

# ACE<sup>®</sup>

UHPLC and HPLC Columns

## Food and Beverage Applications Guide





## Ultra-Inert Base Deactivated UHPLC / HPLC Columns

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# ACE<sup>®</sup> Food and Beverage Applications: Application Index

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# Separation of Additives and Intense Sweeteners

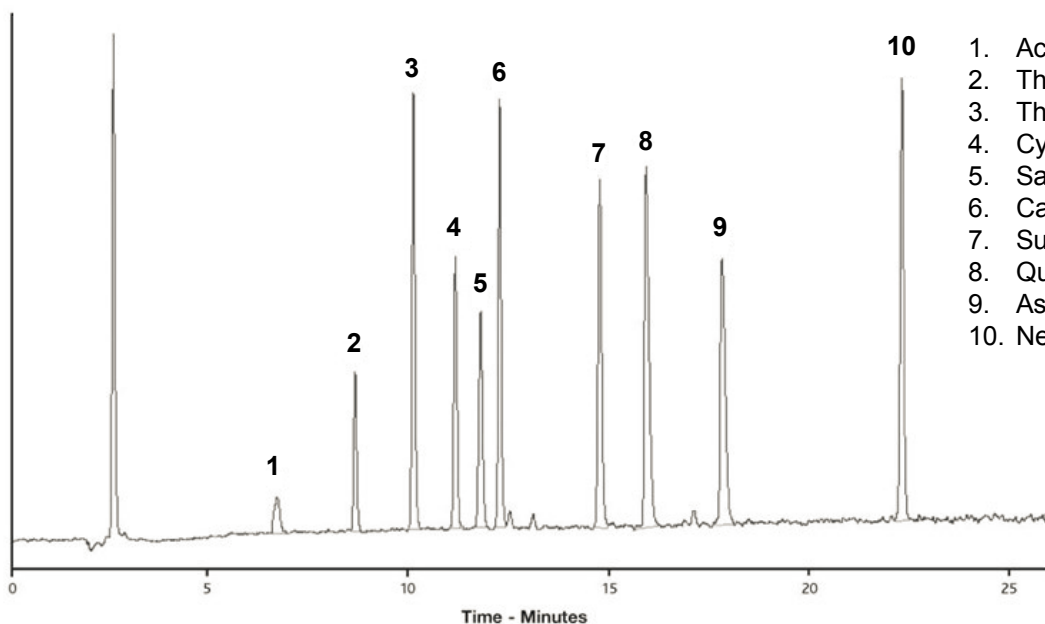
Application #AN2950

## Conditions

Column: ACE 5 C18  
Dimensions: 250 x 4.0 mm  
Part Number: ACE-121-2504  
Mobile Phase: A: H<sub>2</sub>O  
B: MeCN  
C: 1% TFA in H<sub>2</sub>O

Time (mins)	%A	%B	%C
0	88	2	10
25	50	40	10
30	30	60	10
35	88	2	10

Flow Rate: 1 mL/min  
Temperature: 30 °C  
Detection: ELSD



1. Acesulfame K
2. Theobromine
3. Theophylline
4. Cyclamate
5. Saccharin
6. Caffeine
7. Sucralose
8. Quinine sulphate
9. Aspartame
10. Neohesperidin dihydrochalcone



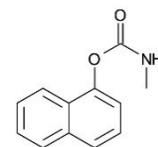
## Conditions

Column: ACE UltraCore 2.5 SuperC18  
 Dimensions: 50 x 2.1 mm  
 Part Number: CORE-25A-0502U  
 Mobile Phase: A: 0.1% formic acid + 5 mM ammonium formate in H<sub>2</sub>O/MeOH (90:10 v/v)  
 B: 0.1% formic acid + 5 mM ammonium formate in H<sub>2</sub>O/MeOH (10:90 v/v)

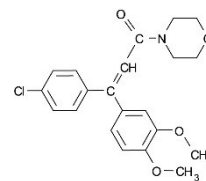
Time (mins)	%B
-------------	----

0.00	0
1.00	0
15.00	100
18.00	100
18.05	0
20.00	0

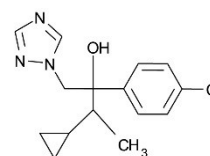
Flow Rate: 0.4 mL/min  
 Injection: 20 µL  
 Temperature: 40 °C  
 Detection: Agilent 6420 Triple Quadrupole MS,  
 +ve mode ESI  
 Dynamic MRM



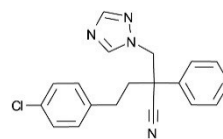
1. Carbaryl  
(*m/z* 202.10 → 145.10)



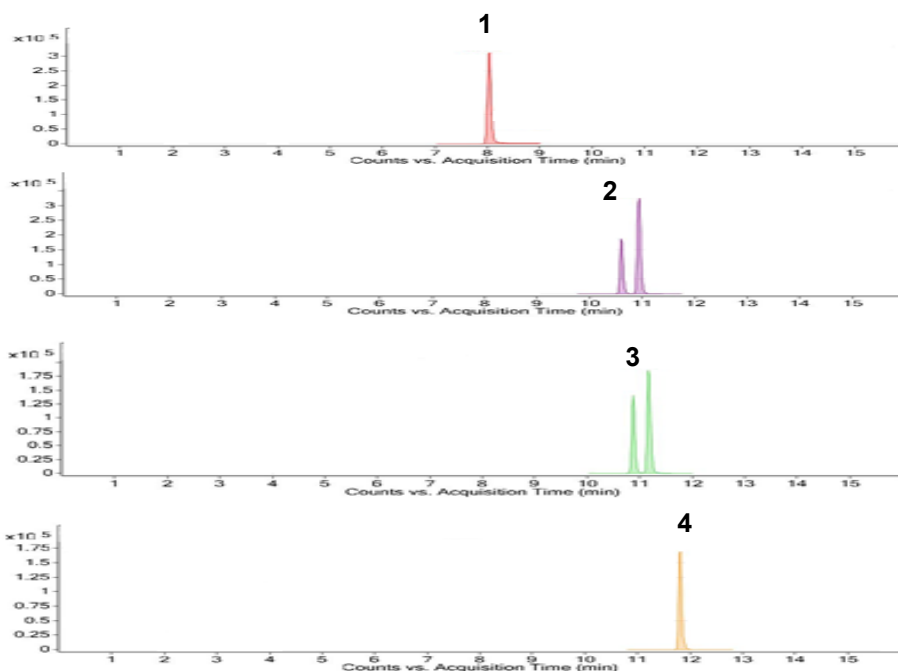
2. Dimethomorphs  
(*m/z* 388.10 → 301.10)



3. Cyproconazoles  
(*m/z* 292.10 → 70.00)



4. Fenbuconazole  
(*m/z* 337.10 → 70.00)



Also analysed under same conditions:

Acephate, Acetamiprid, Aldicarb, Aldicarb sulfone, Aldicarb sulfoxide, Benomyl, Carbendazim, Carbofuran, Clofentezine, Clothianidin, Cyfluthrin, Demeton S-methylsulfone, Demeton S-methylsulfoxide, Dicrotophos, Dimethoate, Dinotefuran, DMA, DMPF, Flubendiamide, Folpet, Formetanate, Hexaconazole, Hexaflumuron, Imidacloprid, Indoxacarb, Mandipropamid, Methamidophos, Methomyl, Monocrotophos, Nicotine, Omethoate, Oxamyl, Pencycuron, Prochloraz, Propargite, Thiabendazole, Thiachloprid, Thiamethoxam, Thiodicarb, Thiophanate methyl and Triflorine

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# Free Amino Acids in Peas (*Pisum sativum*) by HPLC-HRAM-MS

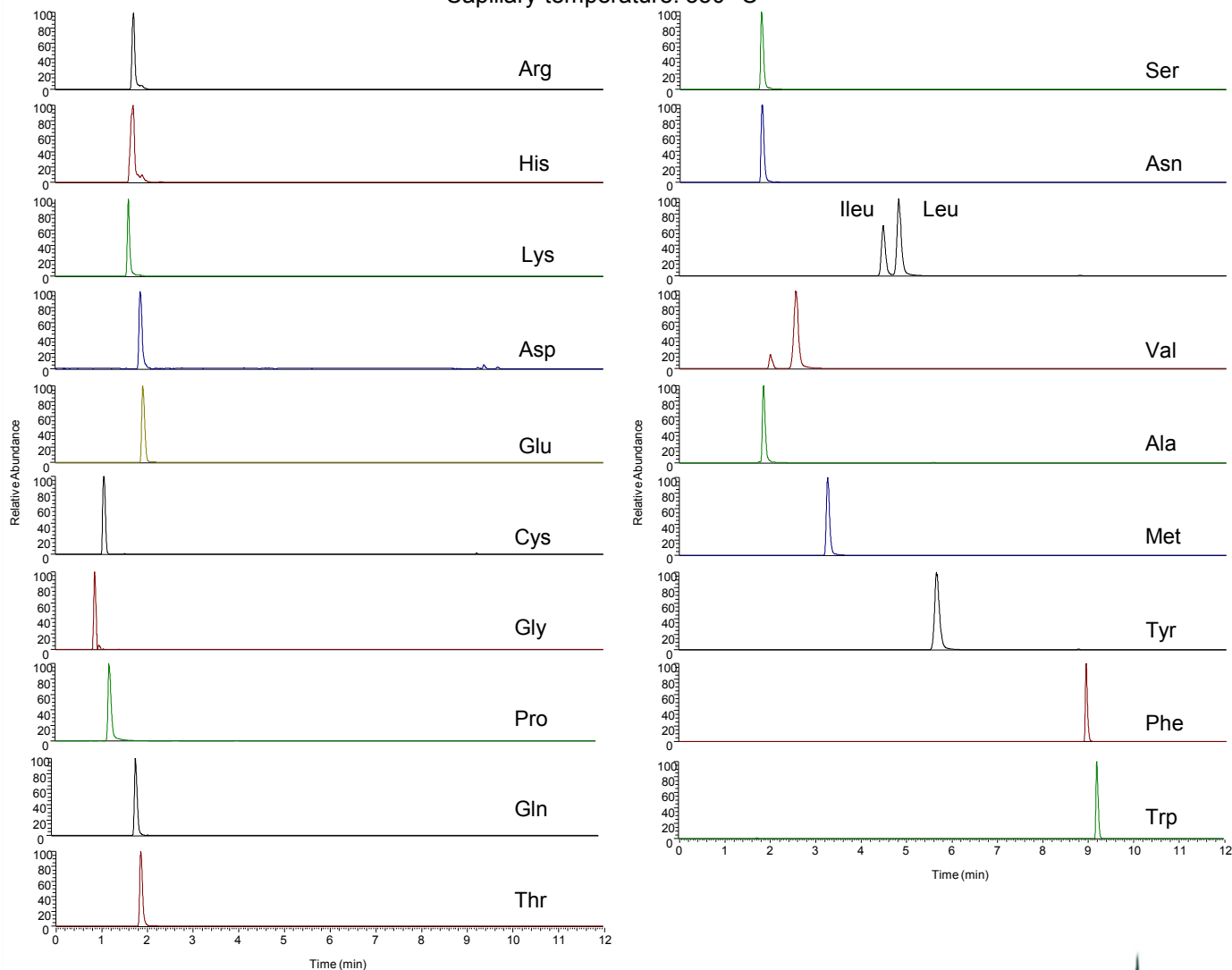
Application #AN2660

## Conditions

Column: ACE 3 AQ  
Dimensions: 150 x 3.0 mm  
Part Number: ACE-116-1503  
Mobile Phase: A: 0.1% formic acid in H<sub>2</sub>O  
B: 0.1% formic acid in MeCN

Time (mins)	%B
0	0
10	100

Flow Rate: 0.4 mL/min  
Injection: 5 µL  
Temperature: 30 °C  
Detection: Exactive Orbitrap high resolution MS  
ESI positive ion mode  
Capillary temperature: 350 °C



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# Amino Acids and Biogenic Amines in Wine and Beer

Application #AN2800

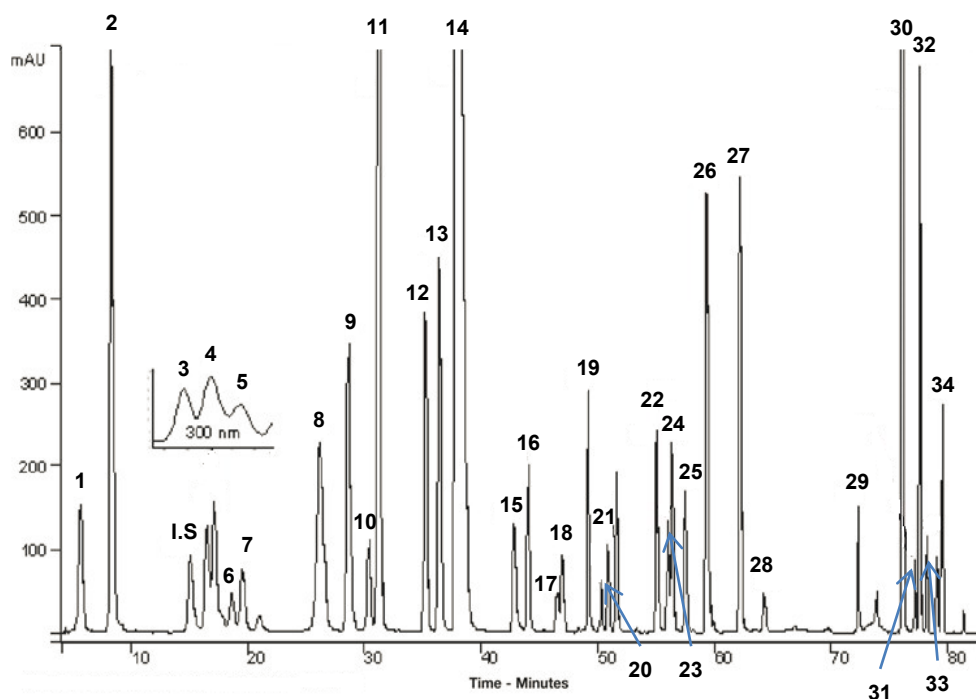
## Conditions

Column: ACE 5 C18-HL  
Dimensions: 250 x 4.6 mm  
Part Number: ACE-321-2546  
Mobile Phase: A: 25 mM acetate buffer pH 5.8 in H<sub>2</sub>O  
B: MeCN/MeOH (80:20 v/v)

Time (mins)	%B
0.0	45
20.0	60
30.5	17
33.5	17
65.0	40
73.0	72
78.0	82
82.0	100
85.0	100

Flow Rate: 0.8 mL/min  
Injection: 20 µL  
Temperature: 16 °C  
Detection: UV, 269 nm, 280 nm and 300 nm

1. Aspartic acid
2. Glutamic acid
3. Asparagine
4. Serine
5. Hydroxyproline
6. Glutamine
7. Histidine
8. Glycine
9. Threonine
10. β-Alanine
11. Arginine
12. α-Alanine
13. GABA
14. Proline
15. Histamine
16. Tyrosine
17. Ammonium ion
18. Agmatine
19. Valine
20. Methionine
21. Cysteine
22. Isoleucine
23. Tryptophan
24. Leucine
25. Phenylalanine
26. Ornithine
27. Lysine
28. Spermidine
29. Tyramine
30. Putrescine
31. Tryptamine
32. Cadaverine
33. Phenylethylamine
34. Isoamylamine
- I.S. L-2-Amino adipic acid

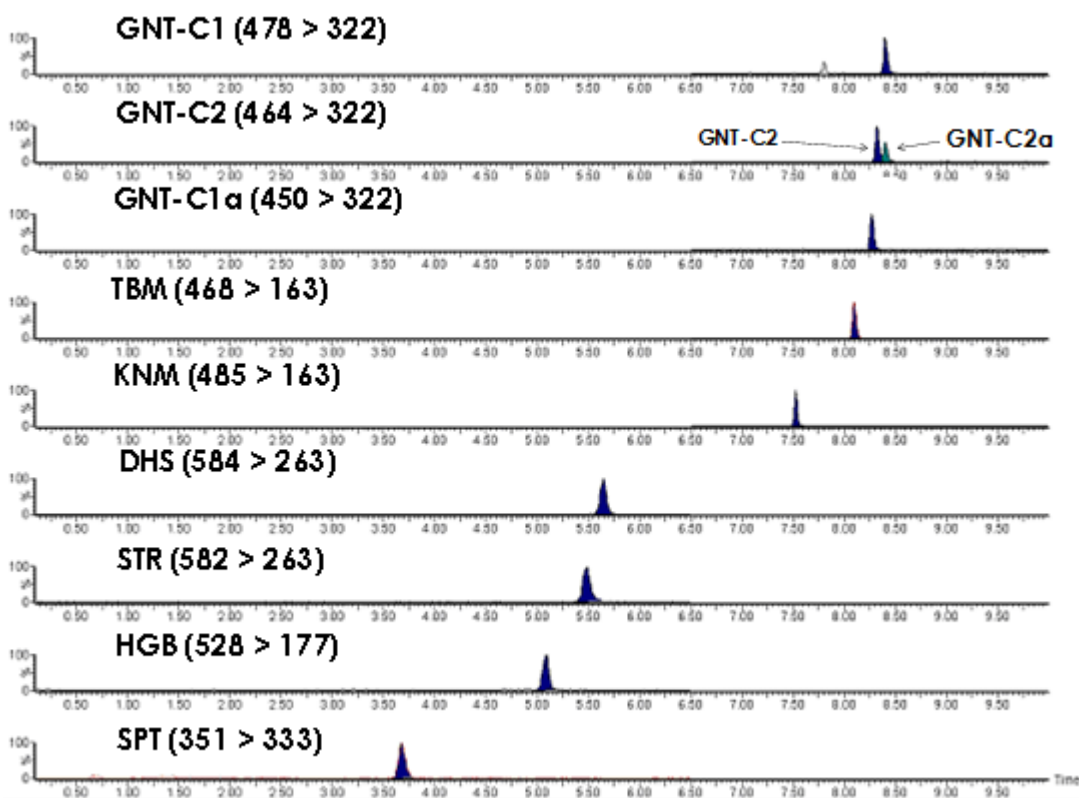


## Conditions

Column: ACE Excel 2 C18-PFP  
Dimensions: 100 x 2.1 mm  
Part Number: EXL-1010-1002U  
Mobile Phase: A: 20 mM HFBA in H<sub>2</sub>O/MeCN (98:2 v/v)  
B: 20 mM HFBA in MeCN/H<sub>2</sub>O (98:2 v/v)

Time (mins)	%B	Curve
0.0	5.0	-
2.0	15.0	6
4.5	19.0	6
5.5	19.5	8
6.0	22.0	6
7.0	35.0	6
9.0	48.0	8
9.5	5.0	6

Flow Rate: 0.4 mL/min  
Temperature: 40 °C  
Detection: Positive ESI MRM (transitions as shown)  
Sample: Extraction at low pH, clean up with WCX SPE cartridge  
Egg sample spiked at 100 µg/kg (CCα)



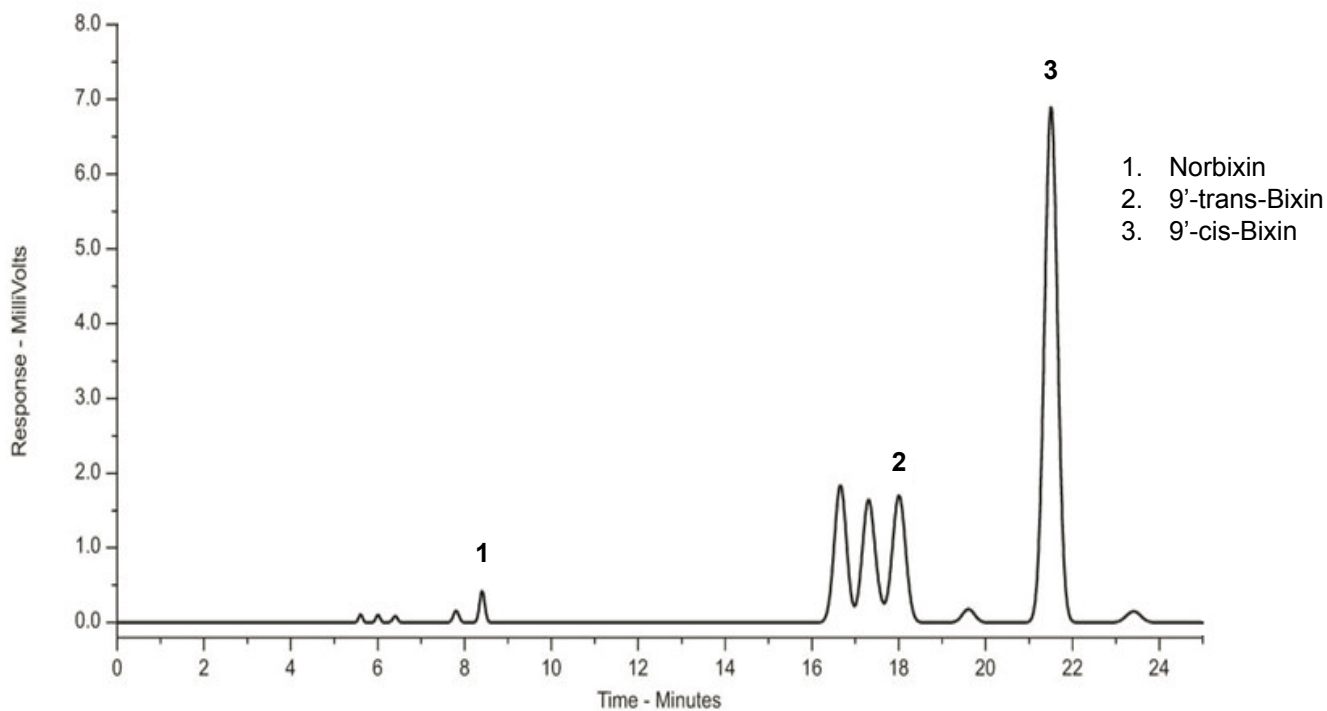
Key  
GNT Gentamicin  
TBM Tobramycin  
KNM Kanamycin  
DHS Dihydrostreptomycin  
STR Streptomycin  
HGB Higmomycin-B  
SPT Spectinomycin

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## Conditions

Column: ACE 5 C18  
Dimensions: 250 x 4.6 mm  
Part Number: ACE-121-2546  
Mobile Phase: MeCN/0.16% acetic acid in H<sub>2</sub>O (70:30 v/v)  
Flow Rate: 1.2 mL/min  
Temperature: Ambient  
Detection: UV-Vis, 478 nm



# Anthocyanins from *Sambucus Nigra* (Elderberry)

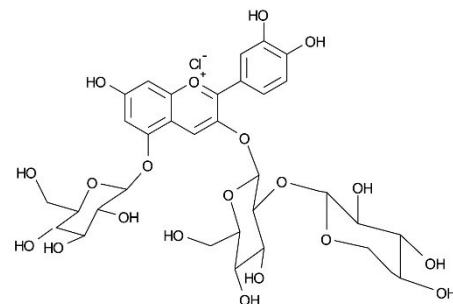
## Application #AN2750

### Conditions

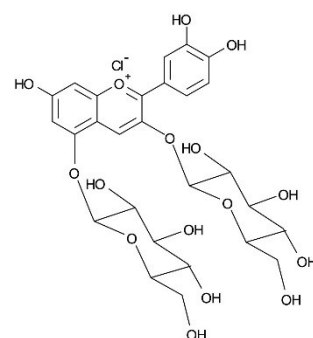
Column: ACE UltraCore 5 SuperC18  
Dimensions: 150 x 4.6 mm  
Part Number: CORE-5A-1546U  
Mobile Phase: A: 5% formic acid in H<sub>2</sub>O  
B: MeOH

Time (mins)	%B
0	5
35	10
55	65
65	65

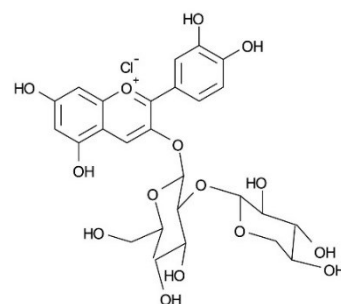
Flow Rate: 1 mL/min  
Temperature: 40 °C  
Detection: UV-Vis, 525 nm



