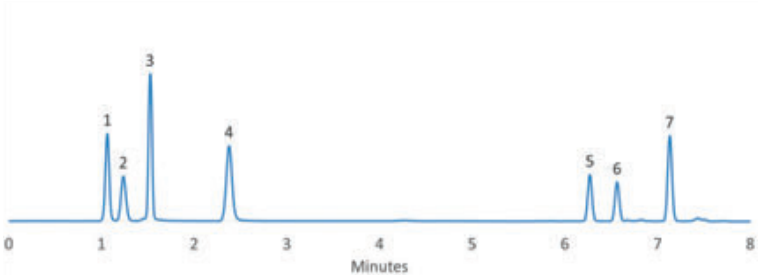
Flow rate: 1.5 mL/min

Column temperature: 25°C

Detector: UV 254 nm

Sample:

1. Pyridoxamine
2. Ascorbic acid
3. Nicotinic acid
4. Nicotinamide
5. Folic acid
6. Cyanocobaltamin
7. Ryboflavin



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