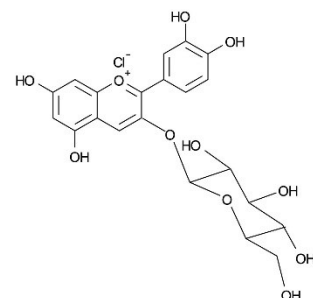
1. Cyanidin-3-sambubioside-5-glucoside



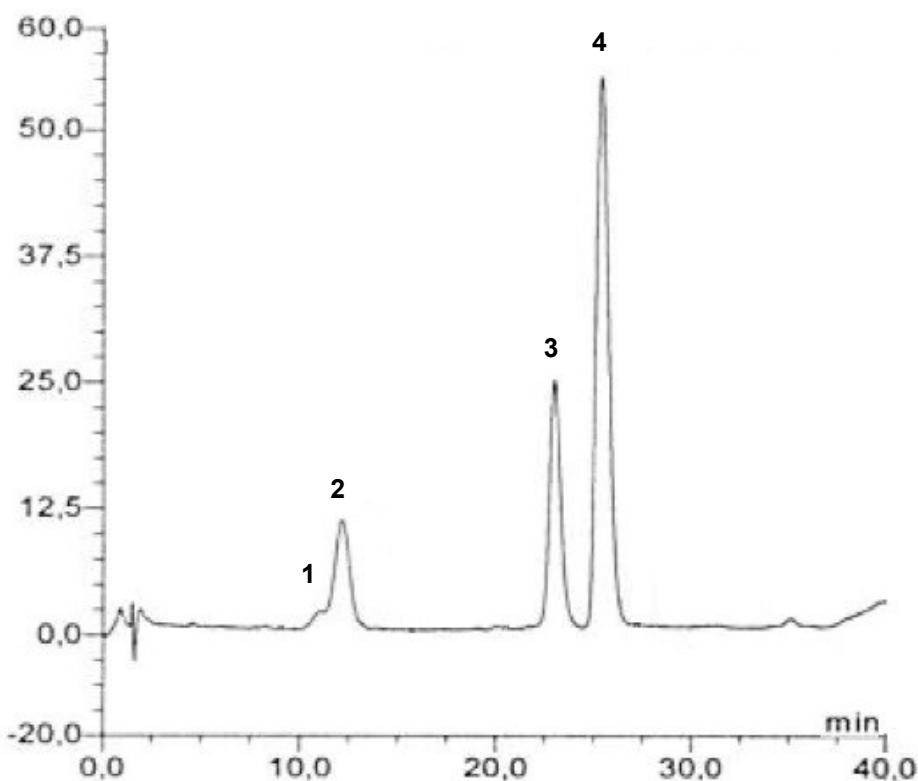
2. Cyanidin-3,5-diglucoside



3. Cyanidin-3-sambubioside



4. Cyanidin-3-glucoside

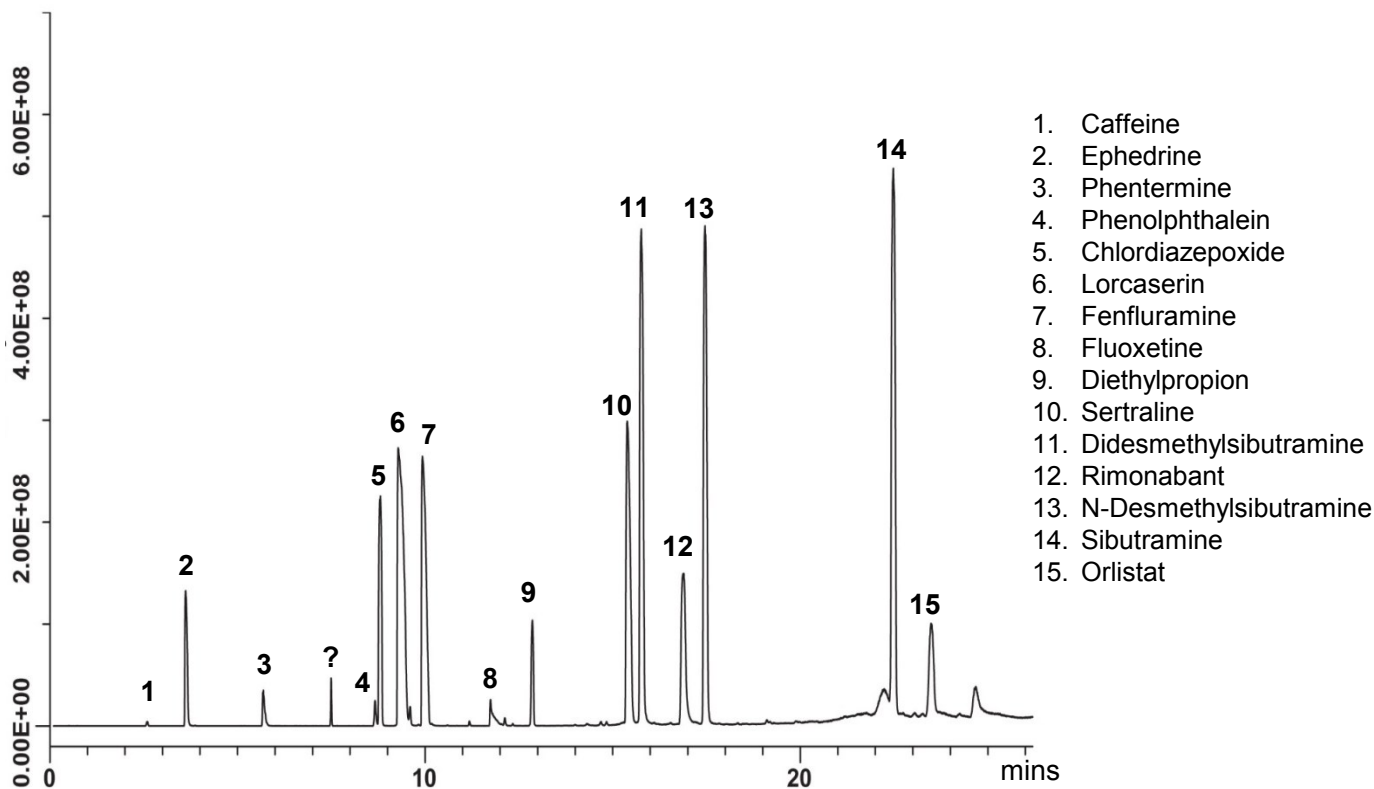


## Conditions

Column: ACE Excel 2 SuperC18  
 Dimensions: 100 x 2.1 mm  
 Part Number: EXL-1011-1002U  
 Mobile Phase: A: 10 mM ammonium acetate pH 9.35 with ammonium hydroxide  
 B: 10 mM ammonium acetate pH 9.35/MeCN (10:90 v/v)

Time (mins)	%B
0.0	11.11
1.0	11.11
21.0	100
23.0	100

Flow Rate: 0.5 mL/min  
 Injection: 2 µL  
 Temperature: 25 °C  
 Detection: MS



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# Arsenolipids from Edible Seaweed by LC-ICP-MS and LC-ESI-MS

Application #AN1970

## Conditions

Column: ACE 3 C18  
Dimensions: 150 x 4.6 mm  
Part Number: ACE-111-1546  
Mobile Phase: A: 0.1% formic acid in H<sub>2</sub>O  
B: 0.1% formic acid in MeOH

Time (mins)	%B
0	0
20	100
45	100

Flow Rate: 1 mL/min  
Injection: 100 µL  
Temperature: 45 °C  
Detection: Split ratio: 75% ESI-MS: 25% ICP-MS  
Thermo Scientific Element 2 ICP-MS  
Mode: Organic mode  
Medium resolution  
Thermo Scientific Orbitrap Discovery  
Positive ESI mode  
Spray voltage: 4.5 kV  
Capillary temperature: 320 °C  
Capillary voltage: 42 V

Arsenic-containing hydrocarbon:

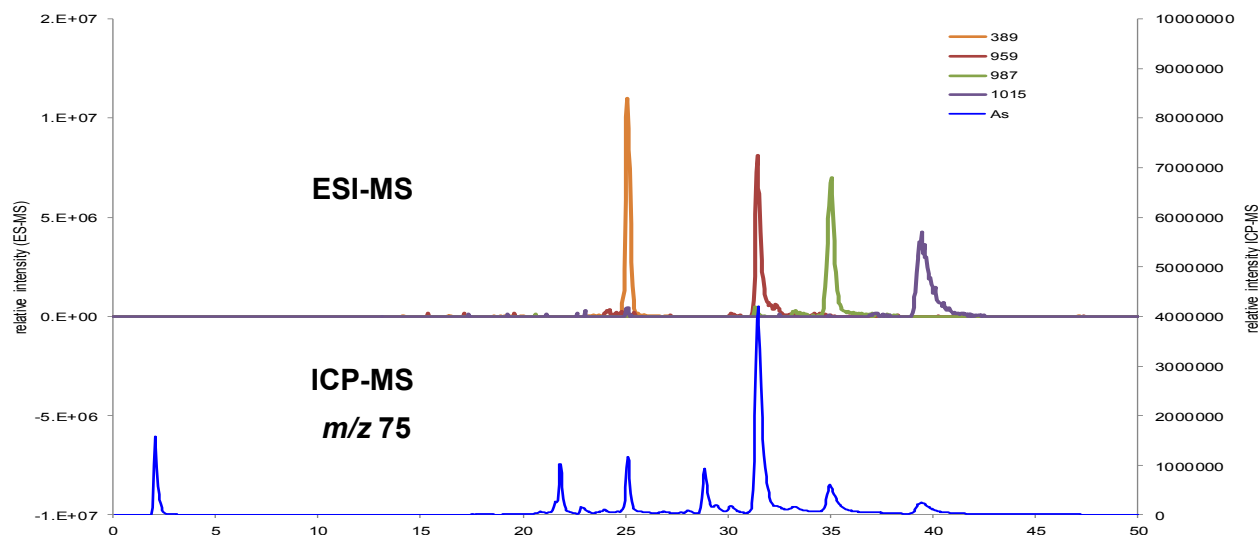
*m/z* 389 [M + H]<sup>+</sup> for C<sub>21</sub>H<sub>46</sub>AsO

Arsenic-containing phospholipids:

*m/z* 959 [M + H]<sup>+</sup> for C<sub>45</sub>H<sub>89</sub>AsO<sub>14</sub>P (C16:0/C16:0)

*m/z* 987 [M + H]<sup>+</sup> for C<sub>47</sub>H<sub>93</sub>AsO<sub>14</sub>P (C18:0/C16:0)

*m/z* 1015 [M + H]<sup>+</sup> for C<sub>49</sub>H<sub>97</sub>AsO<sub>14</sub>P (C20:0/C16:0)

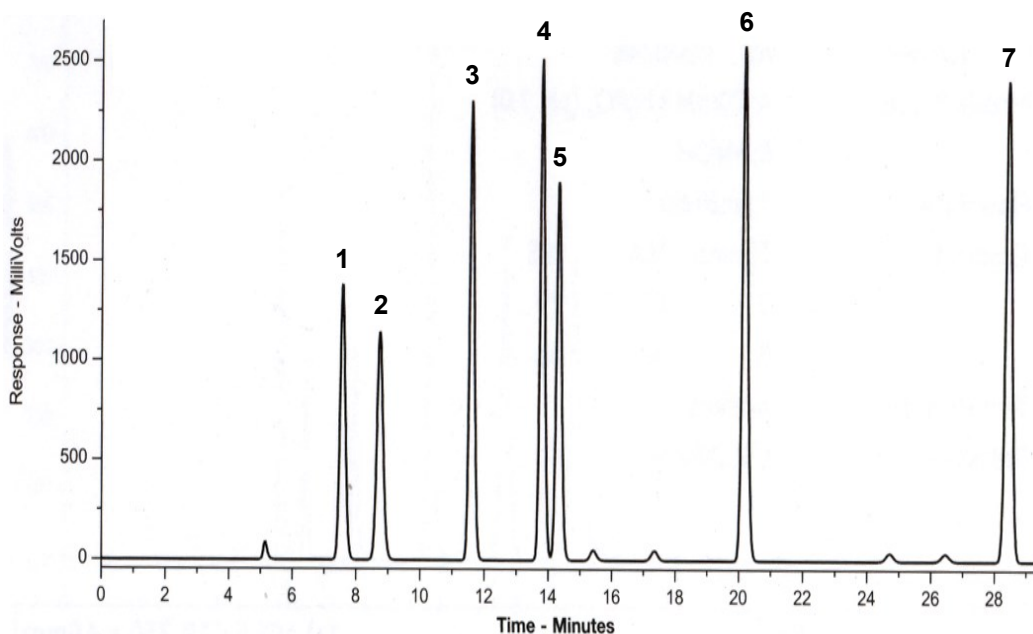


## Conditions

Column: ACE 3 C18  
Dimensions: 100 x 4.6 mm  
Part Number: ACE-111-1046  
Mobile Phase: A: 3 mM tetrabutylammonium bromide and 5 mM KH<sub>2</sub>PO<sub>4</sub> in H<sub>2</sub>O  
B: 5 mM tetrabutylammonium bromide in MeOH

Time (mins)	%B
0	45
20	70
30	45
40	45

Flow Rate: 0.8 mL/min  
Injection: 10 µL  
Temperature: Ambient  
Detection: UV-Vis, 420 nm, 520 nm and 600 nm



1. Amaranth
2. Sunset Yellow
3. Allura Red
4. Red 2G
5. Ponceau 4R
6. Carmoisine
7. Erythrosine





# Separation of Artificial Food Colours

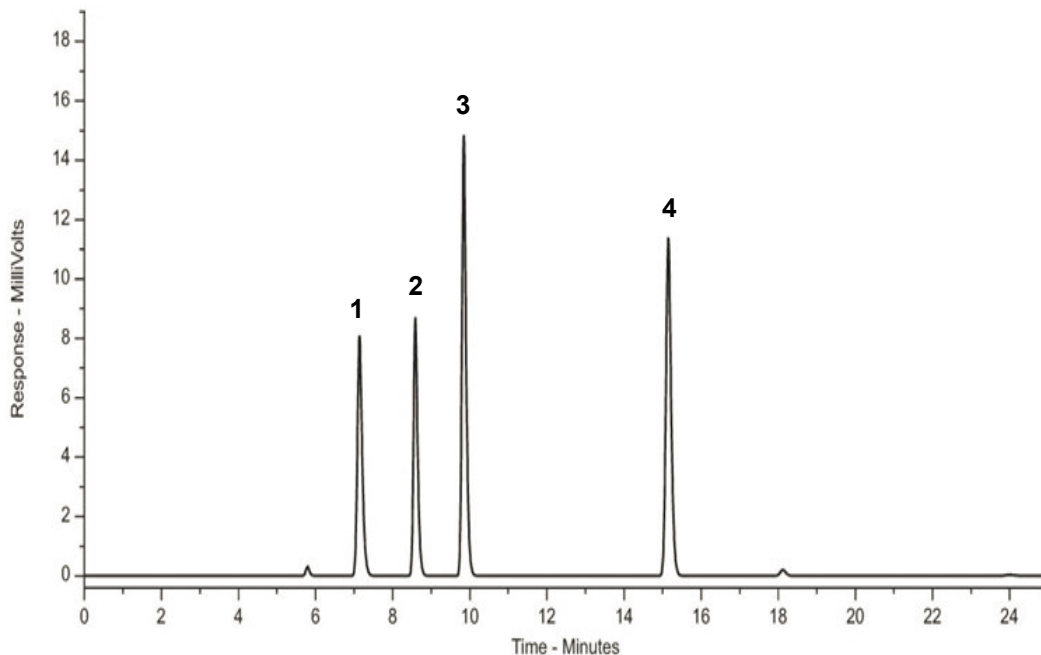
Application #AN2960

## Conditions

Column: ACE 3 C18  
Dimensions: 100 x 4.6 mm  
Part Number: ACE-111-1046  
Mobile Phase: A: 3.1 mM tetrabutylammonium bromide and 5 mM KH<sub>2</sub>PO<sub>4</sub> in H<sub>2</sub>O  
B: 5 mM KH<sub>2</sub>PO<sub>4</sub> in MeOH

Time (mins)	%B
0	45
12	60
25	45

Flow Rate: 0.8 mL/min  
Injection: 10 µL  
Temperature: Ambient  
Detection: UV-Vis, 480 nm



1. Tartrazine
2. Amaranth
3. Sunset Yellow
4. Ponceau 4R

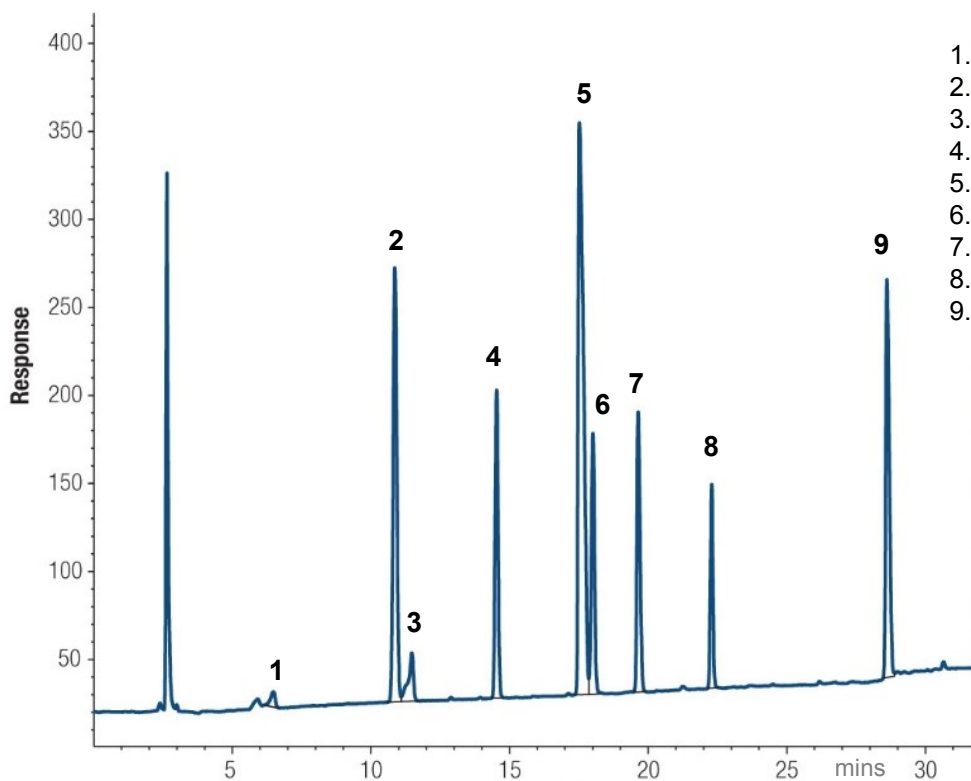


## Conditions

Column: ACE 5 C18  
Dimensions: 250 x 4.6 mm  
Part Number: ACE-121-2546  
Mobile Phase: A: H<sub>2</sub>O  
B: MeCN  
C: 0.1% TFA

Time (mins)	%A	%B	%C
0	88	2	10
25	50	40	10
30	30	60	10
35	88	2	10

Flow Rate: 1 mL/min  
Injection: 50 µL  
Temperature: 30 °C  
Detection: Corona CAD



1. Acesulfame K
2. Cyclamate
3. Saccharin
4. Sucralose
5. Aspartame
6. Neotame
7. Alitame
8. Neohesperidin dihydrochalcone
9. Dulcin

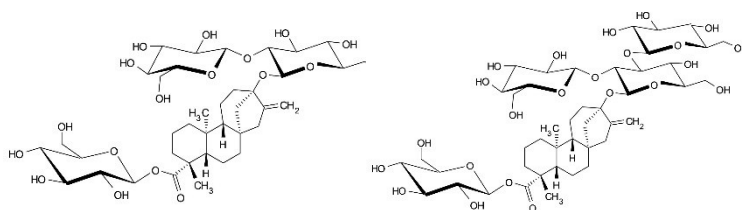
Data courtesy of Durham County Council Scientific Services, UK  
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## Conditions

Column: ACE Excel 2 SuperC18  
 Dimensions: 150 x 2.1 mm  
 Part Number: EXL-1011-1202U  
 Mobile Phase: A: 10 mM sodium dihydrogen phosphate pH 2.8 in H<sub>2</sub>O  
 B: 10 mM sodium dihydrogen phosphate pH 2.8 in H<sub>2</sub>O/MeCN (80:20 v/v)

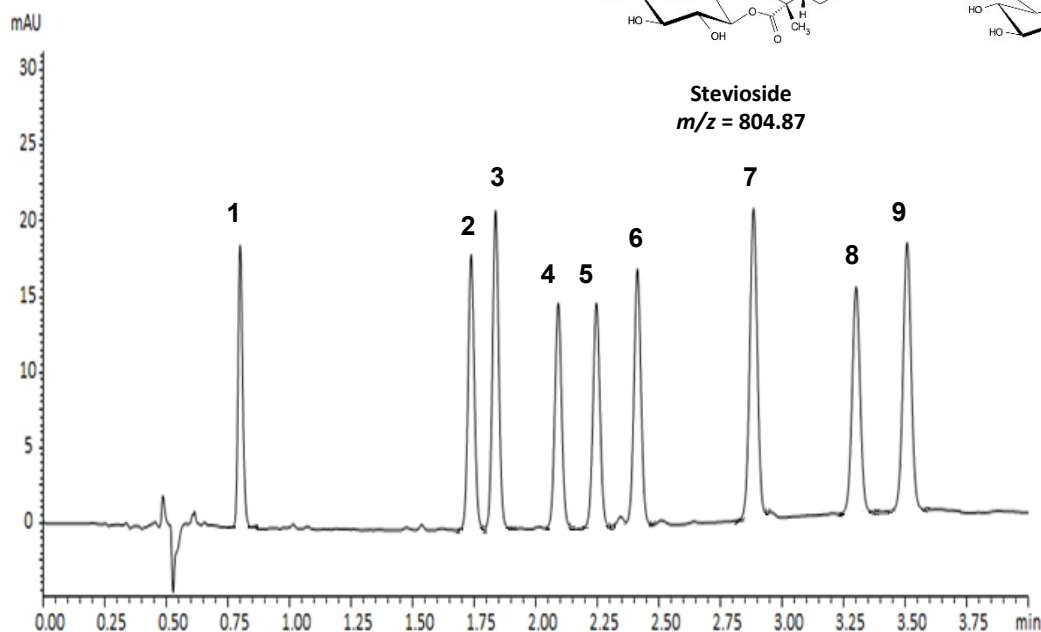
Time (mins)	%B
0	39.5
4	48.0

Flow Rate: 0.6 mL/min  
 Injection: 1 µL  
 Temperature: 50 °C  
 Detection: UV, 200 nm



**Stevioside**  
*m/z* = 804.87

**Rebaudioside**  
*m/z* = 967.01

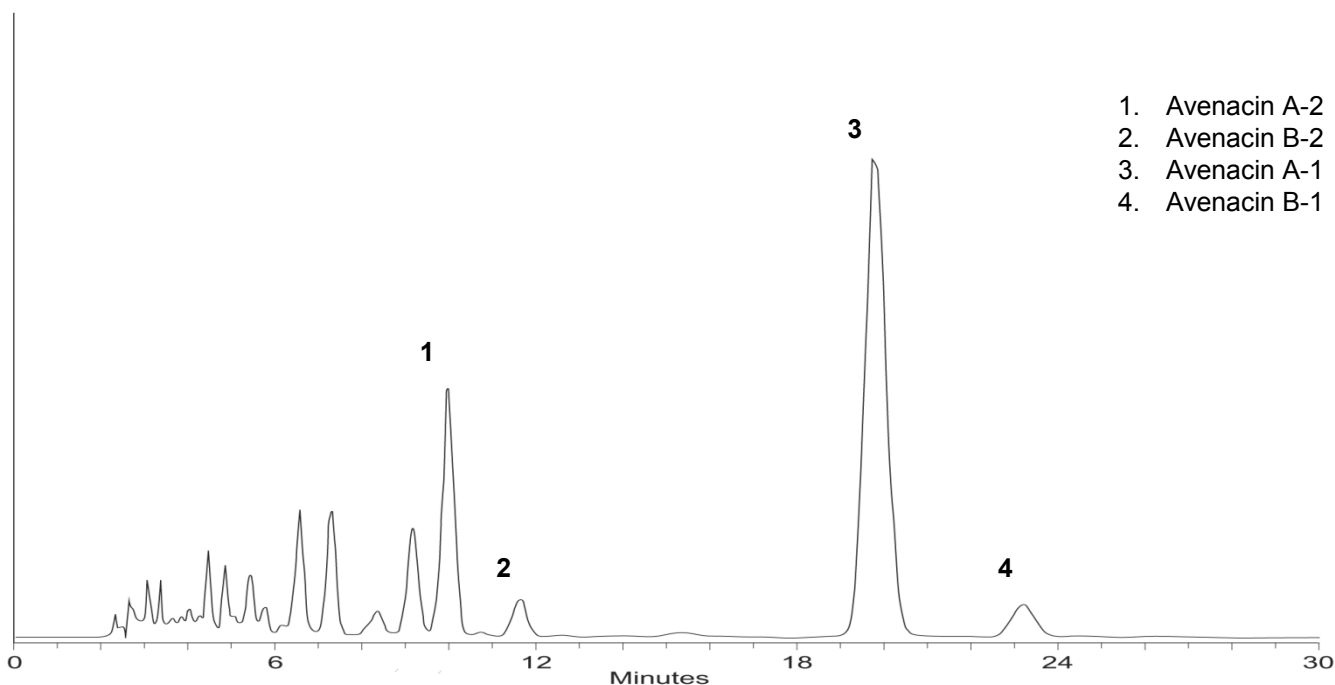


1. Rebaudioside D
2. Rebaudioside A
3. Stevioside
4. Rebaudioside F
5. Rebaudioside C
6. Dulcoside A
7. Rubusoside
8. Rebaudioside B
9. Steviolbioside



## Conditions

Column: ACE 5 C18  
Dimensions: 250 x 4.6 mm  
Part Number: ACE-121-2546  
Mobile Phase: H<sub>2</sub>O/MeOH (30:70 v/v)  
Flow Rate: 1 mL/min  
Temperature: Ambient  
Detection: UV, 225 nm  
Sample: Partially purified extract from oat root



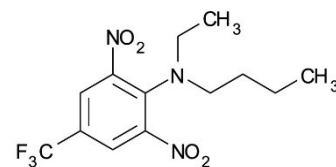
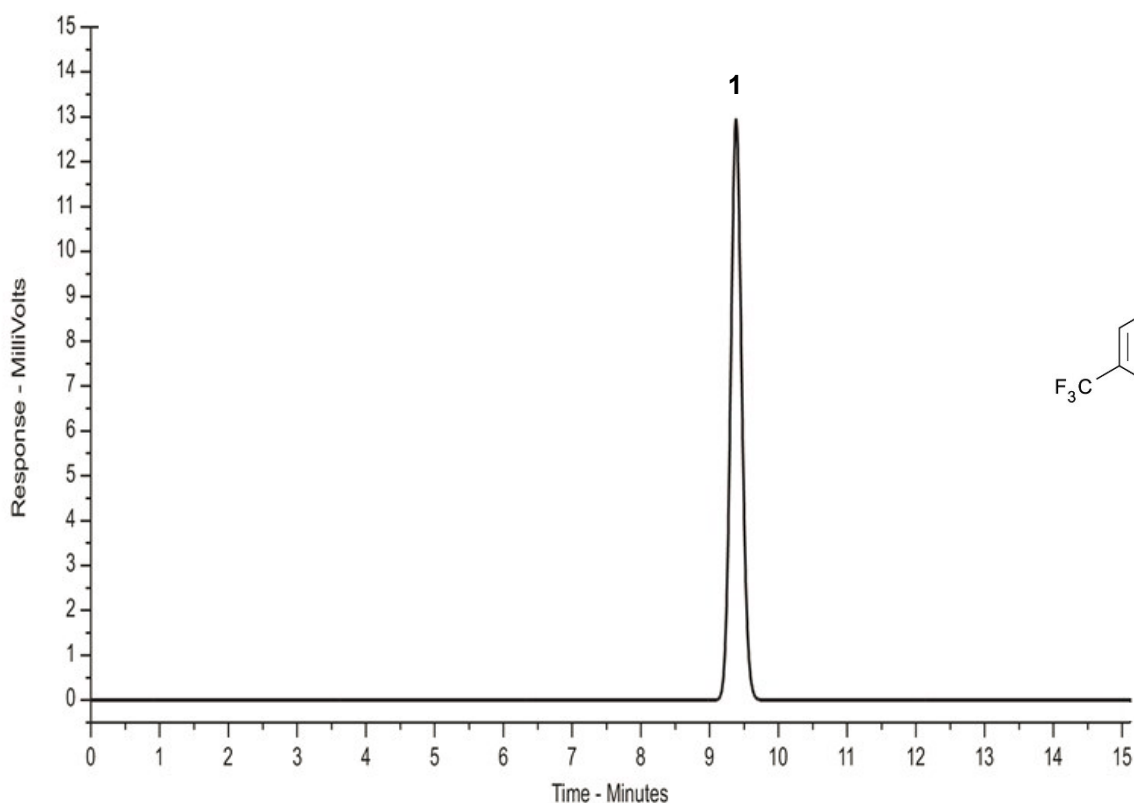
# Detection of the Herbicide Benfluralin

**ACE**<sup>®</sup>  
Ultra-inert  
UHPLC & HPLC Columns

Application #AN2880

## Conditions

Column: ACE 5 C18  
Dimensions: 250 x 4.6 mm  
Part Number: ACE-121-2546  
Mobile Phase: H<sub>2</sub>O/MeOH (15:85 v/v)  
Flow Rate: 1 mL/min  
Temperature: Ambient  
Detection: UV, 254 nm



1. Benfluralin



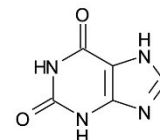
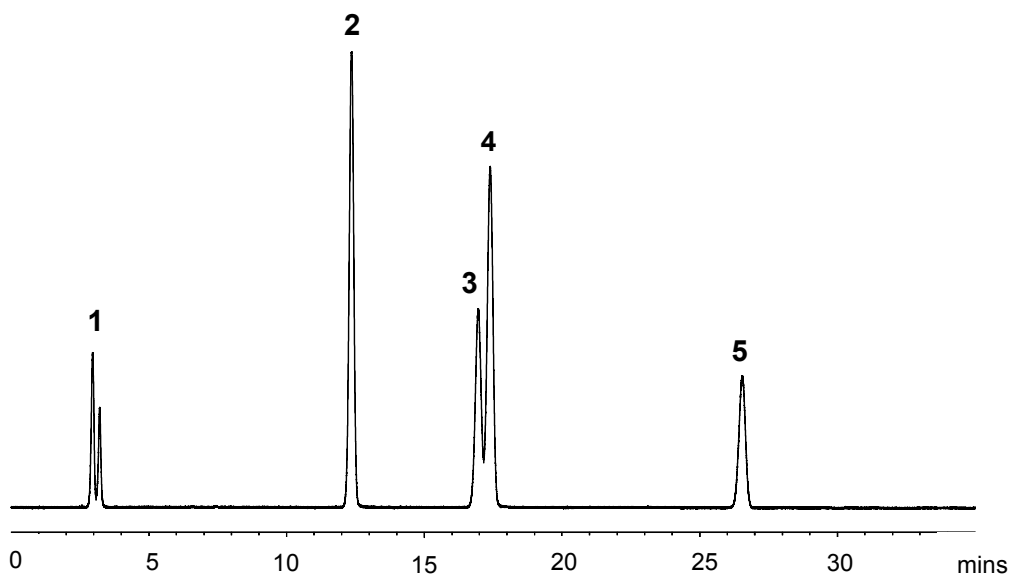
## Conditions

Column: ACE 5 SuperC18  
 Dimensions: 150 x 4.6 mm  
 Part Number: EXL-1211-1546U  
 Mobile Phase: A: 20 mM ammonium acetate pH 7.0 in H<sub>2</sub>O  
 B: 20 mM ammonium acetate pH 7.0 in MeCN/H<sub>2</sub>O (90:10 v/v)

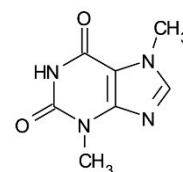
Time (mins)	%B
0	2
45	15
48	15
49	2

Post time 10 minutes

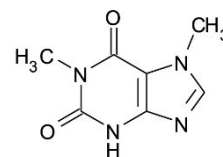
Flow Rate: 1 mL/min  
 Injection: 1 µL  
 Temperature: 60 °C  
 Detection: UV, 273 nm



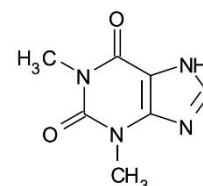
1. Xanthine



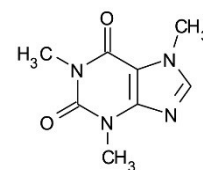
2. Theobromine



3. Paraxanthine



4. Theophylline



5. Caffeine

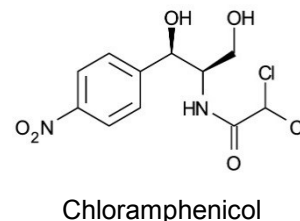
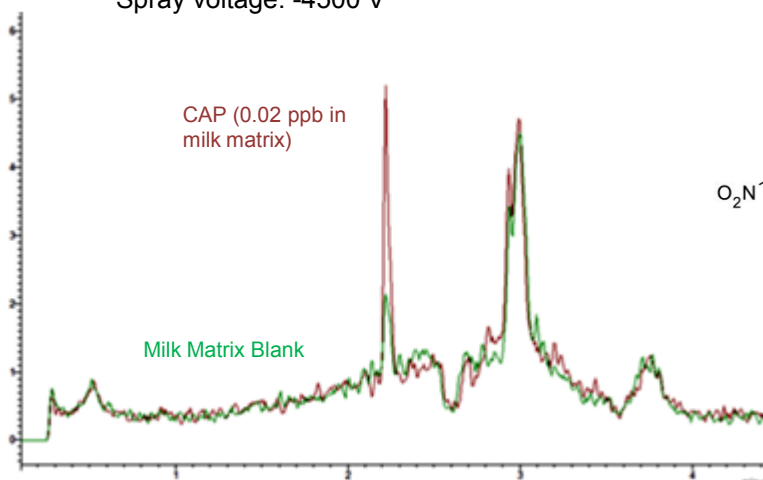
## Conditions

Column: ACE 3 C18  
Dimensions: 50 x 2.1 mm  
Part Number: ACE-111-0502  
Mobile Phase: A: H<sub>2</sub>O  
B: MeOH

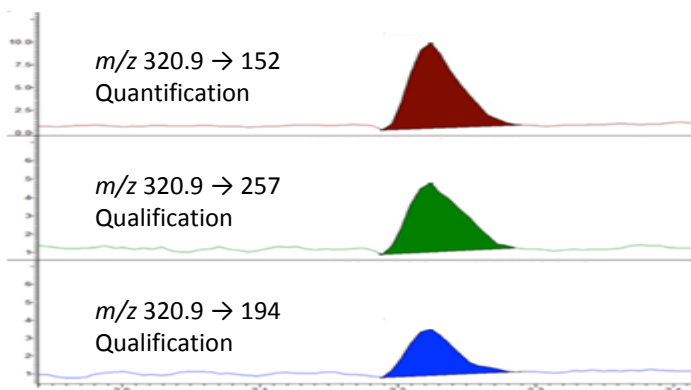
Time (mins)	%B
0.00	10
0.05	10
2.50	95
3.00	95
3.10	10
4.50	10

Flow Rate: 0.5 mL/min  
Injection: 10 µL  
Detection: Bruker EVOQ Elite triple quad MS  
VIP heated-ESI temperature: 400 °C  
Cone gas temperature: 350 °C  
Spray voltage: -4500 V

TIC of 3 MRMs of 0.02 ppb chloramphenicol spiked in milk matrix



MRM chromatograms of 0.05 ppb chloramphenicol in milk



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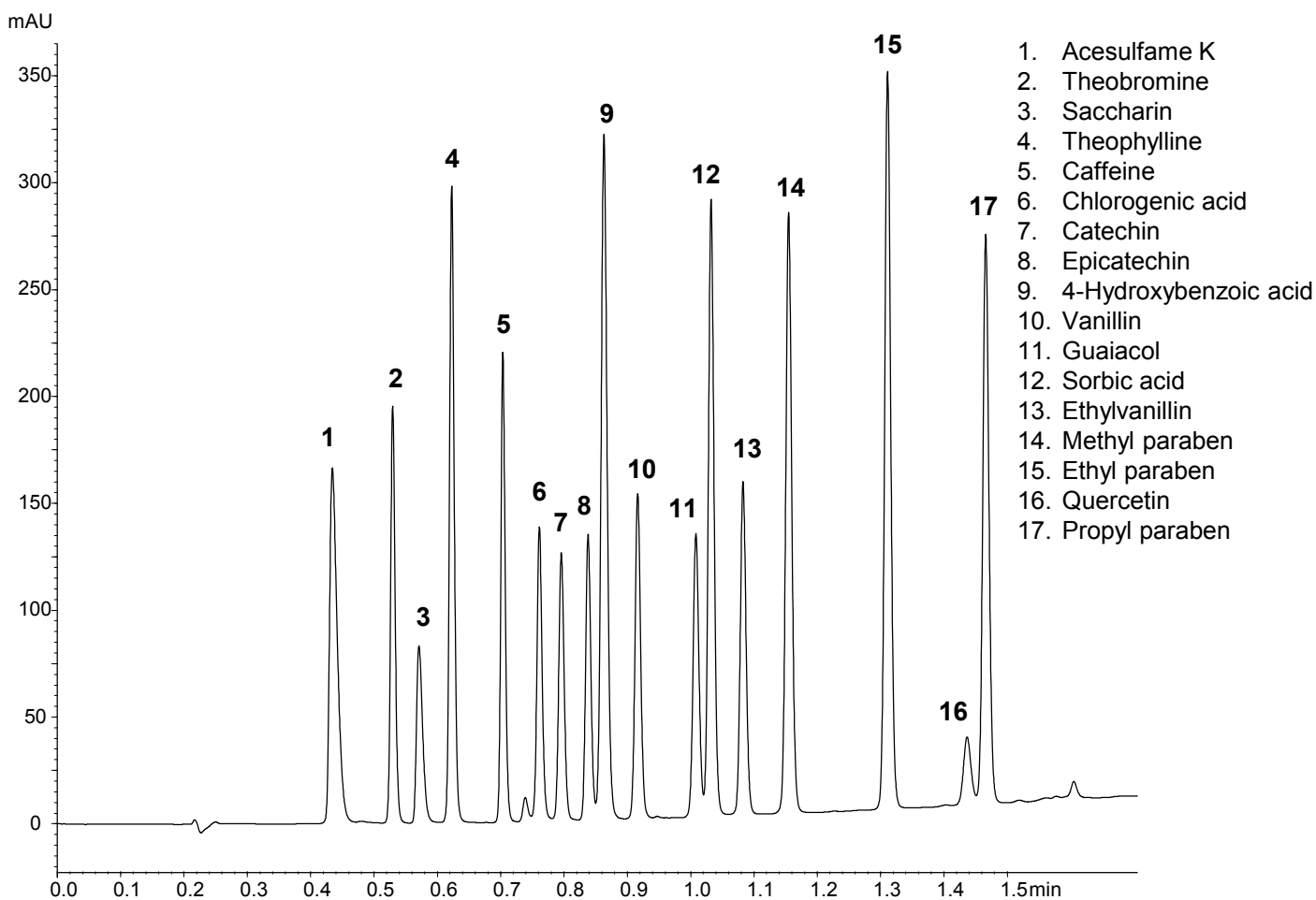


## Conditions

Column: ACE Excel 2 C18-Amide  
 Dimensions: 100 x 2.1 mm  
 Part Number: EXL-1012-1002U  
 Mobile Phase: A: 10 mM ammonium formate pH 2.8 in H<sub>2</sub>O  
 B: 10 mM ammonium formate pH 2.8 in MeCN/H<sub>2</sub>O (90:10 v/v)

Time (mins)	%B
0.0	5
1.5	85

Flow Rate: 1.2 mL/min  
 Temperature: 42 °C  
 Detection: UV, 254 nm





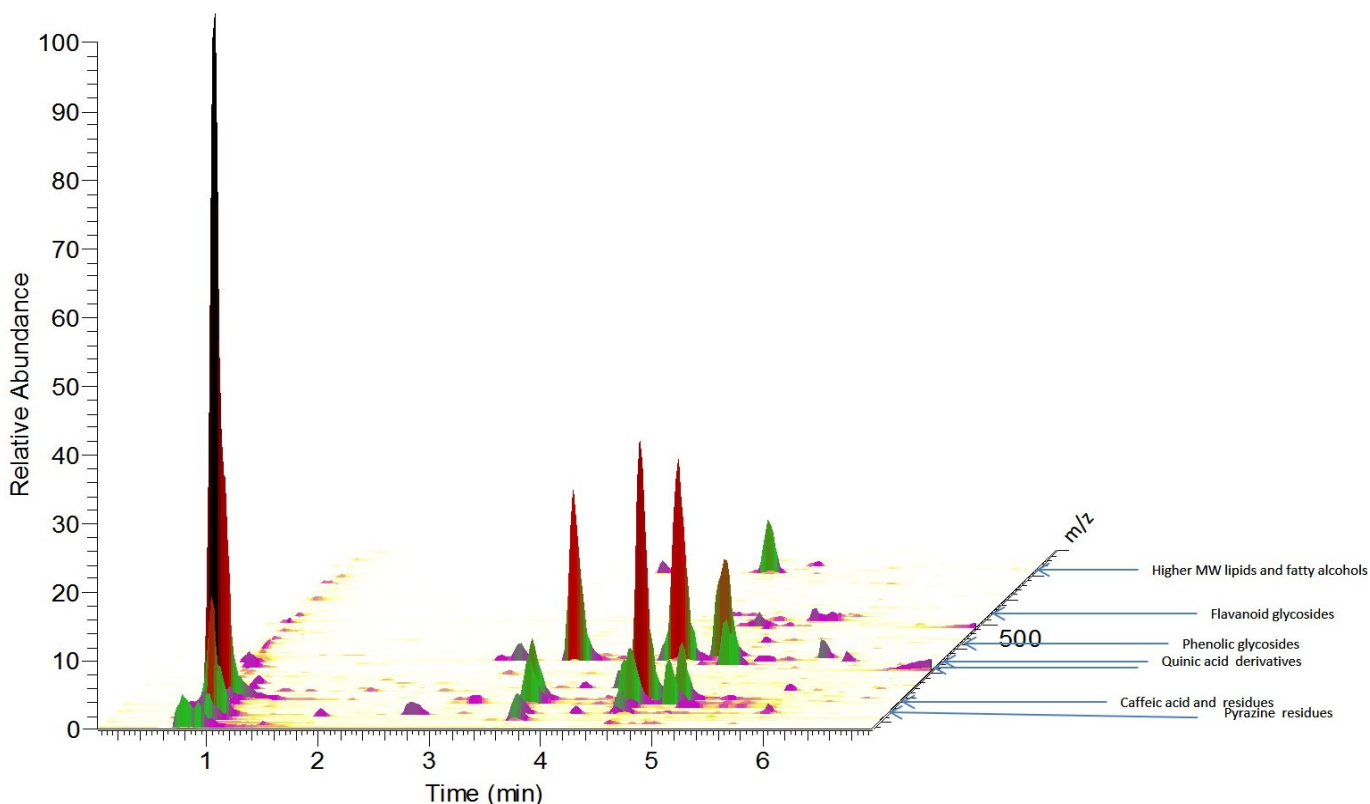
## Conditions

Column: ACE Excel 1.7 C18-Amide  
 Dimensions: 100 x 2.1 mm  
 Part Number: EXL-1712-1002U  
 Mobile Phase: A: 0.01% formic acid in H<sub>2</sub>O  
 B: 0.01% formic acid in MeCN

Time (mins)	%B
0.0	3
2.5	10
8.0	100
8.5	3
10.0	3

Flow Rate: 0.5 mL/min  
 Detection: Exactive accurate mass MS system  
 ESI in negative ion mode

Sample: Analytes between *m/z* 70-800 monitored  
 Metabolites from coffee extracted into cold water by vortexing for 20 mins.  
 Samples filtered prior to injection onto column and modular Accela LC system

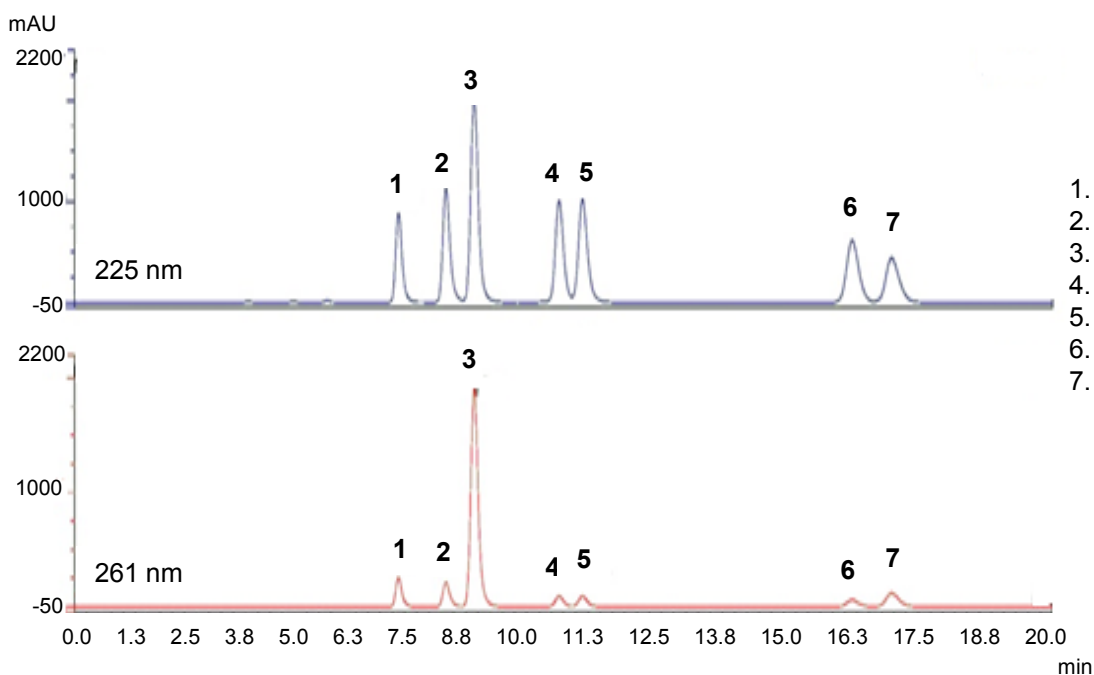


# Cyclodextrin-Encapsulated Flavour Compounds in Beer

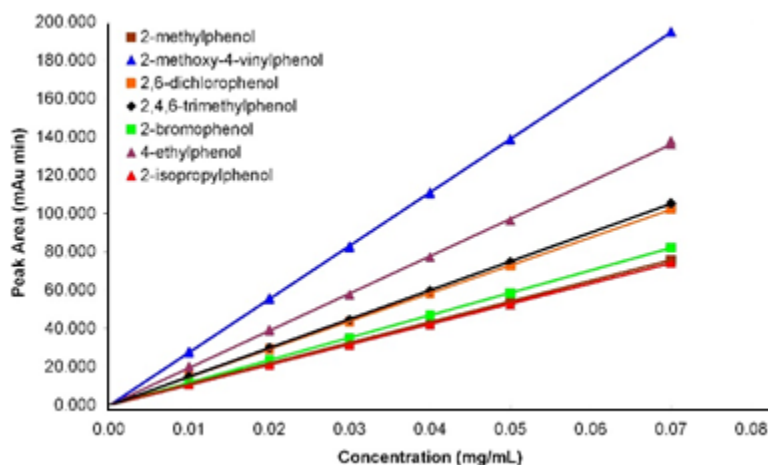
Application #AN2300

## Conditions

Column: ACE 3 C18  
Dimensions: 150 x 4.0 mm  
Part Number: ACE-111-1504  
Mobile Phase: 0.1% phosphoric acid in MeOH/H<sub>2</sub>O (53:47 v/v)  
Flow Rate: 0.5 mL/min  
Injection: 20 µL  
Temperature: 35 °C  
Detection: UV, 225 nm



1. 2-Methylphenol
2. 2-Bromophenol
3. 2-Methoxy-4-vinylphenol
4. 4-Ethylphenol
5. 2,4-Dichlorophenol
6. 2,4,6-Trimethylphenol
7. 2-Isopropylphenol



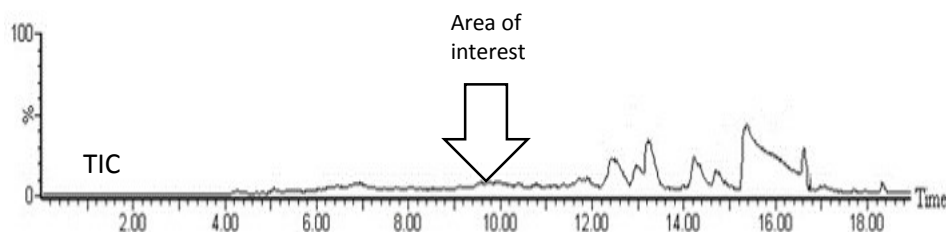
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## Conditions

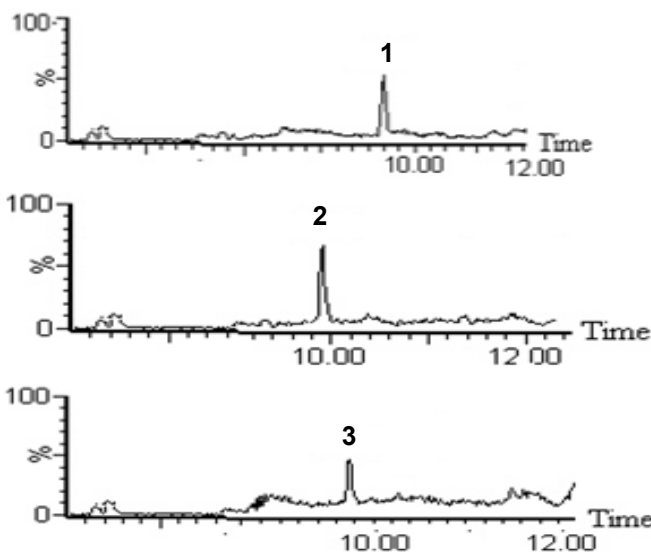
Column: ACE UltraCore 2.5 SuperC18  
Dimensions: 50 x 3.0 mm  
Part Number: CORE-25A-1503U  
Mobile Phase: A: 0.1% formic acid in H<sub>2</sub>O  
B: 0.1% formic acid in MeCN

Time (mins)	%B
0	2
2	2
17	50
19	95
20	95

Flow Rate: 0.6 mL/min  
Sample Preparation: SPE on C18  
Detection: Synapt G1 QToF +ESI MS  
Sampling cone voltage: 40 V  
Source temperature: 150 °C  
Capillary voltages: 4.8 kV  
Extraction cone voltages: 41 kV  
Desolvation temperature: 500 °C  
Acquisition: 100-2000 m/z



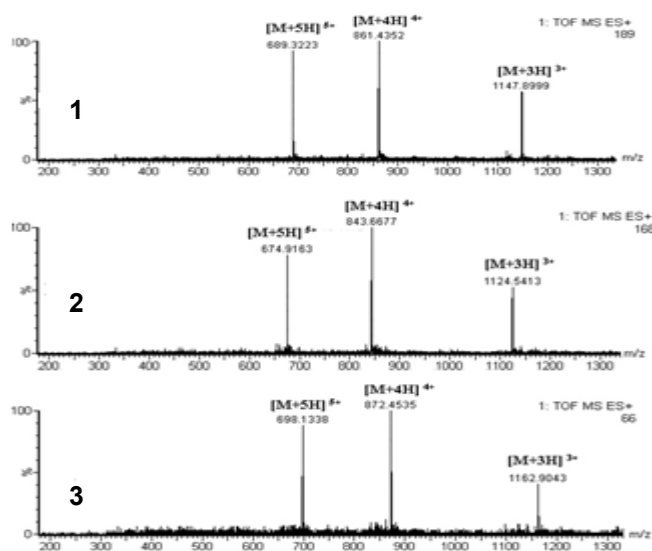
Extracted ion current chromatograms  
(sum of multiply protonated ions [M+3H]<sup>3+</sup>, [M+4H]<sup>4+</sup> and [M+5H]<sup>5+</sup>)



## Defensin Human Neutrophil Peptides

1. HNP-1  
(30 amino acid residues)
2. HNP-2  
(29 amino acid residues)
3. HNP-3  
(30 amino acid residues)

## Mass spectra



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# Ethanol Extract from Seed Cover (*Acacia Farnesiana*)

**ACE**<sup>®</sup>  
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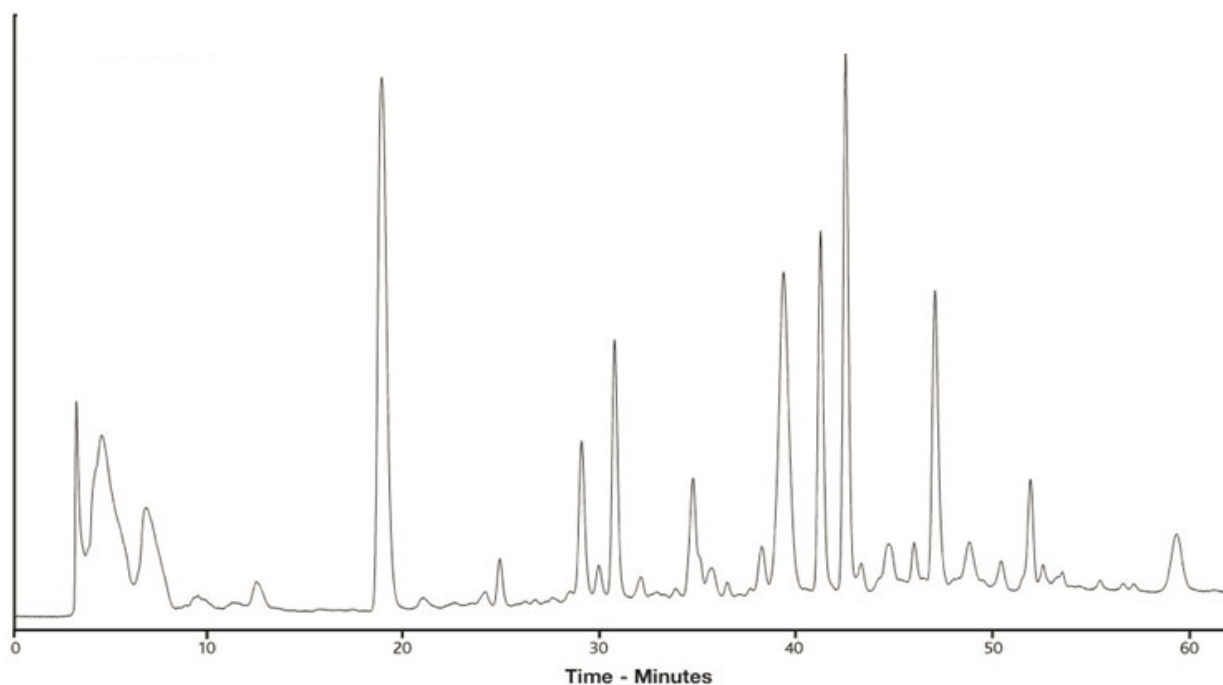
Application #AN2900

## Conditions

Column: ACE 5 C18  
Dimensions: 250 x 4.6 mm  
Part Number: ACE-121-2546  
Mobile Phase: A: MeOH  
B: H<sub>2</sub>O

Time (mins)	%B
0.0	85
2.5	85
60.0	50
62.5	50
70.0	85

Flow Rate: 2 mL/min  
Temperature: Ambient  
Detection: UV, 230 nm



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[www.ace-hplc.com](http://www.ace-hplc.com) or email: [info@ace-hplc.com](mailto:info@ace-hplc.com)

# Detection of Flavone and Dibucaine

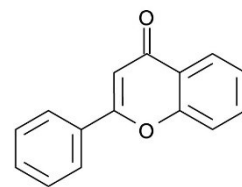
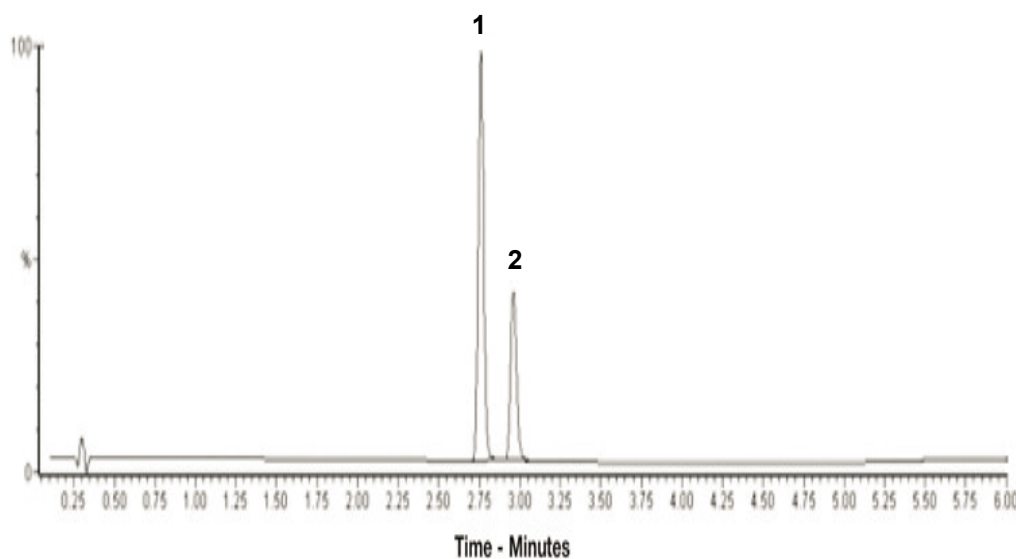
Application #AN2850

## Conditions

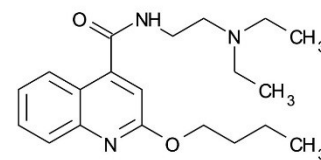
Column: ACE 3 C18  
Dimensions: 30 x 4.6 mm  
Part Number: ACE-111-0346  
Mobile Phase: A: 6.5 mM ammonium acetate in H<sub>2</sub>O  
B: MeCN  
C: MeOH

Time (mins)	%A	%B	%C
0.0	80	10	10
5.2	0	50	50
5.6	0	0	100

Flow Rate: 2 mL/min  
Temperature: 60 °C  
Detection: UV, 200-450 nm



1. Flavone



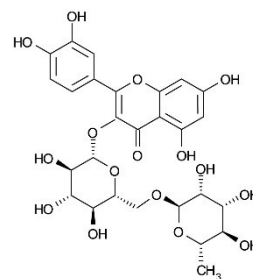
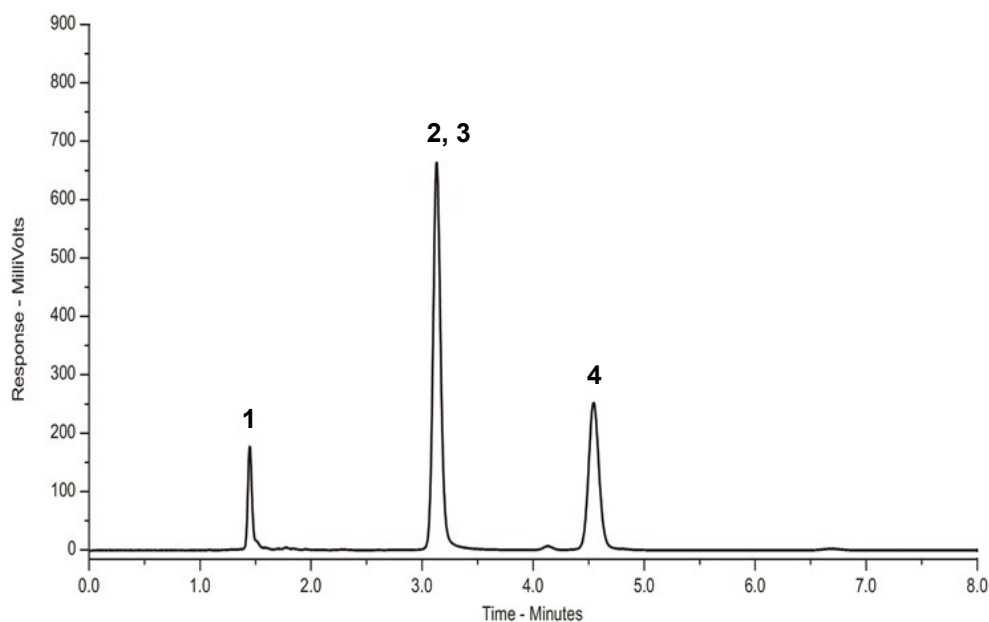
2. Dibucaine

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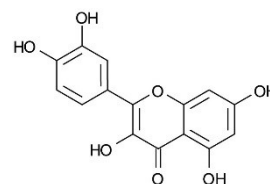
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## Conditions

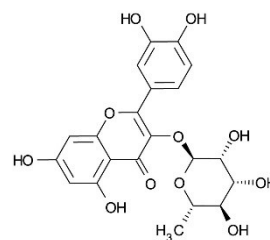
Column: ACE 5 C18  
Dimensions: 150 x 4.6 mm  
Part Number: ACE-121-1546  
Mobile Phase: MeCN/0.1% formic acid in H<sub>2</sub>O (40:60 v/v)  
Flow Rate: 1 mL/min  
Injection: 1 µL  
Temperature: Ambient  
Detection: UV, 254 nm



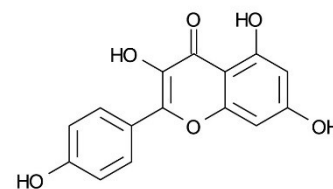
1. Rutin



2. Quercetin



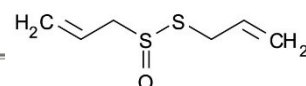
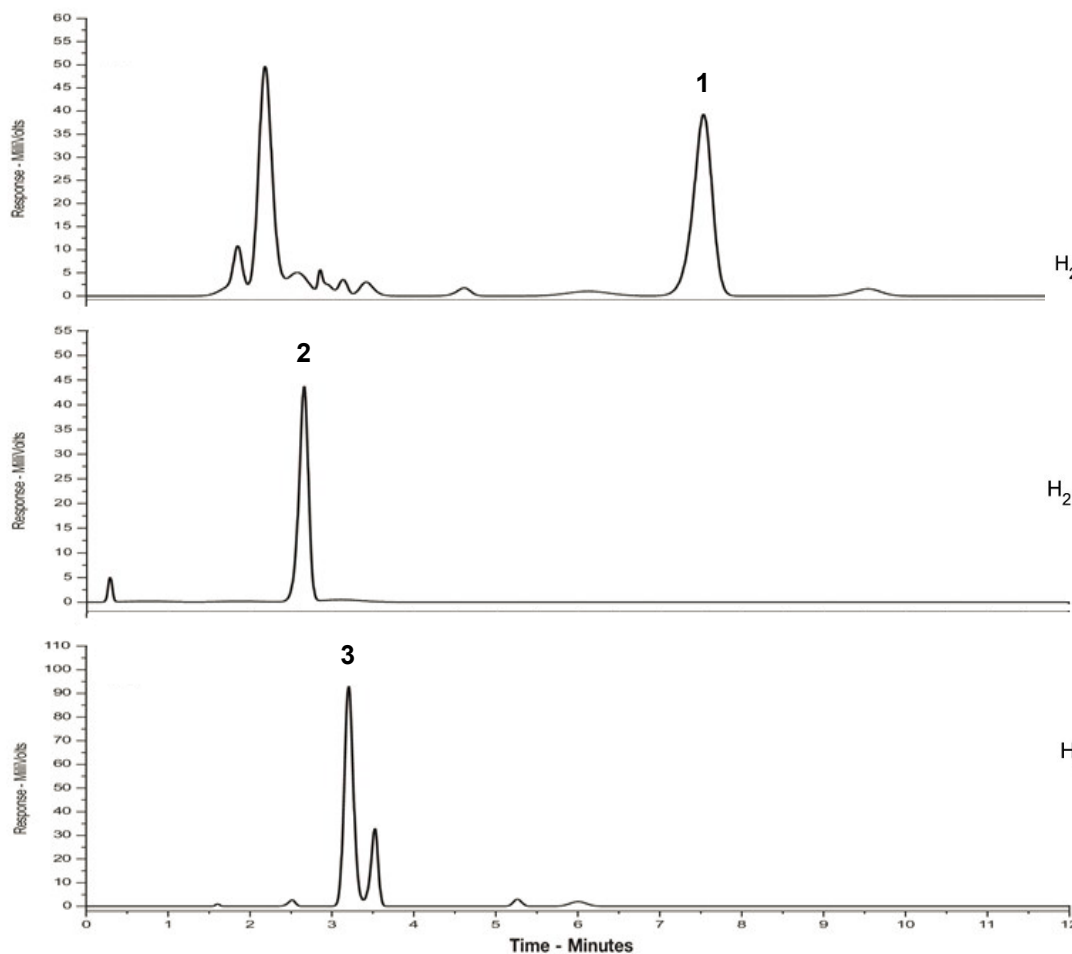
3. Quercitrin



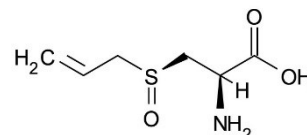
4. Kaempferol

## Conditions

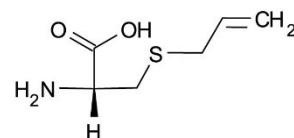
Column: ACE 5 C18  
Dimensions: 250 x 4.6 mm  
Part Number: ACE-121-2546  
Mobile Phase: H<sub>2</sub>O/MeOH (50:50 v/v)  
Flow Rate: 1 mL/min  
Injection: 20 µL  
Temperature: 30 °C  
Detection: UV, 210 nm



1. Allicin



2. Alliin



3. Deoxyalliin

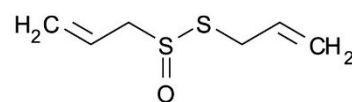
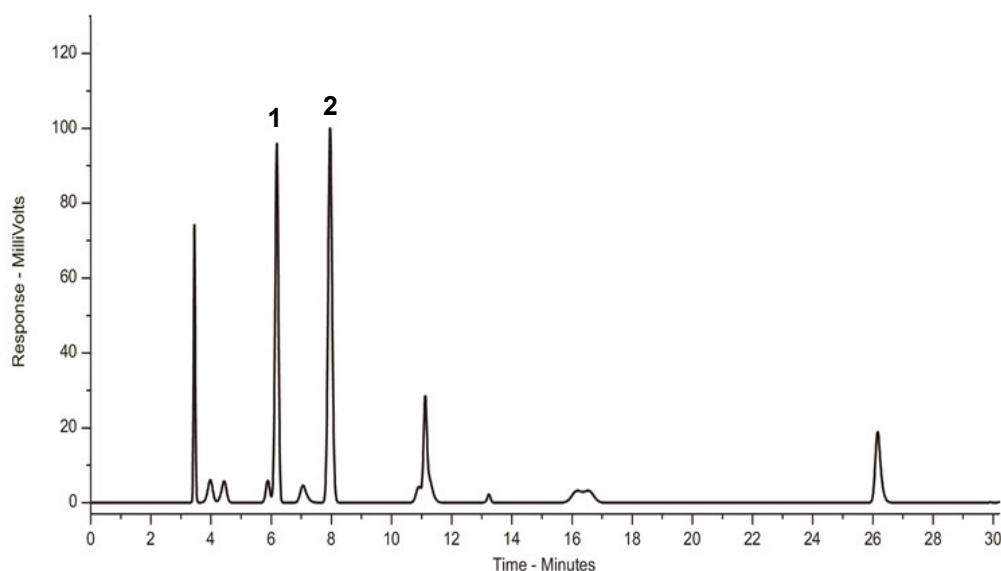


## Conditions

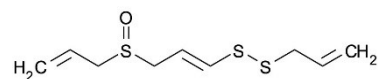
Column: ACE 5 C18  
Dimensions: 250 x 4.6 mm  
Part Number: ACE-121-2546  
Mobile Phase: A: H<sub>2</sub>O  
B: MeCN

Time (mins)	%B
0	40
20	100
25	100

Flow Rate: 1 mL/min  
Injection: 20 µL  
Temperature: 30 °C  
Detection: UV, 254 nm



1. Allicin



2. Ajoene





# Metabolite Profiling of Green Tea by LC-MS

Application #AN2580

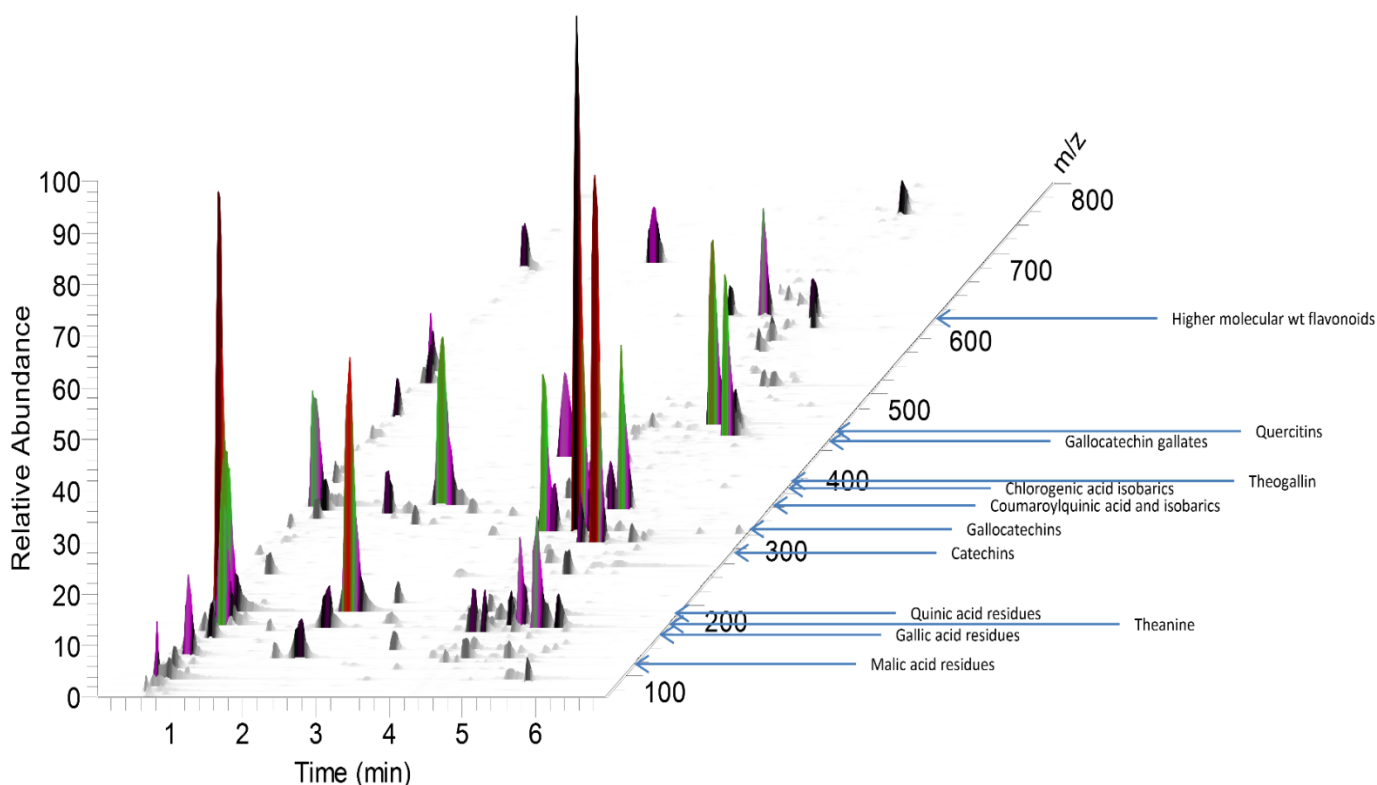
## Conditions

Column: ACE Excel 1.7 C18-Amide  
Dimensions: 100 x 2.1 mm  
Part Number: EXL-1712-1002U  
Mobile Phase: A: 0.01% formic acid in H<sub>2</sub>O  
B: 0.01% formic acid in MeCN

Time (mins)	%B
0.0	3
2.5	10
8.0	100
8.5	3
10.0	3

Flow Rate: 0.5 mL/min  
Detection: Exactive accurate mass MS system  
ESI in negative ion mode

Sample: Analytes between *m/z* 70-800 monitored  
Metabolites from green tea extracted into cold water by vortexing for 20 mins. Samples filtered prior to injection onto column and modular Accela LC system



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[www.ace-hplc.com](http://www.ace-hplc.com) or email: [info@ace-hplc.com](mailto:info@ace-hplc.com)

# Impurity Profile of a Herbicide

Application #AN2130

## Conditions

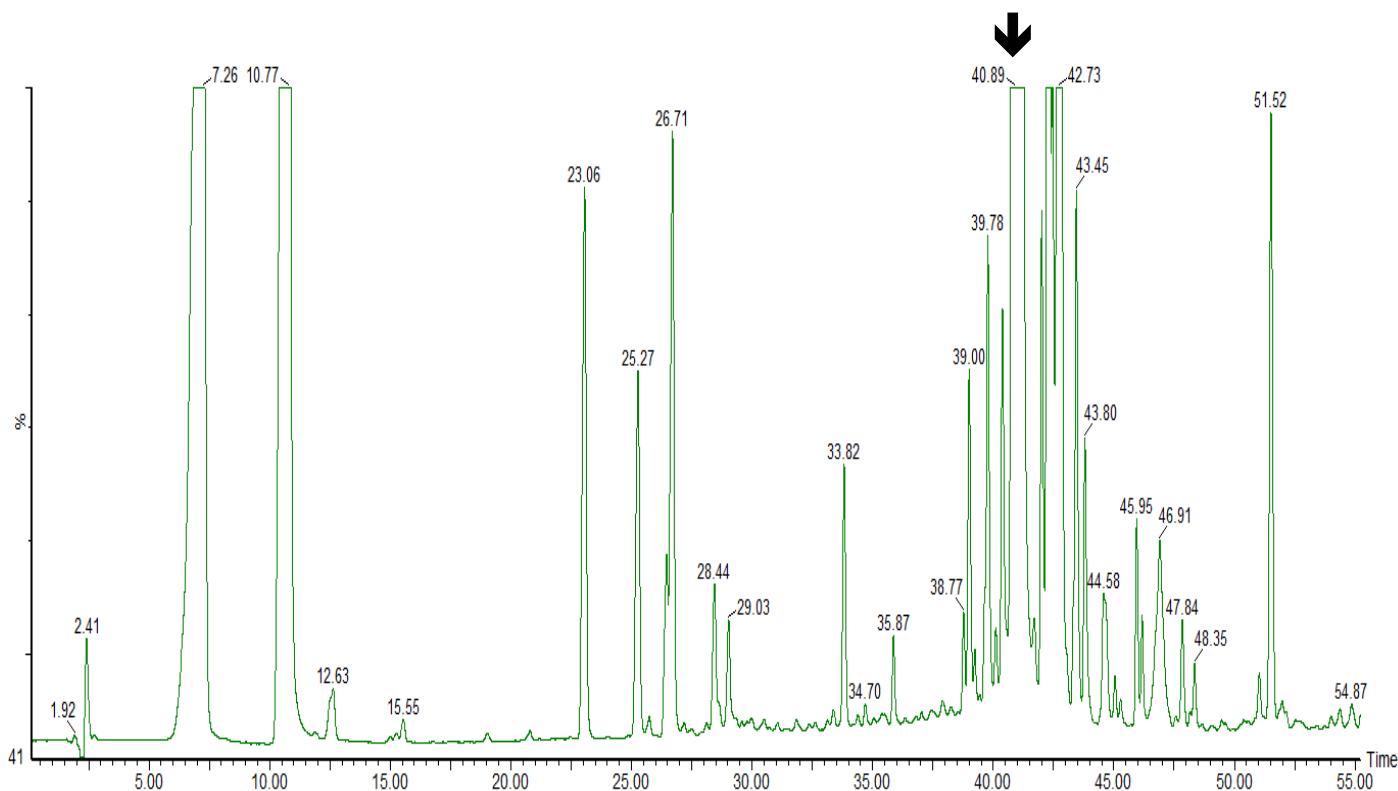
Column: ACE UltraCore 2.5 SuperC18  
Dimensions: 150 x 4.6 mm  
Part Number: CORE-25A-1546U  
Mobile Phase: A: MeCN/H<sub>2</sub>O/TFA (5:95:0.05 v/v/v)  
B: MeCN/TFA (99.9:0.05 v/v)

Time (mins)	%B
0	10
3	10
35	100
55	100
56	10
60	10

Flow Rate: 0.6 mL/min  
Injection: 10 µL  
Temperature: 25 °C  
Detection: UV, 240 nm

Technical Grade Herbicide

Active component



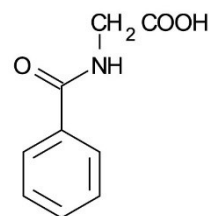
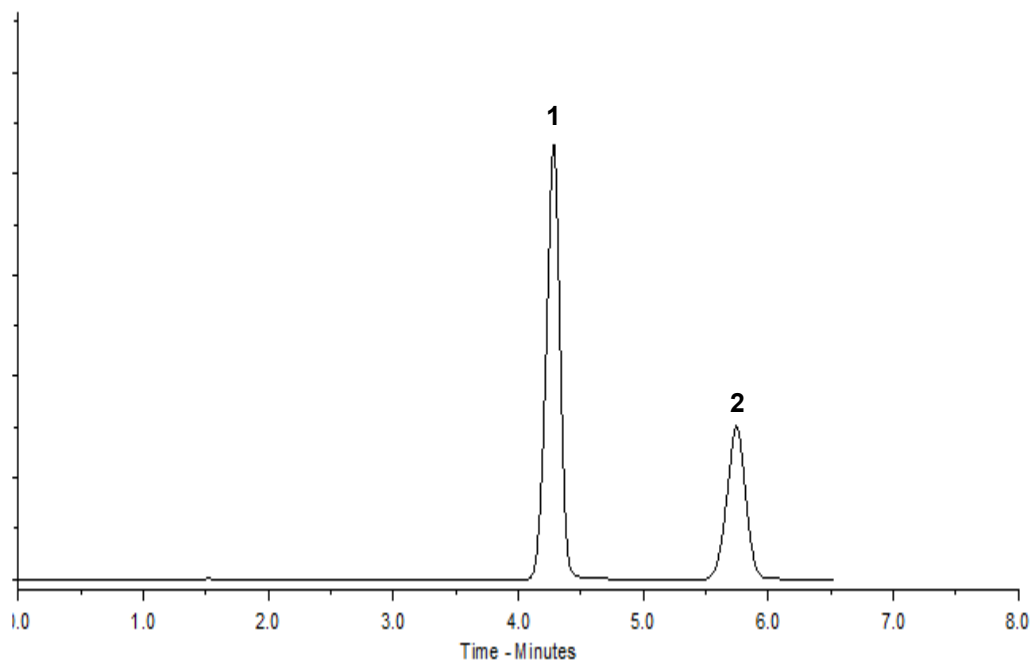
# Separation of Hippuric Acid

**ACE**<sup>®</sup>  
Ultra-inert  
UHPLC & HPLC Columns

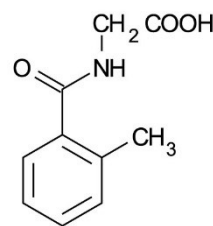
Application #AN2760

## Conditions

Column: ACE 5 C18  
Dimensions: 150 x 4.6 mm  
Part Number: ACE-121-1546  
Mobile Phase: 10 mM KH<sub>2</sub>PO<sub>4</sub> pH 3.5 in H<sub>2</sub>O/MeCN (15:85 v/v)  
Flow Rate: 1 mL/min  
Temperature: Ambient  
Detection: UV, 254 nm



1. Hippuric acid



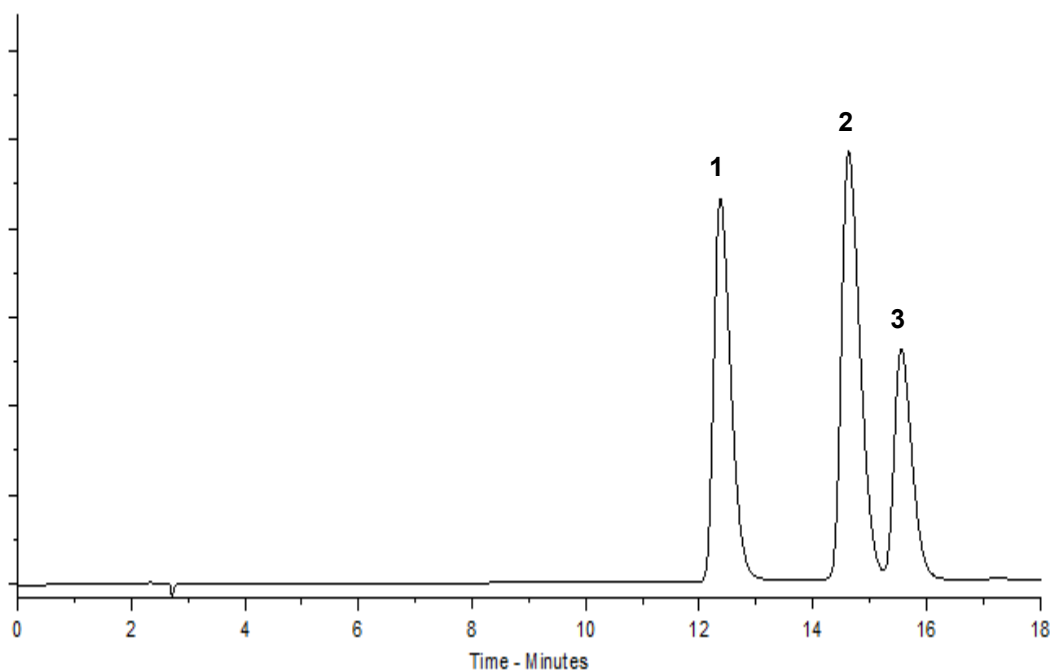
2. 2-Methylhippuric acid

### Conditions

Column: ACE 5 C18  
Dimensions: 250 x 4.6 mm  
Part Number: ACE-121-2546  
Mobile Phase: A: 0.1% TFA in H<sub>2</sub>O/MeCN (71:29 v/v)  
B: 0.1% TFA in H<sub>2</sub>O/MeCN (68:32 v/v)

Time (mins)	%B
0	10
16	90

Flow Rate: 1 mL/min  
Temperature: Ambient  
Detection: UV, 215 nm

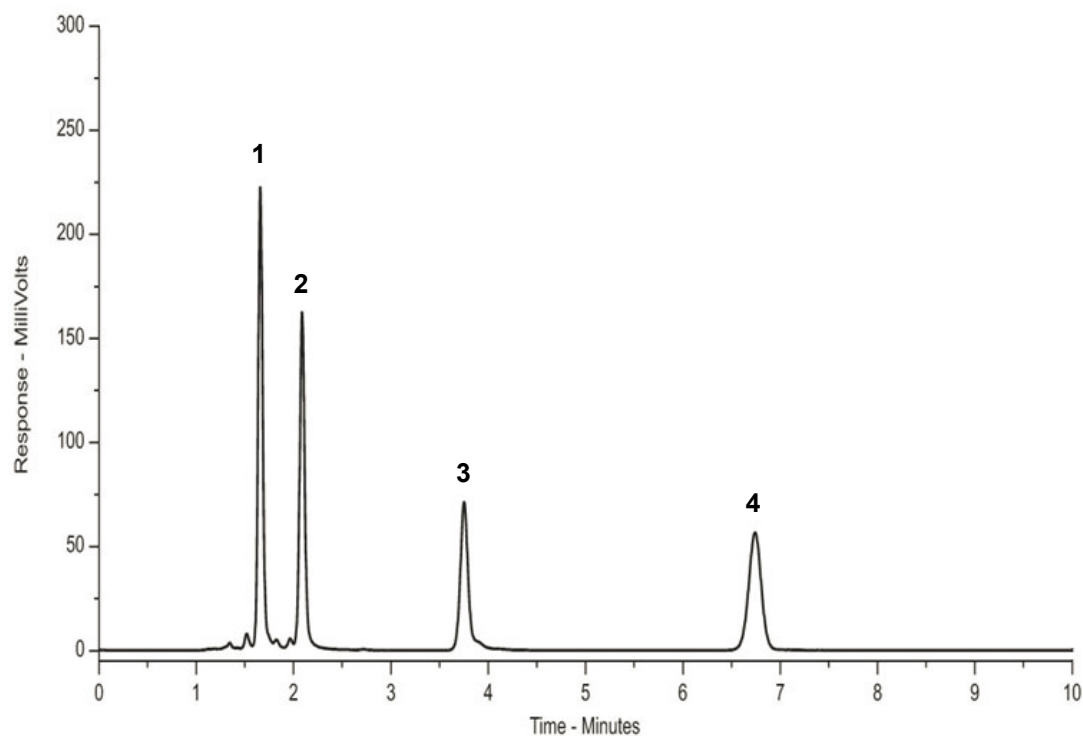


1. Bovine insulin
2. Human insulin
3. Porcine insulin



## Conditions

Column: ACE 5 C18  
Dimensions: 150 x 4.6 mm  
Part Number: ACE-121-1546  
Mobile Phase: MeCN/0.1% formic acid in H<sub>2</sub>O (35:65 v/v)  
Flow Rate: 1 mL/min  
Injection: 1 µL  
Temperature: Ambient  
Detection: UV, 254 nm



1. Daidzin
2. Genistin
3. Daidzein
4. Genistein



# Isoflavones in Red Clover and Soy Extract

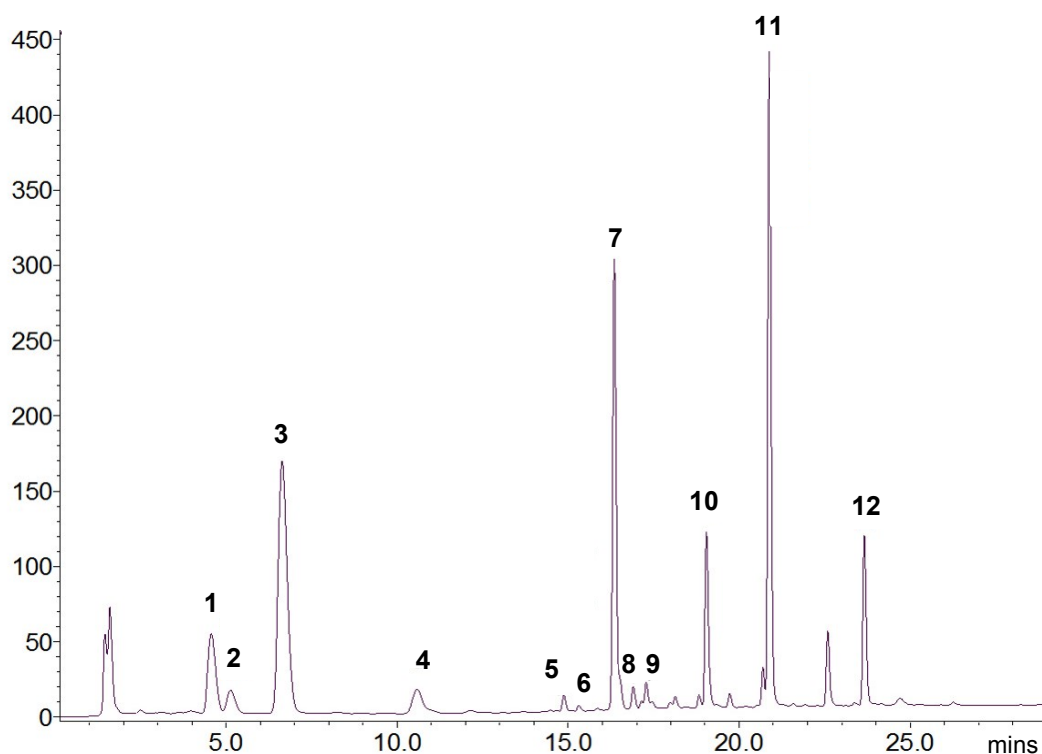
Application #AN1130

## Conditions

Column: ACE 3 C18-AR  
Dimensions: 150 x 2.1 mm  
Part Number: ACE-119-1502  
Mobile Phase: A: Acetic acid in H<sub>2</sub>O pH 2.8  
B: 0.6% Acetic acid in MeCN

Time (min)	%B
0	15
7	15
27	75

Flow Rate: 0.35 mL/min  
Injection: 3 µL  
Temperature: 25 °C  
Detection: UV, 254 nm



1. Daidzin
2. Glycitin
3. Rutin (Int. Standard)
4. Genistin
5. Acetyl-Daidzin
6. Acetyl-Glycitin
7. Daidzein
8. Glycitein
9. Acetyl-Genistin
10. Genistein
11. Formononetin
12. Biochanin A

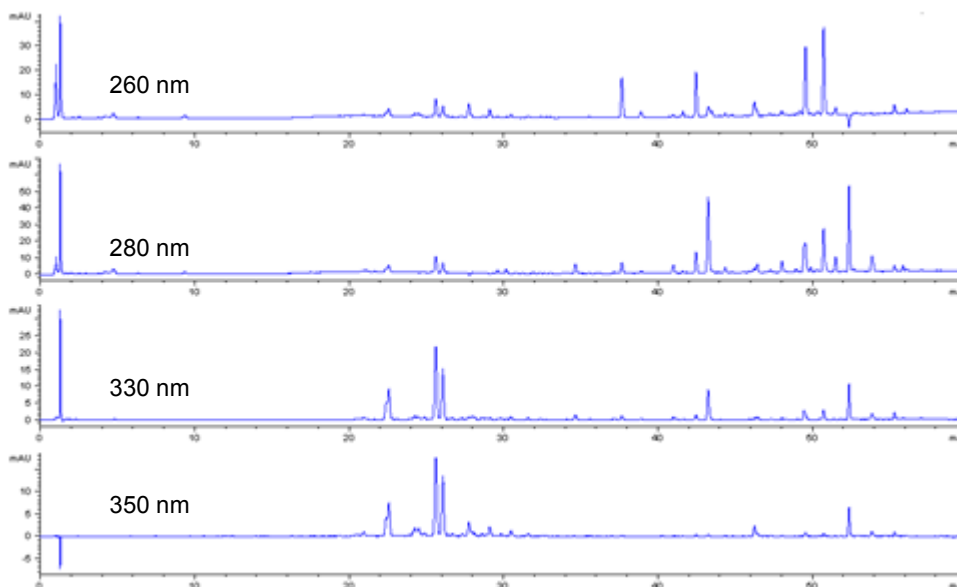
## Conditions

Column: ACE 3 C18-PFP  
 Dimensions: 150 x 2.1 mm  
 Part Number: ACE-1110-1502  
 Mobile Phase: A: Ammonium acetate in H<sub>2</sub>O pH 4  
 B: MeOH

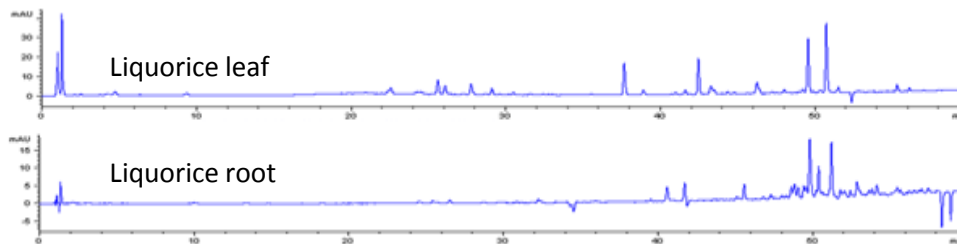
Time (mins)	%B
0	10
1	10
11	15
55	90
60	100

Flow Rate: 0.4 mL/min  
 Injection: 2 µL  
 Temperature: 40 °C  
 Detection: UV, 260, 280, 330 and 350 nm  
 Sample: Plant material ground to a fine powder in pestle and mortar. Powdered material extracted into methanol by ultrasonification for 30 minutes, followed by centrifugal filtration.

Methanolic liquorice leaf extract at different wavelengths

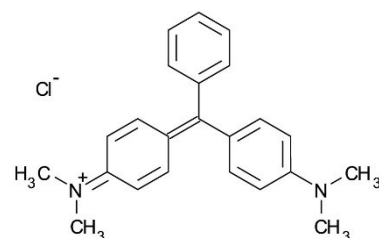
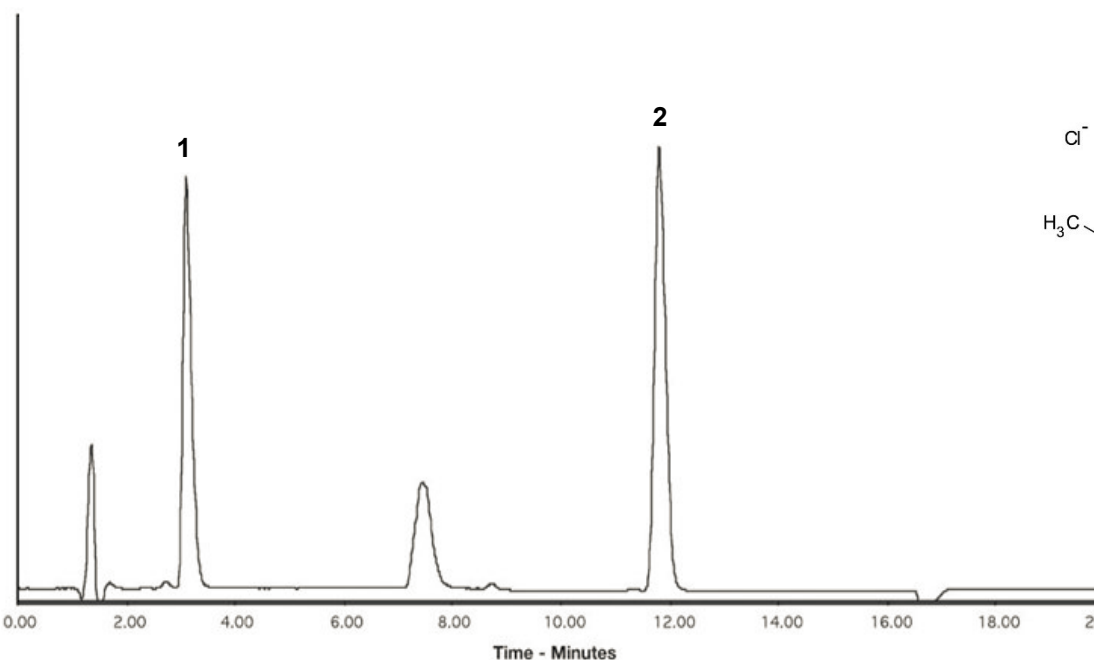


Comparison of methanolic extracts at 260 nm

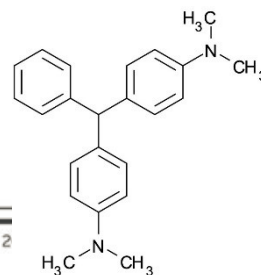


## Conditions

Column:	ACE 5 C18
Dimensions:	150 x 3.0 mm
Part Number:	ACE-121-1503
Mobile Phase:	10 mM oxalic acid pH 2.9 in H <sub>2</sub> O/MeCN (80:20 v/v)
Flow Rate:	0.4 mL/min
Temperature:	Ambient
Detection:	UV-Vis, 618 nm



1. Malachite green



2. Leucomalachite green



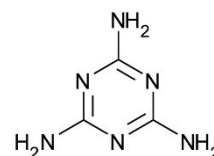
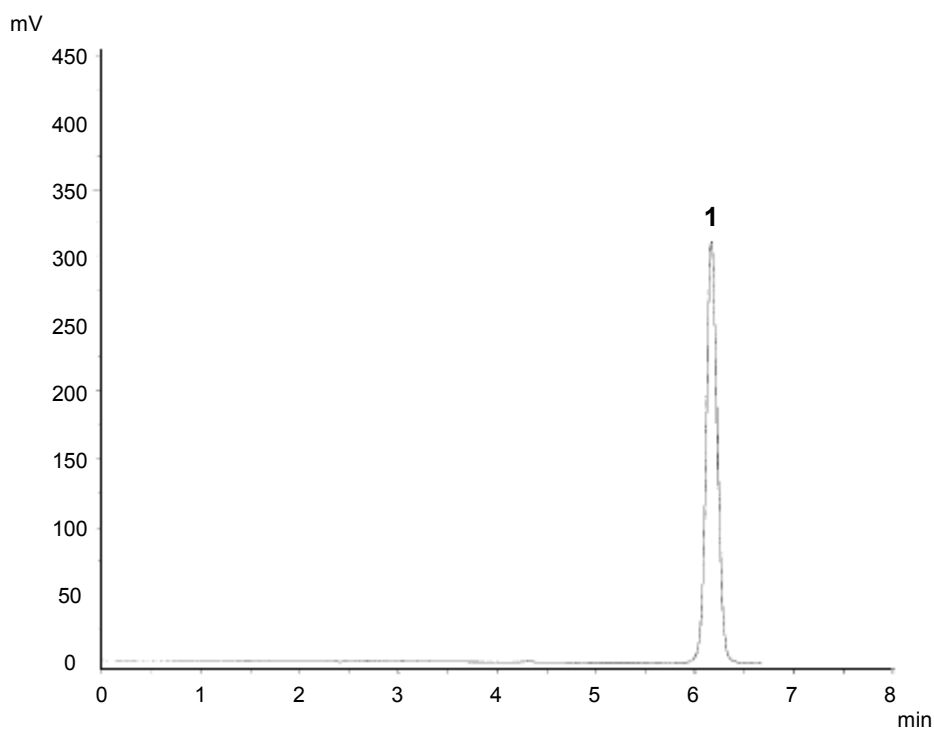
# Detection of Melamine using Ion-Pairing Reagent

**ACE**<sup>®</sup>  
Ultra-inert  
UHPLC & HPLC Columns

Application #AN2510

## Conditions

Column: ACE 5 C8  
Dimensions: 150 x 4.6 mm  
Part Number: ACE-122-1546  
Mobile Phase: 5 mM heptafluorobutyric acid:MeCN (95:5 v/v)  
Flow Rate: 1 mL/min  
Injection: 5 µL  
Temperature: Ambient  
Detection: UV, 240 nm



1. Melamine

# Microcystins from Blue/Green Algae in Drinking Water

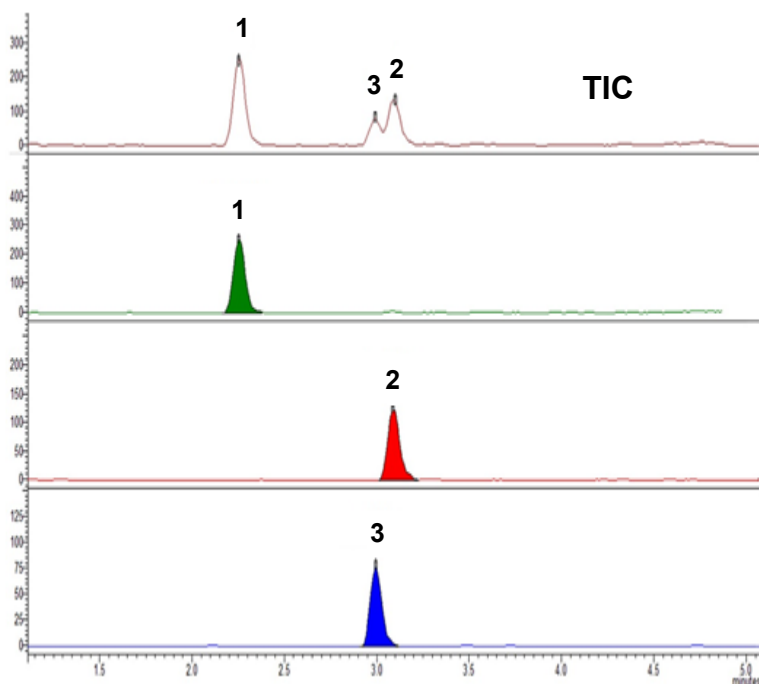
Application #AN1190

## Conditions

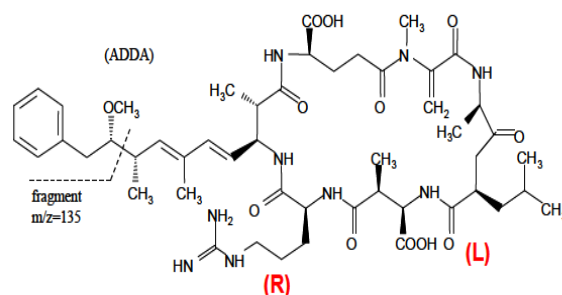
Column: ACE Excel 2 C18  
Dimensions: 100 x 2.1 mm  
Part Number: EXL-101-1002U  
Mobile Phase: A: 0.1% formic acid in H<sub>2</sub>O  
B: MeCN

Time (mins)	%B
0.0	30
1.0	30
7.0	95
7.1	30
10.0	30

Flow Rate: 0.4 mL/min  
Injection: 50 µL  
Temperature: 40 °C  
Sample: 0.05 ppb  
Detection: Bruker EVOQ Elite triple quad MS  
VIP heated-ESI temperature: 350 °C  
Cone gas temperature: 200 °C  
Spray voltage: 4500 V (+)  
Collision gas: argon 1.5 mTorr



1. Microcystin RR (MW 1038)  
(*m/z* 520 → 135)
2. Microcystin LR (MW 995)  
(*m/z* 498 → 135)
3. Microcystin YR (MW 1045)  
(*m/z* 523 → 135)



Variants	R	L
Microcystin-LR	Leucine	Arginine
Microcystin-RR	Arginine	Arginine
Microcystin-YR	Tyrosine	Arginine

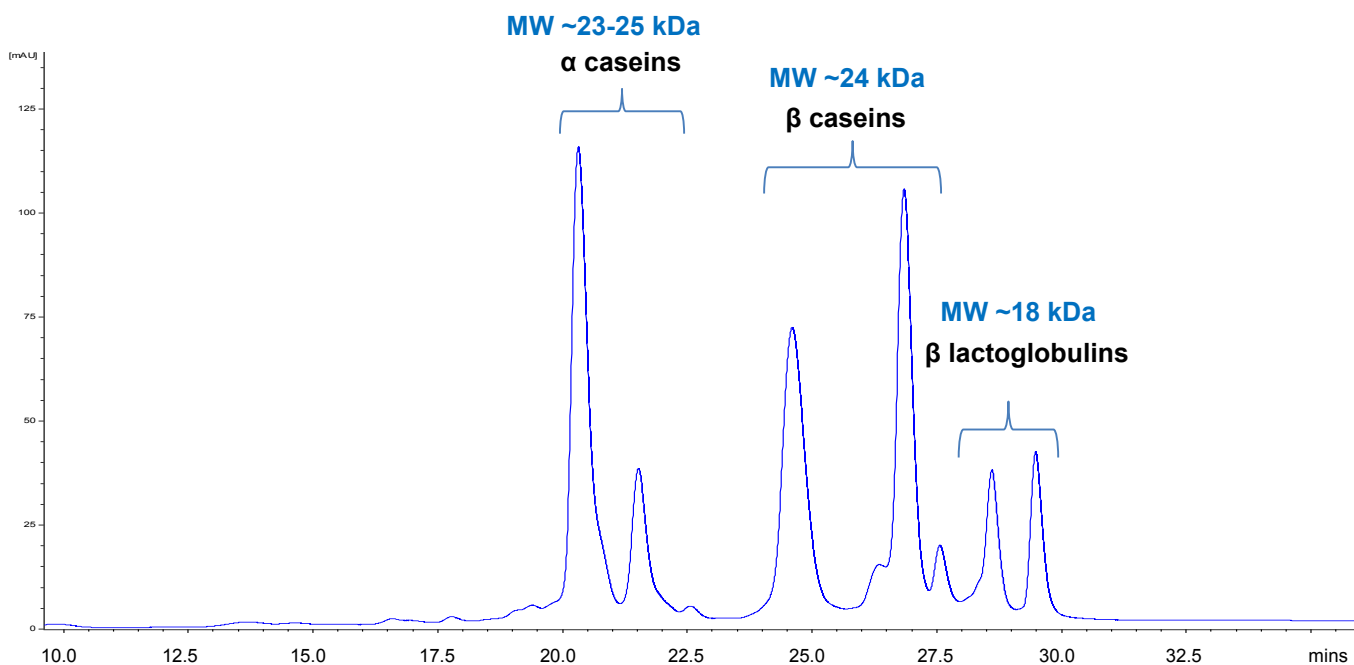
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## Conditions

Column: ACE 5 C18-300  
Dimensions: 150 x 2.1 mm  
Part Number: ACE-221-1502  
Mobile Phase: A: 0.01% TFA in H<sub>2</sub>O  
B: 0.01% TFA in MeCN

Time (mins)	%B
0.0	33
5.0	33
9.0	35
18.0	37
22.0	40
27.5	41
28.0	41
43.0	43

Flow Rate: 0.2 mL/min  
Temperature: 45 °C  
Detection: UV, 214 nm

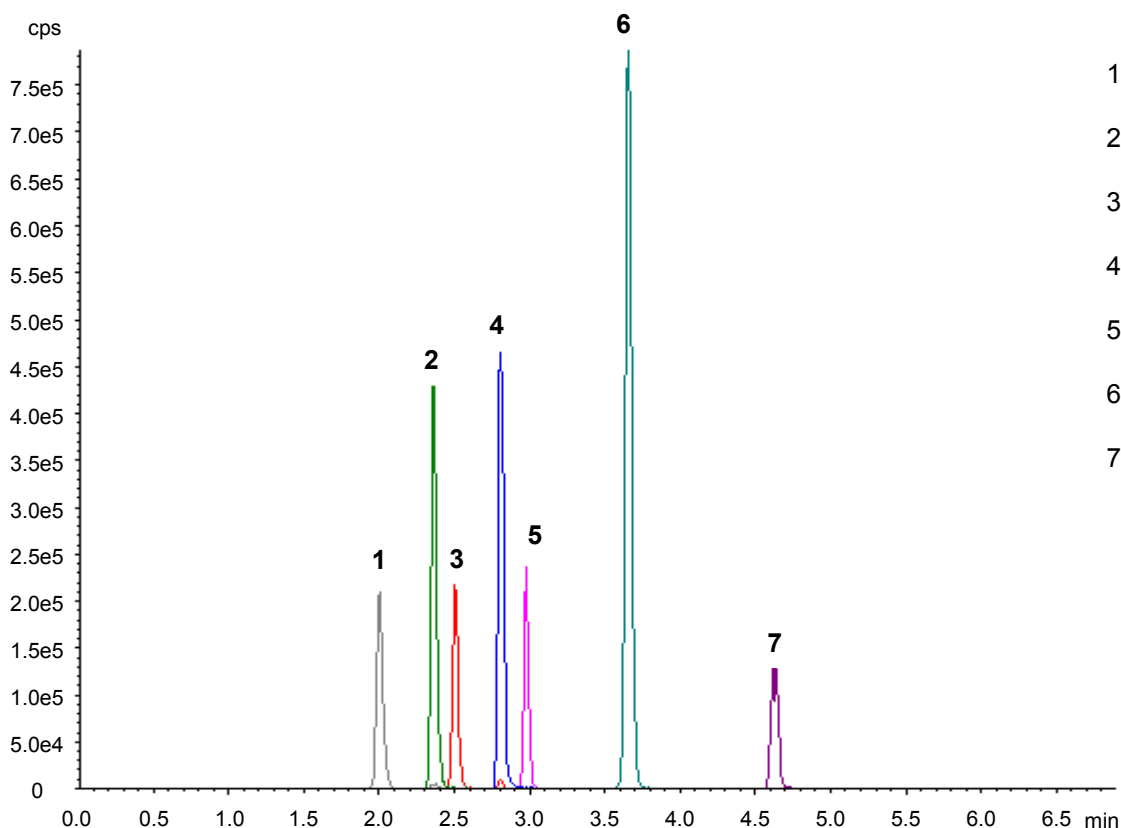


## Conditions

Column: ACE Excel 2 C18-AR  
 Dimensions: 50 x 2.1 mm  
 Part Number: EXL-109-0502U  
 Mobile Phase: A: 1 mM ammonium acetate, 0.5% acetic acid in H<sub>2</sub>O  
 B: 1 mM ammonium acetate, 0.5% acetic acid in 95% MeOH

Time (mins)	%B
0.0	40
1.0	40
2.4	60
6.8	87

Flow Rate: 0.6 mL/min  
 Injection: 2 µL  
 Temperature: 40 °C  
 Detection: AB SCIEX triple quad 5500  
 Positive ESI mode  
 Source temperature: 500 °C  
 IonSpray voltage: 5500 V

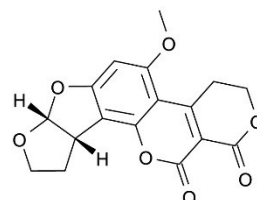
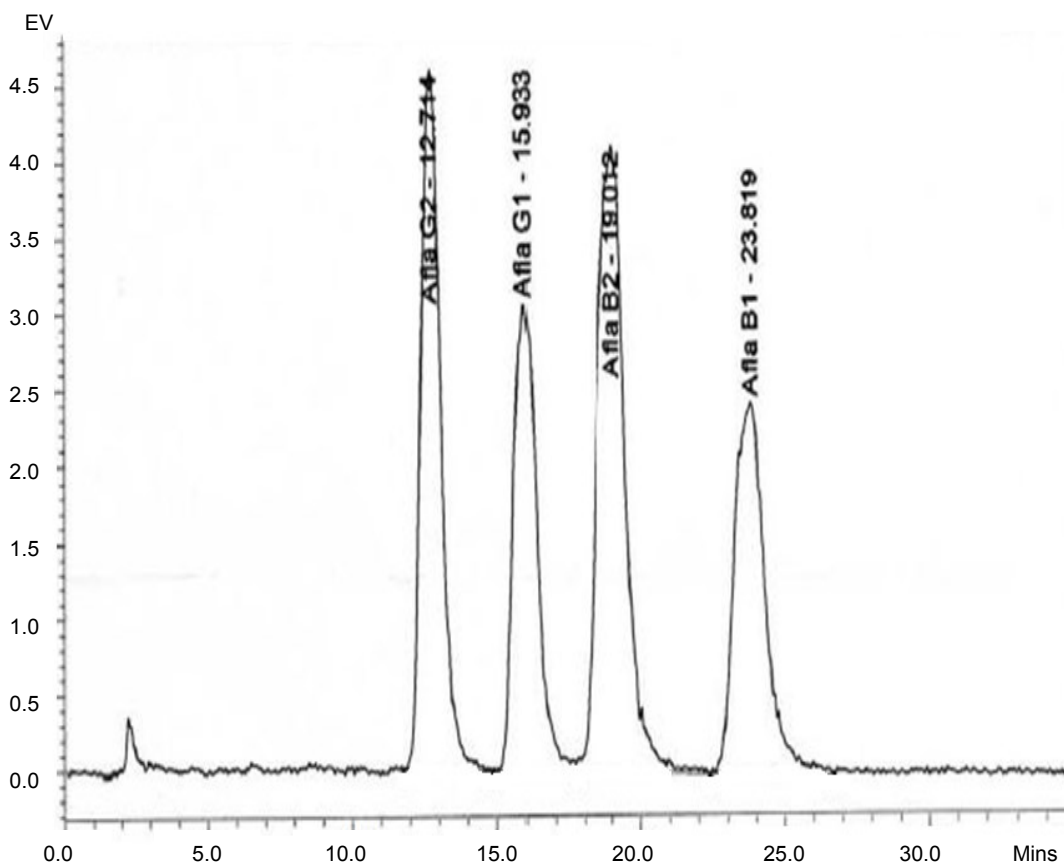


1. Aflatoxin G2  
(*m/z* 331.1 → 313.1)
2. Aflatoxin G1  
(*m/z* 329.0 → 243.1)
3. Aflatoxin B2  
(*m/z* 315.1 → 287.0)
4. Aflatoxin B1  
(*m/z* 313.1 → 285.0)
5. HT-2-toxin  
(*m/z* 442.2 → 263.1)
6. T-2-toxin  
(*m/z* 484.2 → 305.1)
7. Ochratoxin A  
(*m/z* 404.1 → 239.0)

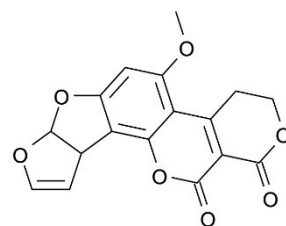


## Conditions

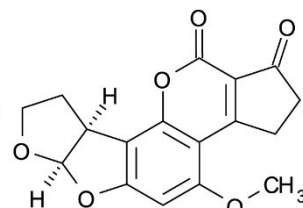
Column:	ACE 3 C18-PFP
Dimensions:	150 x 4.6 mm
Part Number:	ACE-1110-1546
Mobile Phase:	H <sub>2</sub> O/MeOH (60:40 v/v)
Flow Rate:	1 mL/min
Injection:	100 µL
Temperature:	45 °C
Detection:	Fluorescence, Ex λ 362 nm, Em λ 425 nm



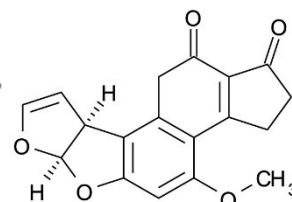
1. Aflatoxin G2



2. Aflatoxin G1



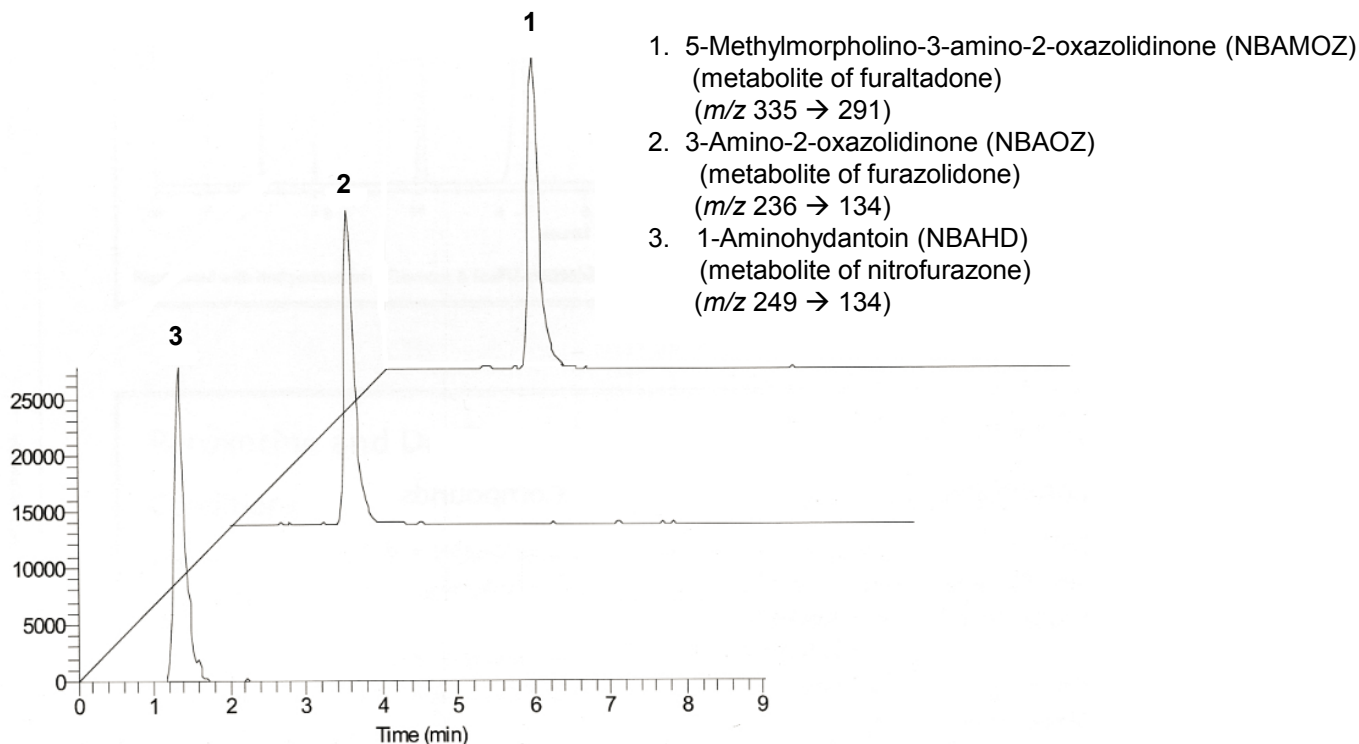
3. Aflatoxin B2



4. Aflatoxin B1

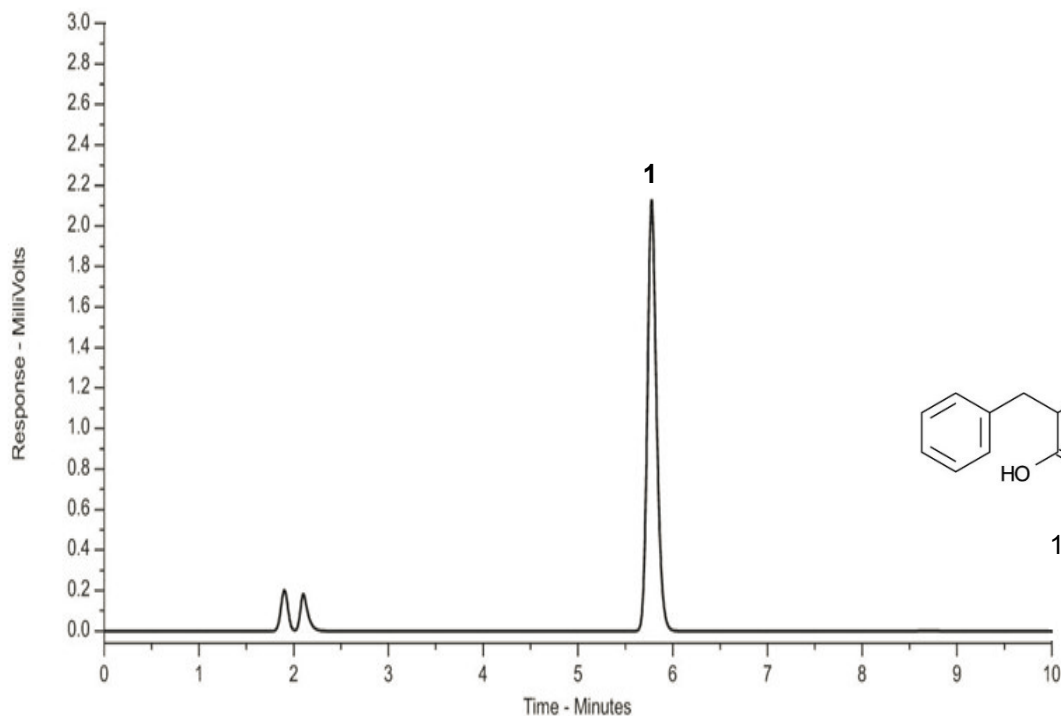
## Conditions

Column:	ACE 3 C18
Dimensions:	50 x 2.1 mm
Part Number:	ACE-111-0502
Mobile Phase:	MeOH/0.5 mM ammonium acetate in H <sub>2</sub> O (50:50 v/v)
Flow Rate:	0.2 mL/min
Injection:	20 µL
Temperature:	Ambient
Detection:	ESI MS/MS (+ve mode)
Sample:	Metabolites derivatised with 2-nitrobenzaldehyde to form nitrophenyl derivatives, prior to LC-MS analysis



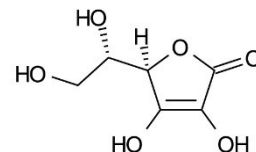
## Conditions

Column:	ACE 5 C18
Dimensions:	150 x 4.6 mm
Part Number:	ACE-121-1546
Mobile Phase:	MeCN/H <sub>2</sub> O/Acetic acid (51:47:2 v/v)
Flow Rate:	1 mL/min
Temperature:	Ambient
Detection:	Fluorescence – $\lambda_{\text{ex}}$ 333 nm, $\lambda_{\text{em}}$ 443 nm

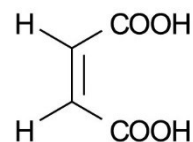


## Conditions

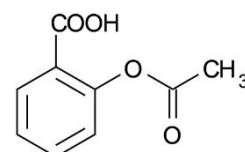
Column: ACE 5 C18  
Dimensions: 250 x 4.6 mm  
Part Number: ACE-121-2546  
Mobile Phase: 50 mM KH<sub>2</sub>PO<sub>4</sub> pH 5.7 in H<sub>2</sub>O/MeOH (70:30 v/v)  
Flow Rate: 1 mL/min  
Temperature: 22 °C  
Detection: UV, 220 nm



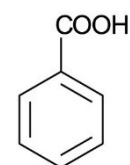
1. L-Ascorbic acid



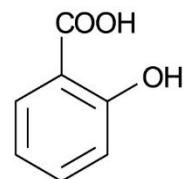
2. Maleic acid



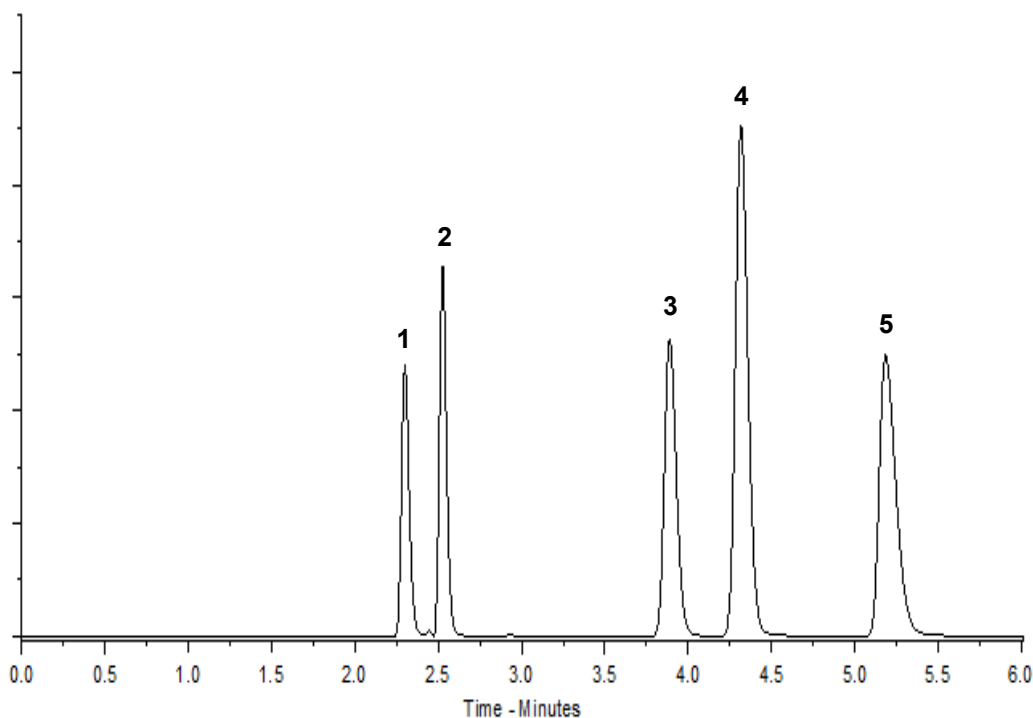
3. Acetylsalicylic acid



4. Benzoic acid



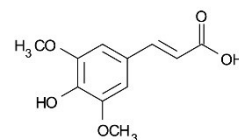
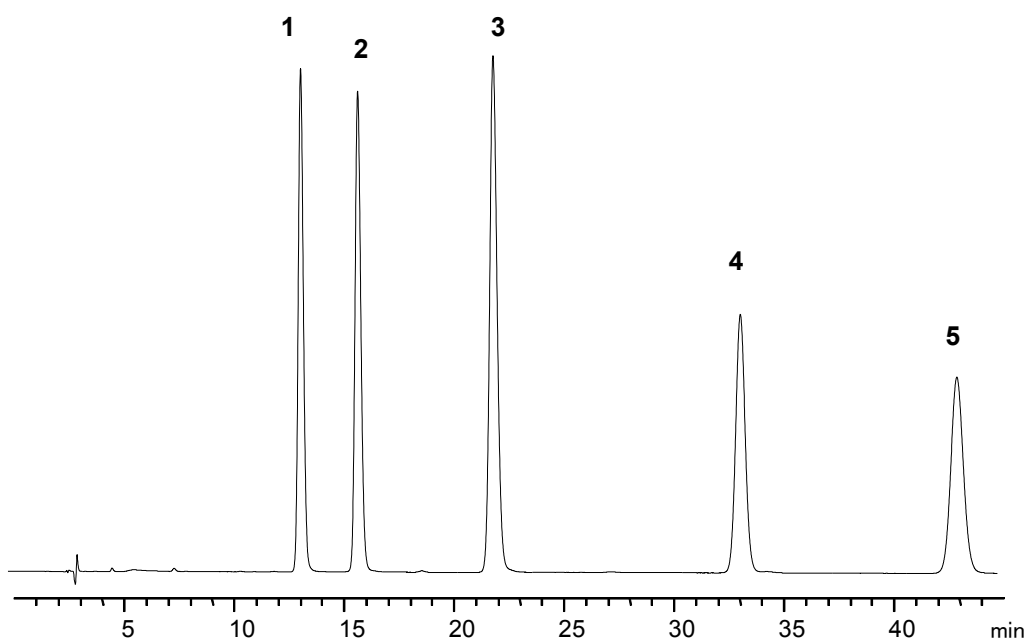
5. Salicylic acid



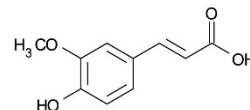


## Conditions

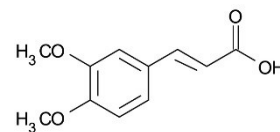
Column:	ACE 3 C18-Amide
Dimensions:	250 x 2.1 mm
Part Number:	EXL-1112-2502U
Mobile Phase:	20 mM H <sub>3</sub> PO <sub>4</sub> in MeOH/H <sub>2</sub> O (40:60 v/v)
Flow Rate:	0.21 mL/min
Injection:	5 µL
Temperature:	20 °C
Detection:	UV, 210 nm



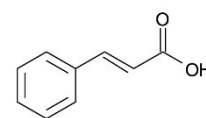
1. Sinapic acid



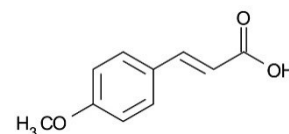
2. Ferulic acid



3. 3,4-Dimethoxycinnamic acid



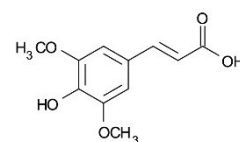
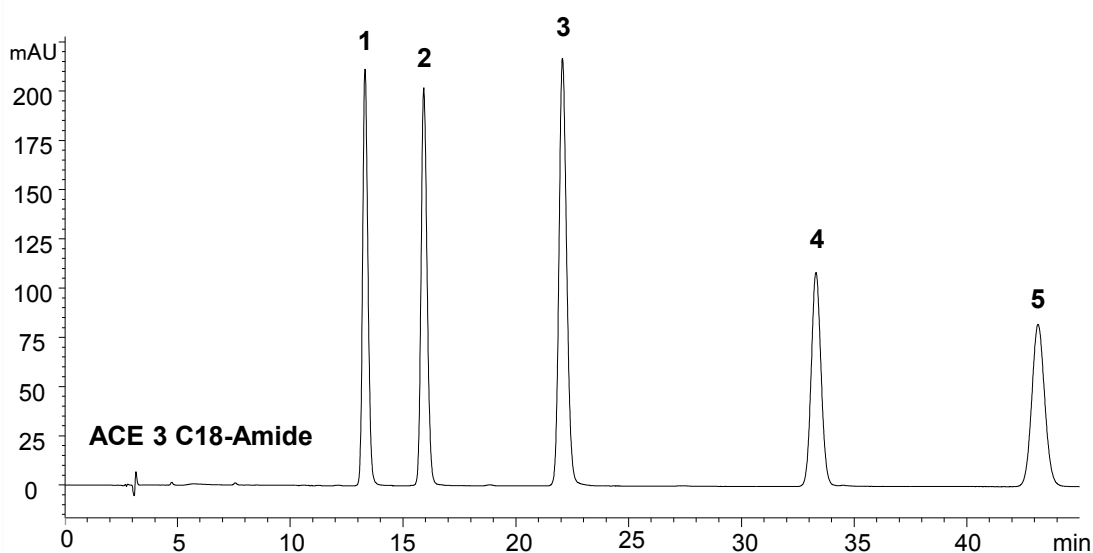
4. Cinnamic acid



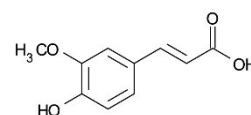
5. 4-Methoxycinnamic acid

## Conditions

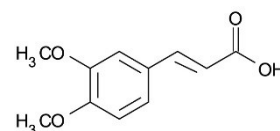
Column:	ACE 3 C18-Amide ACE Excel 1.7 C18-Amide
Dimensions:	250 x 2.1 mm 50 x 3.0 mm
Part Number:	250 x 2.1 mm (EXL-1112-2502U), 50 x 3 mm (EXL-1712-0503U)
Mobile Phase:	20 mM H <sub>3</sub> PO <sub>4</sub> in MeOH/H <sub>2</sub> O (40:60 v/v)
Flow Rate:	0.21 mL/min (250 x 2.1 mm) 0.8 mL/min (50 x 3.0 mm)
Injection:	5 µL (250 x 2.1 mm) 2 µL (50 x 3.0 mm)
Temperature:	20 °C
Detection:	UV, 210 nm



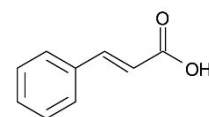
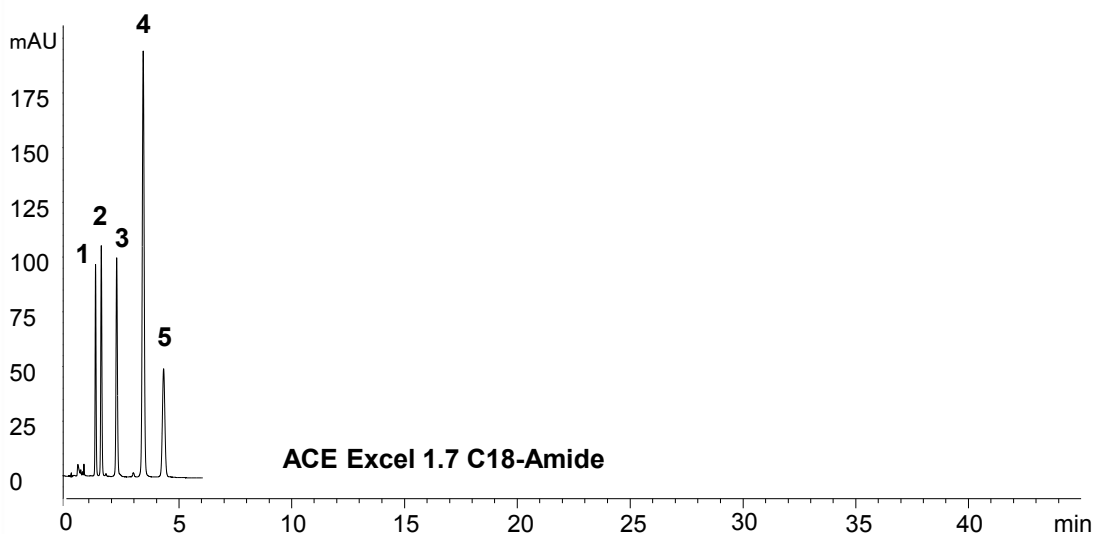
1. Sinapic acid



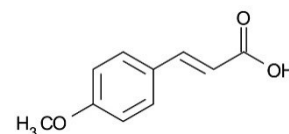
2. Ferulic acid



3. 3,4-Dimethoxycinnamic acid



4. Cinnamic acid



5. 4-Methoxycinnamic acid



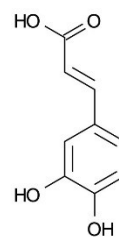
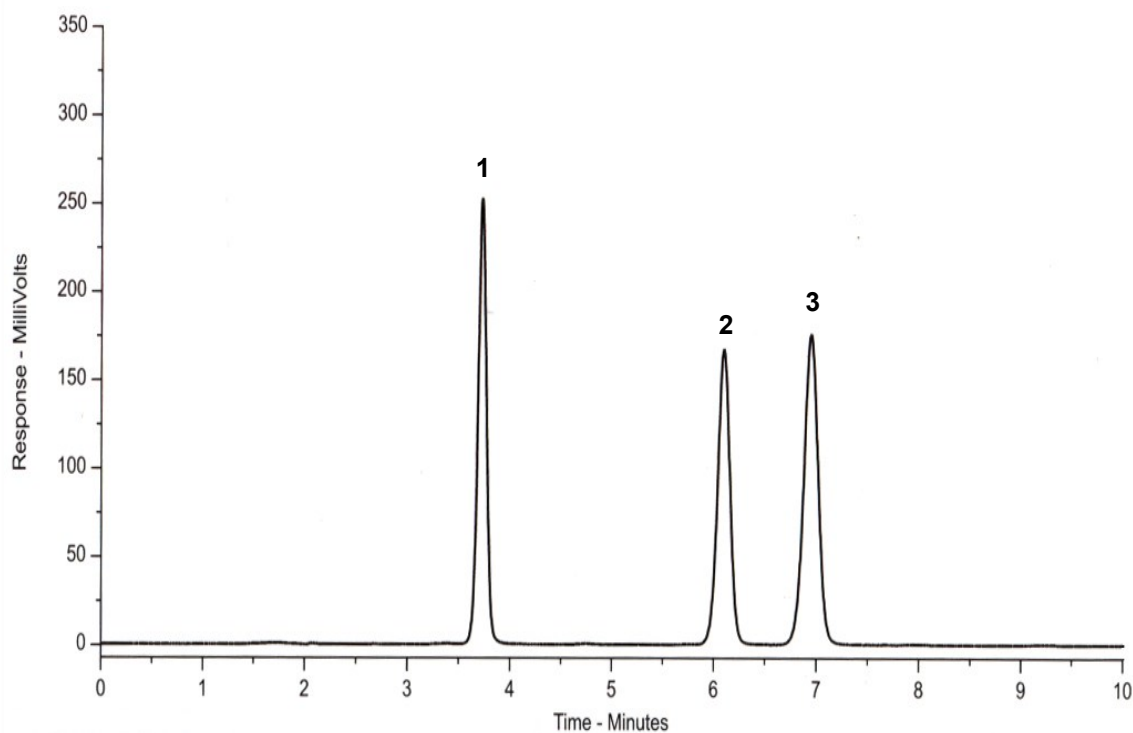
# Separation of Phenolic Acids

**ACE**<sup>®</sup>  
Ultra-inert  
UHPLC & HPLC Columns

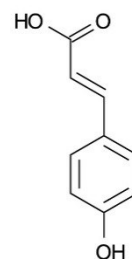
Application #AN3030

## Conditions

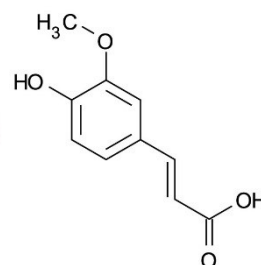
Column: ACE 5 C18  
Dimensions: 150 x 4.6 mm  
Part Number: ACE-121-1546  
Mobile Phase: MeCN/0.1% formic acid in H<sub>2</sub>O (20:80 v/v)  
Flow Rate: 1 mL/min  
Injection: 1 µL  
Temperature: Ambient  
Detection: UV, 254 nm



1. Caffeic acid



2. p-Coumaric acid



3. Ferulic acid

# Organophosphorus Flame Retardants in Water by LC-MS/MS

Application #AN1240

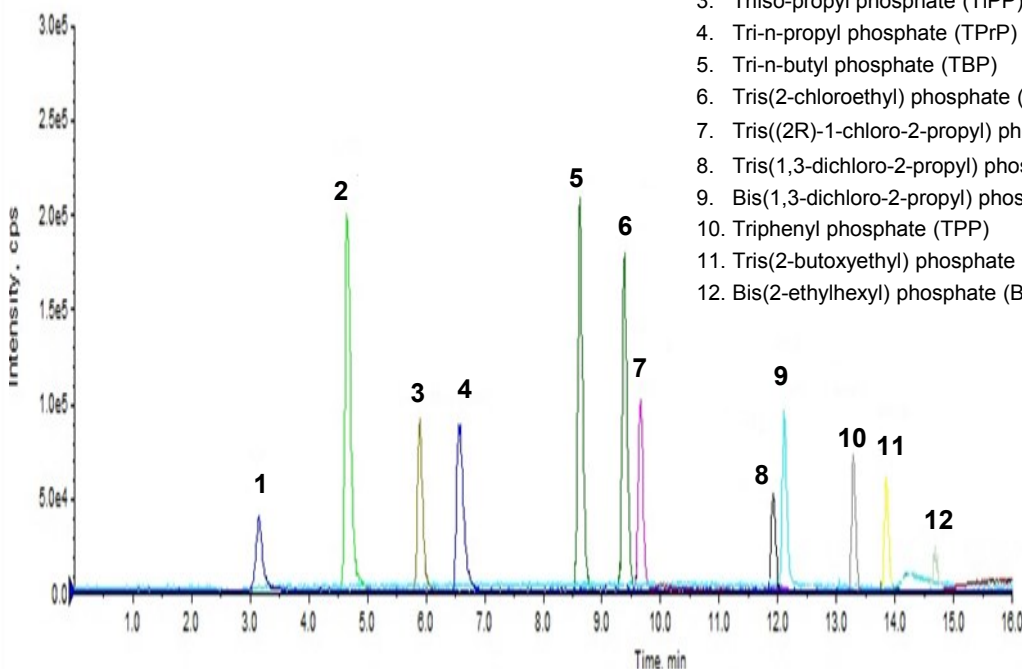
## Conditions

Column: ACE 3 C18  
Dimensions: 100 x 2.1 mm  
Part Number: ACE-111-1002  
Mobile Phase: A: 0.05 mM ammonium formate + 0.005% formic acid in H<sub>2</sub>O  
B: MeOH/MeCN (95:5 v/v)

Time (mins)	%B
0.1	50
12.0	90
13.0	100
15.0	100
15.1	50
20.0	50

Flow Rate: 0.25 mL/min  
Injection: 80 µL  
Temperature: 25 °C  
Detection: MS/MS

	Q1 Mass	Q3 Mass
1. Trimethyl phosphate (TMP)	141	109
2. Triethyl phosphate (TEP)	183	127
3. Triisopropyl phosphate (TiPP)	225	99
4. Tri-n-propyl phosphate (TPnP)	225	99
5. Tri-n-butyl phosphate (TBP)	267	211
6. Tris(2-chloroethyl) phosphate (TCEP)	285	223
7. Tris((2R)-1-chloro-2-propyl) phosphate (TCPP)	327	99
8. Tris(1,3-dichloro-2-propyl) phosphate (TDCPP)	431	99
9. Bis(1,3-dichloro-2-propyl) phosphate (BDCP)	321	99
10. Triphenyl phosphate (TPP)	327	215
11. Tris(2-butoxyethyl) phosphate (TBEP)	399	299
12. Bis(2-ethylhexyl) phosphate (BEHP)	323	99



# Isomeric Organophosphorus Flame Retardants in Water

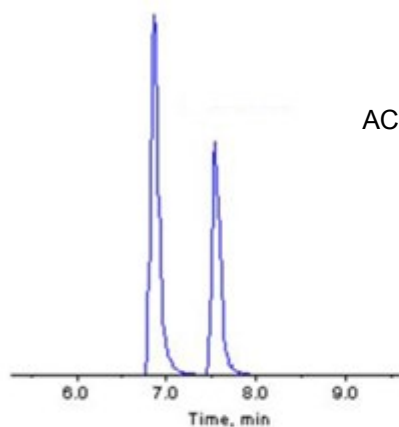
Application #AN1140

## Conditions

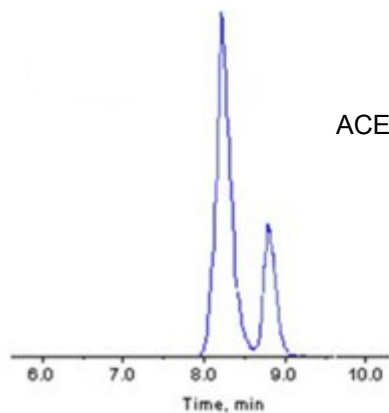
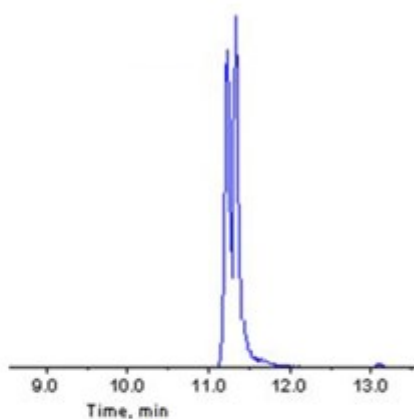
Column:	ACE 3 C18 ACE 3 C18-PFP
Dimensions:	100 x 2.1 mm
Part Number:	ACE-111-1002, ACE-1110-1002
Mobile Phase:	A: 0.05 mM ammonium formate + 0.005% formic acid in H <sub>2</sub> O B: MeOH/MeCN (95:5 v/v)
	<b>Time (mins)</b> <b>%B</b>
	0.1                    50
	12.0                  90
	13.0                  100
	15.0                  100
	15.1                  50
	20.0                  50
Flow Rate:	0.25 mL/min
Injection:	80 µL
Temperature:	25 °C
Detection:	MS/MS

TiPP and TPrP

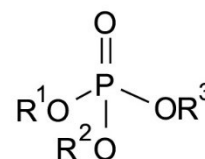
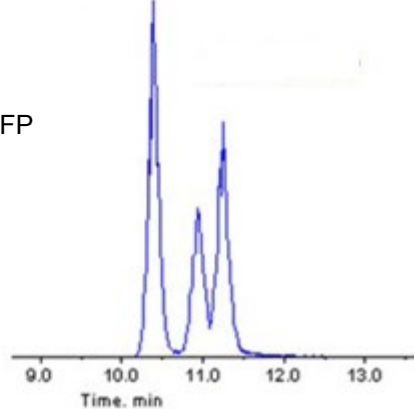
TOTP, TPTP and TMTP



ACE C18



ACE C18-PFP

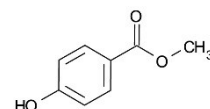
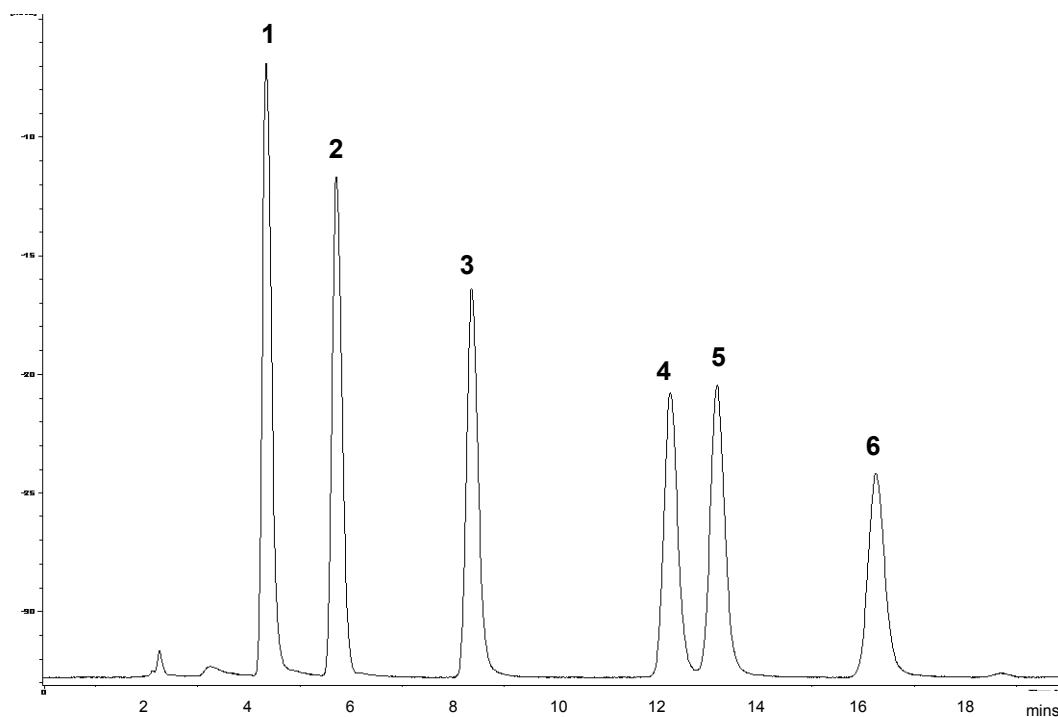


1. Triiso-propyl phosphate (TiPP) ( $m/z$  225 → 99)
2. Tri-n-propyl phosphate (TPrP) ( $m/z$  225 → 99)
3. Tri-o-tolyl phosphate (TOTP) ( $m/z$  369 → 91)
4. Tri-p-tolyl phosphate (TPTP) ( $m/z$  369 → 91)
5. Tri-m-tolyl phosphate (TMTP) ( $m/z$  369 → 91)

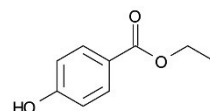


## Conditions

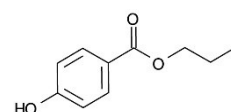
Column: ACE 3 Phenyl  
Dimensions: 150 x 2.1 mm  
Part Number: ACE-115-1502  
Mobile Phase: 25 mM ammonium acetate pH 6.8 in H<sub>2</sub>O/MeOH (50:50 v/v)  
Flow Rate: 0.2 mL/min  
Injection: 2 µL  
Temperature: 40 °C  
Detection: UV, 240 nm



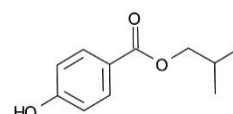
1. Methyl paraben



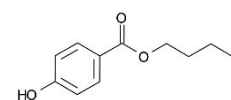
2. Ethyl paraben



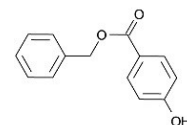
3. n-Propyl paraben



4. i-Butyl paraben



5. n-Butyl paraben



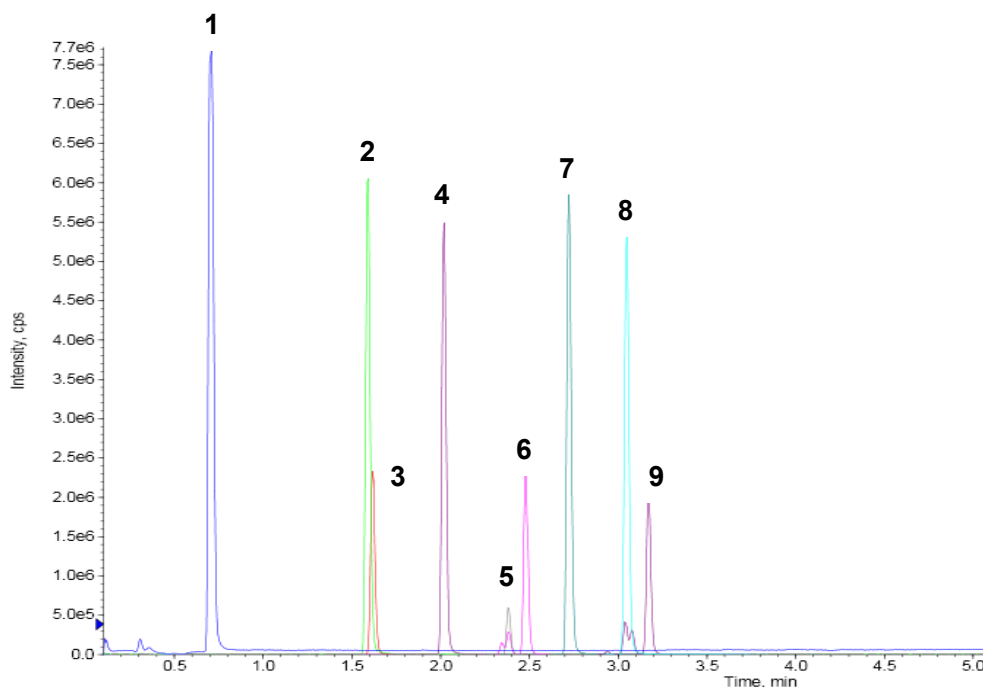
6. Benzyl paraben

## Conditions

Column: ACE Excel 2 C18  
 Dimensions: 50 x 2.1 mm  
 Part Number: EXL-101-0502U  
 Mobile Phase: A: 2 mM ammonium acetate, 0.1% acetic acid/MeCN (95:5 v/v)  
 B: 2 mM ammonium acetate, 0.1% acetic acid/MeCN (5:95 v/v)

Time (mins)	%B
0.0	25
0.5	25
5.5	95
7.5	95
8.0	25
10.0	25

Flow Rate: 0.5 mL/min  
 Injection: 20 µL  
 Temperature: 40 °C  
 Detection: AB SCIEX triple quad 5500  
 Negative ESI MRM  
 Source temperature: 450 °C  
 IonSpray voltage: -2400 V



1. Heptafluorobutyric acid  
(*m/z* 212.9 → 168.9)
2. Perfluorohexanoic acid  
(*m/z* 313 → 268.9)
3. Perfluorobutylsulfonic acid  
(*m/z* 299 → 79.9)
4. Perfluoroheptanoic acid  
(*m/z* 363 → 319)
5. Perfluorooctanoic acid  
(*m/z* 413 → 368.9)
6. Perfluorohexylsulfonic acid  
(*m/z* 399 → 80)
7. Perfluorononanoic acid  
(*m/z* 463 → 419)
8. Perfluorodecanoic acid  
(*m/z* 513 → 469)
9. Perfluorooctanesulfonic acid  
(*m/z* 499 → 80)



# Perfluoroalkyl Substances by Ion-Pairing LC-MS/MS

Application #AN2560

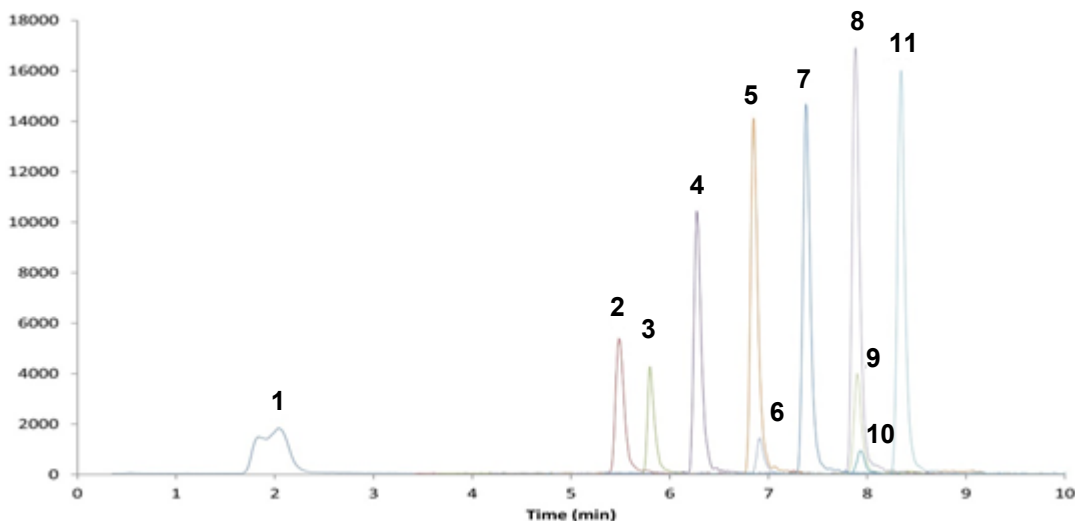
## Conditions

Column: ACE UltraCore 2.5 SuperC18  
Dimensions: 50 x 2.1 mm  
Part Number: CORE-25A-0502U  
Mobile Phase: A: 2 mM ammonium acetate + 5 mM 1-methylpiperidine in MeOH/H<sub>2</sub>O (5:95 v/v)  
B: 2 mM ammonium acetate + 5 mM 1-methylpiperidine in MeOH/H<sub>2</sub>O (95:5 v/v)

Time (mins)	%B
0.0	10
0.3	10
1.0	20
1.5	50
5.0	80
10.0	80
13.0	100
16.0	100

Flow Rate: 0.3 mL/min  
Injection: 5 µL  
Temperature: 35 °C  
Detection: Agilent 6430 triple quad MS  
ESI in negative ion mode  
Capillary voltage: 3000 V  
Nebulizer pressure: 50 psi

1. PFBA  
(*m/z* 213 → 169)
2. PFPeA  
(*m/z* 263 → 219)  
(*m/z* 263 → 175)
3. PFBS  
(*m/z* 299 → 99)  
(*m/z* 299 → 80)
4. PFHxA  
(*m/z* 313 → 269)  
(*m/z* 313 → 119)
5. PFHpA  
(*m/z* 363 → 319)  
(*m/z* 363 → 169)
6. PFHxS  
(*m/z* 399 → 99)  
(*m/z* 399 → 80)
7. PFOA  
(*m/z* 413 → 369)  
(*m/z* 413 → 169)
8. PFNA  
(*m/z* 463 → 419)  
(*m/z* 463 → 169)
9. PFOS  
(*m/z* 499 → 99)  
(*m/z* 499 → 80)
10. FOSA  
(*m/z* 498 → 498)  
(*m/z* 498 → 78)
11. PFDA  
(*m/z* 513 → 469)  
(*m/z* 513 → 269)



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# Perfluorinated Compounds in Water by LC-MS/MS

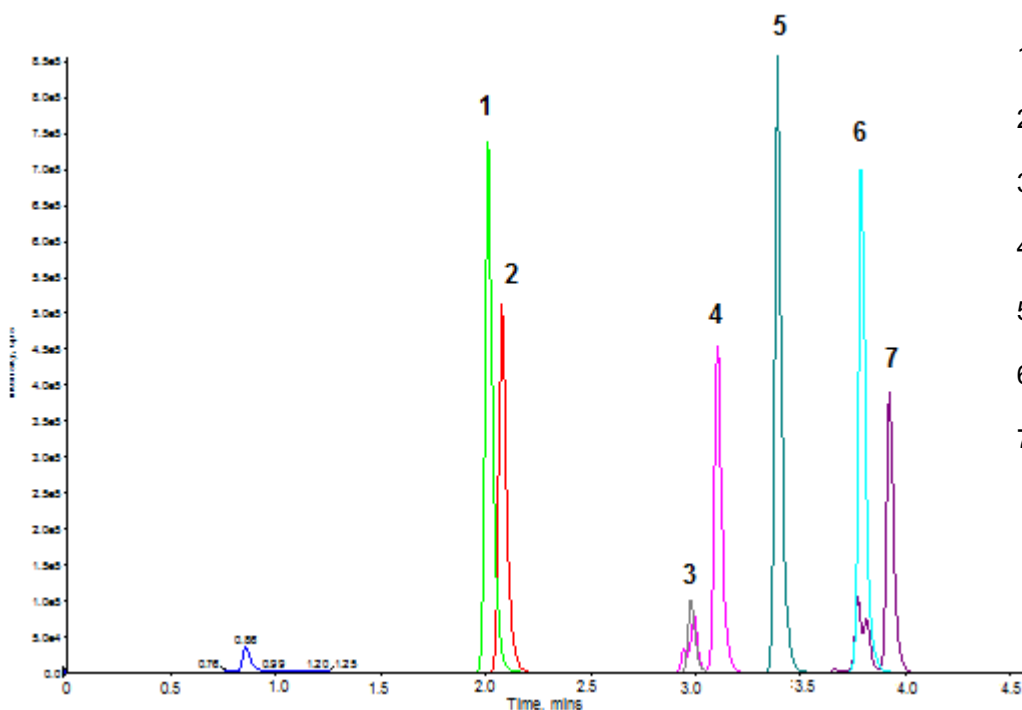
Application #AN2260

## Conditions

Column: ACE Excel 1.7 C18  
Dimensions: 100 x 2.1 mm  
Part Number: EXL-171-1002U  
Mobile Phase: A: 2 mM ammonium acetate, 0.1% formic acid in H<sub>2</sub>O/MeCN (90:10 v/v)  
B: 2 mM ammonium acetate, 0.1% formic acid in H<sub>2</sub>O/MeCN (10:90 v/v)

Time (mins)	%B
0.0	25
0.5	25
3.5	70
4.0	100
5.5	100
6.0	25
9.0	25

Flow Rate: 0.5 mL/min  
Injection: 10 µL  
Temperature: 40 °C  
Detection: AB SCIEX triple quad 5500  
Negative ESI MRM  
Source temperature: 450 °C  
IonSpray voltage: -2400 V



1. Perfluorohexanoic acid ( $m/z$  313.0 → 268.9)
2. Perfluorobutanesulfonic acid ( $m/z$  299.0 → 79.9)
3. Perfluorooctanoic acid ( $m/z$  413.0 → 368.9)
4. Perfluorohexanesulfonic acid ( $m/z$  399.0 → 80.0)
5. Perfluorononanoic acid ( $m/z$  463.0 → 419.0)
6. Perfluorodecanoic acid ( $m/z$  513.0 → 469.0)
7. Perfluorooctanesulfonic acid ( $m/z$  499.0 → 80.0)

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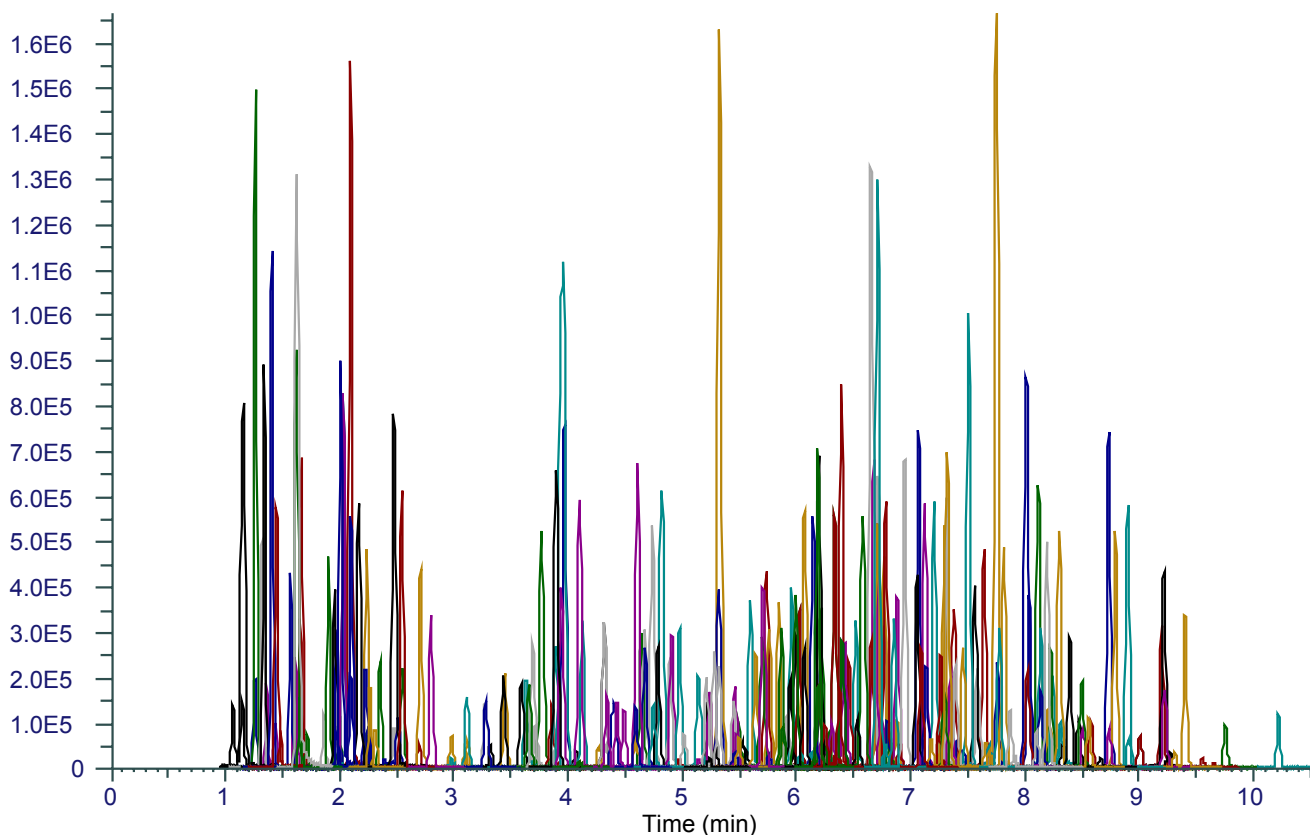
# 250 Pesticide Screen using LC-MS/MS

## Conditions

Column: ACE Excel 2 C18  
Dimensions: 100 x 2.1 mm  
Part Number: EXL-101-1002U  
Mobile Phase: A: 10 mM ammonium formate + 0.05% formic acid in H<sub>2</sub>O  
B: 10 mM ammonium formate + 0.05% formic acid in MeOH

Time (mins)	%B
0.00	2
0.25	30
10.00	100
12.00	100
12.50	2
14.50	2

Flow Rate: 0.5 mL/min  
Temperature: 50 °C  
Detection: TSQ Quantiva triple quad MS  
Positive mode HESI  
Spray voltage: 3500 V  
Ion transfer tube temperature: 350 °C  
Vaporizer temperature: 300 °C



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Analyte	R <sub>t</sub>	Adduct	Precursor Ion m/z	Quant Ion m/z	Conf Ion m/z	Analyte	R <sub>t</sub>	Adduct	Precursor Ion m/z	Quant Ion m/z	Conf Ion m/z
3-OH Carbofuran	2.25	[M+H] <sup>+</sup>	238.1	181.2	163.1	Cyprosulamide	3.30	[M+H] <sup>+</sup>	375.1	135.1	254.1
5-OH Thiabendazole	1.66	[M+H] <sup>+</sup>	218.0	147.2	191.1	Cyromazine	1.15	[M+H] <sup>+</sup>	167.1	125.2	68.2
Abamectin	9.45	[M+NH <sub>4</sub> ] <sup>+</sup>	890.5	305.3	567.5	DEF	9.20	[M+H] <sup>+</sup>	315.1	169.0	113.0
Acephate	1.26	[M+H] <sup>+</sup>	184.0	143.1	125.1	Demeton-S sulfone	2.55	[M+H] <sup>+</sup>	291.1	235.1	263.1
Acetamiprid	2.24	[M+H] <sup>+</sup>	223.1	126.1	90.1	Dialifos	7.46	[M+H] <sup>+</sup>	394.0	208.1	181.0
Aldicarb	2.95	[M+NH <sub>4</sub> ] <sup>+</sup>	208.1	116.1	89.0	Diazinon	7.12	[M+H] <sup>+</sup>	305.1	169.1	153.2
Aldicarb sulfone	1.44	[M+NH <sub>4</sub> ] <sup>+</sup>	240.1	148.0	86.0	Diazinon OA	5.32	[M+H] <sup>+</sup>	289.1	153.2	233.1
Aldicarb sulfoxide	1.37	[M+NH <sub>4</sub> ] <sup>+</sup>	224.1	132.0	89.1	Dichlormid	3.85	[M+H] <sup>+</sup>	208.0	140.0	81.2
Allethrin	8.33	[M+H] <sup>+</sup>	303.2	135.1	123.1	Dichlorvos	3.63	[M+H] <sup>+</sup>	221.0	109.1	127.0
Ametoctradin	7.64	[M+H] <sup>+</sup>	276.2	149.1	176.2	Dicrotophos	1.87	[M+H] <sup>+</sup>	238.1	112.2	193.1
Atrazine	4.64	[M+H] <sup>+</sup>	216.1	174.0	104.0	Diethofencarb	5.53	[M+H] <sup>+</sup>	268.2	124.1	180.2
Azinphos ethyl	6.30	[M+H] <sup>+</sup>	346.0	132.1	233.0	Diflubenzuron	6.66	[M+H] <sup>+</sup>	311.0	158.0	141.0
Azinphos methyl	5.14	[M+H] <sup>+</sup>	318.0	132.0	124.9	Dimethenamid	5.70	[M+H] <sup>+</sup>	276.1	244.1	168.2
Azinphos methyl OA	2.98	[M+H] <sup>+</sup>	302.0	132.2	160.0	Dimethoate	2.23	[M+H] <sup>+</sup>	230.1	199.0	125.0
Azoxystrobin	5.59	[M+H] <sup>+</sup>	404.1	372.1	344.1	Dimethomorph	5.76, 6.07	[M+H] <sup>+</sup>	388.1	301.0	165.1
Bendiocarb	3.72	[M+H] <sup>+</sup>	224.1	167.1	109.1	Dinotefuran	1.36	[M+H] <sup>+</sup>	203.1	129.1	114.2
Benoxacor	5.23	[M+H] <sup>+</sup>	260.1	134.1	120.1	Dioxacarb	2.26	[M+H] <sup>+</sup>	224.1	123.1	167.1
Bifenazate	6.27	[M+H] <sup>+</sup>	301.1	198.0	170.1	Dioxathion	8.10	[M-C <sub>4</sub> H <sub>10</sub> O <sub>2</sub> PS <sub>2</sub> ] <sup>+</sup>	271.1	97.0	125.0
Bitertanol	7.41	[M+H] <sup>+</sup>	338.2	269.3	99.1	Disulfoton sulfone	4.59	[M+H] <sup>+</sup>	307.0	261.1	125.0
Boscalid	5.85	[M+H] <sup>+</sup>	343.0	307.0	140.0	Disulfoton sulfoxide	4.49	[M+H] <sup>+</sup>	291.0	185.1	213.1
Bupirimate	6.68	[M+H] <sup>+</sup>	317.2	210.2	237.3	Diuron	4.82	[M+H] <sup>+</sup>	233.0	72.1	160.0
Buprofezin	8.24	[M+H] <sup>+</sup>	306.1	201.1	106.1	DMST	3.90	[M+H] <sup>+</sup>	215.1	106.1	151.0
Cadusafos	7.58	[M+H] <sup>+</sup>	271.1	159.0	131.0	Dodine	7.56	[M+H] <sup>+</sup>	228.3	186.3	60.1
Carbaryl	4.07	[M+NH <sub>4</sub> ] <sup>+</sup>	219.1	145.1	127.0	Emamectin	8.57	[M+H] <sup>+</sup>	886.5	158.1	126.1
Carbendazim	2.10	[M+H] <sup>+</sup>	192.1	160.1	132.1	Ethiofencarb	4.27	[M+H] <sup>+</sup>	226.1	107.1	169.1
Carbofuran	3.77	[M+H] <sup>+</sup>	222.1	165.2	123.2	Ethiofencarb sulfone	1.90	[M+NH <sub>4</sub> ] <sup>+</sup>	275.1	107.1	201.1
Carboxin	3.97	[M+H] <sup>+</sup>	236.1	143.0	93.0	Ethiofencarb sulfoxide	1.98	[M+H] <sup>+</sup>	242.1	107.1	185.0
Carfentrazone ethyl	6.88	[M+H] <sup>+</sup>	412.0	346.1	366.0	Ethion	8.31	[M+H] <sup>+</sup>	385.0	199.1	143.0
Chlorantraniliprole	5.24	[M+H] <sup>+</sup>	484.0	286.0	194.0	Ethion monoxon	6.73	[M+H] <sup>+</sup>	369.0	199.0	143.0
Chlorfenvinphos	7.21	[M+H] <sup>+</sup>	359.0	170.0	99.1	Ethiprole	5.77	[M+NH <sub>4</sub> ] <sup>+</sup>	413.9	351.0	255.0
Chlorimuron ethyl	5.73	[M+H] <sup>+</sup>	415.1	186.0	83.0	Ethofumesate	5.55	[M+H] <sup>+</sup>	287.1	121.1	241.1
Chlorpyrifos	8.47	[M+H] <sup>+</sup>	349.9	198.0	97.0	Ethoprop	6.46	[M+H] <sup>+</sup>	243.1	173.0	131.0
Chlorpyrifos OA	6.65	[M+H] <sup>+</sup>	334.0	278.0	197.9	Etofenprox	9.75	[M+NH <sub>4</sub> ] <sup>+</sup>	394.2	177.2	107.1
Clethodim	7.71	[M+H] <sup>+</sup>	360.3	164.1	136.1	Etoxazole	8.73	[M+H] <sup>+</sup>	360.2	141.0	304.2
Clofentezine	7.38	[M+H] <sup>+</sup>	303.0	138.1	102.0	Famoxadone	7.24	[M+NH <sub>4</sub> ] <sup>+</sup>	392.2	331.1	238.0
Cloransulam methyl	4.13	[M+H] <sup>+</sup>	430.0	398.1	370.0	Fenamidone	5.76	[M+H] <sup>+</sup>	312.1	236.1	92.2
Clothianidin	1.99	[M+H] <sup>+</sup>	250.0	169.1	132.0	Fenamiphos	6.71	[M+H] <sup>+</sup>	304.1	217.1	202.0
Coumaphos	7.07	[M+H] <sup>+</sup>	363.0	227.1	307.1	Fenamiphos sulfone	4.10	[M+H] <sup>+</sup>	336.1	266.1	188.1
Crotoxyphos	5.86	[M+NH <sub>4</sub> ] <sup>+</sup>	332.1	127.1	193.1	Fenamiphos sulfoxide	3.96	[M+H] <sup>+</sup>	320.1	233.1	171.1
Crufomate	6.77	[M+H] <sup>+</sup>	292.1	236.1	108.1	Fenazaquin	9.21	[M+H] <sup>+</sup>	307.2	161.2	57.2
Cyantraniliprole	4.33	[M+2+H] <sup>+</sup>	475.0	286.0	444.1	Fenhexamid	6.39	[M+H] <sup>+</sup>	302.1	178.0	97.2
Cyazofamid	6.52	[M+H] <sup>+</sup>	325.1	108.1	261.2	Fenobucarb	5.49	[M+H] <sup>+</sup>	208.1	95.0	152.0
Cyflufenamid	7.42	[M+H] <sup>+</sup>	413.1	295.1	203.0	Fenoxaprop ethyl	8.04	[M+H] <sup>+</sup>	362.1	288.1	91.1
Cymoxanil	2.48	[M+H] <sup>+</sup>	199.1	128.1	111.1	Fenoxycarb	6.80	[M+H] <sup>+</sup>	302.1	88.1	116.1
Cyphenothrin	9.27	[M+NH <sub>4</sub> ] <sup>+</sup>	393.2	151.2	123.2	Fenpropimorph	6.42	[M+H] <sup>+</sup>	304.3	147.2	119.1



Analyte	R <sub>t</sub>	Adduct	Precursor Ion m/z	Quant Ion m/z	Conf Ion m/z	Analyte	R <sub>t</sub>	Adduct	Precursor Ion m/z	Quant Ion m/z	Conf Ion m/z
Fenpyroximate	8.90	[M+H] <sup>+</sup>	422.2	366.1	214.2	Mepanipyrim	6.21	[M+H] <sup>+</sup>	224.1	106.2	77.1
Fensulfothion	4.89	[M+H] <sup>+</sup>	309.0	235.0	281.1	Mesotrione	2.01	[M+H] <sup>+</sup>	340.1	228.1	104.1
Fenuron	2.17	[M+H] <sup>+</sup>	165.1	72.1	77.1	Metaflumizone	8.30	[M+H] <sup>+</sup>	507.1	178.0	287.1
Fonicamid	1.66	[M+H] <sup>+</sup>	230.1	203.0	98.0	Metalaxyl	4.91	[M+H] <sup>+</sup>	280.1	220.1	192.1
Fluazifop P butyl	8.12	[M+H] <sup>+</sup>	384.1	282.2	328.2	Metaldehyde	2.02	[M+NH <sub>4</sub> ] <sup>+</sup>	194.1	62.2	45.3
Fludioxonil	5.76	[M+NH <sub>4</sub> ] <sup>+</sup>	266.1	158.1	131.0	Metconazole	7.32	[M+H] <sup>+</sup>	320.2	70.1	125.0
Flufenoxuron	8.79	[M+H] <sup>+</sup>	489.0	158.1	141.1	Methamidophos	1.16	[M+H] <sup>+</sup>	142.0	94.2	125.1
Flufenpyr ethyl	6.72	[M+H] <sup>+</sup>	409.1	335.0	307.0	Methidathion	4.97	[M+NH <sub>4</sub> ] <sup>+</sup>	320.0	145.1	85.1
Flumetsulam	2.03	[M+H] <sup>+</sup>	326.1	129.1	109.0	Methiocarb	5.64	[M+H] <sup>+</sup>	226.1	169.2	121.1
Flumiclorac pentyl	8.13	[M+NH <sub>4</sub> ] <sup>+</sup>	441.1	308.1	354.1	Methiocarb sulfone	2.35	[M+NH <sub>4</sub> ] <sup>+</sup>	275.0	122.1	201.1
Fluometuron	4.31	[M+H] <sup>+</sup>	233.1	72.2	46.3	Methiocarb sulfoxide	2.10	[M+H] <sup>+</sup>	242.1	185.1	122.1
Fluopicolide	6.00	[M+H] <sup>+</sup>	383.0	173.0	145.0	Methomyl	1.61	[M+H] <sup>+</sup>	163.1	106.1	88.1
Fluopyram	6.33	[M+H] <sup>+</sup>	397.1	173.0	208.0	Methoxyfenozide	6.04	[M+H] <sup>+</sup>	369.2	149.1	313.1
Fluoxastrobin	6.40	[M+H] <sup>+</sup>	459.1	427.2	188.1	Metolcarb	3.28	[M+H] <sup>+</sup>	166.1	109.1	94.1
Fluridone	5.32	[M+H] <sup>+</sup>	330.1	309.1	290.0	Metribuzin	3.59	[M+H] <sup>+</sup>	215.1	187.1	131.1
Flusilazole	6.77	[M+H] <sup>+</sup>	316.1	247.2	165.1	Mevinphos	2.70	[M+NH <sub>4</sub> ] <sup>+</sup>	242.1	193.1	127.1
Fluthiacet methyl	6.88	[M+H] <sup>+</sup>	404.0	344.0	273.9	Monocrotophos	1.71	[M+H] <sup>+</sup>	224.1	193.0	127.0
Flutolanil	5.95	[M+H] <sup>+</sup>	324.1	262.0	282.0	Monolinuron	4.16	[M+H] <sup>+</sup>	215.1	126.1	148.1
Flutriafol	4.74	[M+H] <sup>+</sup>	302.1	70.1	123.1	Myclobutanil	6.15	[M+H] <sup>+</sup>	289.1	125.0	70.1
Fluxapyroxad	6.02	[M+H] <sup>+</sup>	382.1	342.1	314.1	Nicosulfuron	3.45	[M+H] <sup>+</sup>	411.1	182.0	213.0
Forchlorfenuron	4.78	[M+H] <sup>+</sup>	248.1	129.1	93.1	Norflurazon	4.98	[M+H] <sup>+</sup>	304.0	160.0	140.0
Formetanate HCl	1.26	[M+H] <sup>+</sup>	222.0	165.1	120.0	Norflurazon desmethyl	4.43	[M+H] <sup>+</sup>	290.0	179.0	140.0
Fosthiazate	4.40	[M+H] <sup>+</sup>	284.1	104.1	228.1	Omethoate	1.33	[M+H] <sup>+</sup>	214.0	183.0	125.0
Hexaconazole	7.29	[M+H] <sup>+</sup>	314.1	158.9	70.0	Oxamyl	1.48	[M+NH <sub>4</sub> ] <sup>+</sup>	237.1	72.0	90.0
Hexythiazox	8.51	[M+H] <sup>+</sup>	353.1	228.0	168.0	Oxamyl oxime	1.34	[M+H] <sup>+</sup>	163.1	72.1	90.1
Imazalil	5.14	[M+H] <sup>+</sup>	297.1	159.1	255.1	Oxydemeton methyl	1.57	[M+H] <sup>+</sup>	247.0	169.1	109.1
Imazosulfuron	5.28	[M+H] <sup>+</sup>	413.0	153.0	156.1	Oxydemeton methyl sulfone	1.62	[M+H] <sup>+</sup>	263.0	169.0	109.0
Imidacloprid	1.96	[M+H] <sup>+</sup>	256.1	209.1	175.0	Parathion methyl OA	3.10	[M+H] <sup>+</sup>	248.0	202.0	109.1
Imiprothrin	6.34	[M+H] <sup>+</sup>	319.2	151.1	123.1	Parathion OA	4.61	[M+H] <sup>+</sup>	276.1	220.1	248.1
Indaziflam	6.58	[M+H] <sup>+</sup>	302.2	158.1	145.1	Pencycuron	7.50	[M+H] <sup>+</sup>	329.1	125.1	89.1
Indoxacarb	7.75	[M+H] <sup>+</sup>	528.1	249.0	150.1	Penflufen	6.95	[M+H] <sup>+</sup>	318.2	234.1	141.0
Ipconazole	7.81	[M+H] <sup>+</sup>	334.2	70.1	125.0	Penthiopyrad	7.05	[M+H] <sup>+</sup>	360.1	177.1	276.1
Iprovalicarb	6.31	[M+H] <sup>+</sup>	321.2	119.1	186.2	Phenothrin	9.56	[M+H] <sup>+</sup>	351.2	183.1	168.0
Isofenphos	7.39	[M+H] <sup>+</sup>	346.1	217.0	245.1	Phenthoate	6.81	[M+H] <sup>+</sup>	321.0	247.1	79.1
Isoprocarb	4.67	[M+H] <sup>+</sup>	194.1	95.1	152.2	Phorate OA	5.10	[M+H] <sup>+</sup>	245.0	75.2	47.2
Isoproturon	4.79	[M+H] <sup>+</sup>	207.2	72.2	165.2	Phorate OA Sulfone	2.51	[M+H] <sup>+</sup>	277.0	155.0	127.0
Kresoxim methyl	6.90	[M+H] <sup>+</sup>	314.1	267.2	222.1	Phorate OA Sulfoxide	2.31	[M+H] <sup>+</sup>	261.0	153.0	81.0
Lactofen	8.22	[M+NH <sub>4</sub> ] <sup>+</sup>	479.1	344.1	223.0	Phorate Sulfone	4.61	[M+H] <sup>+</sup>	293.0	114.9	171.0
Lenacil	4.67	[M+H] <sup>+</sup>	235.1	153.1	136.1	Phorate Sulfoxide	4.49	[M+H] <sup>+</sup>	277.0	170.9	199.0
Leptophos OA	7.75	[M+2+H] <sup>+</sup>	396.9	155.1	364.9	Phosalone	7.35	[M+H] <sup>+</sup>	368.0	182/0	111.1
Linuron	5.46	[M+H] <sup>+</sup>	249.0	182.1	160.1	Phosmet	5.21	[M+H] <sup>+</sup>	318.0	160.1	133.1
Malathion	5.92	[M+H] <sup>+</sup>	331.0	127.1	285.1	Phosmet OA	3.12	[M+H] <sup>+</sup>	302.0	160.0	133.0
Malathion OA	3.89	[M+H] <sup>+</sup>	315.1	127.1	99.0	Phosphamidon	3.43	[M+H] <sup>+</sup>	300.1	127.1	174.1
Mandipropamid	5.94	[M+H] <sup>+</sup>	412.1	328.2	356.2	Phoxim	7.25	[M+H] <sup>+</sup>	299.1	77.2	129.1
Mefenpyr diethyl	7.26	[M+H] <sup>+</sup>	373.1	327.1	160.0	Picoxystrobin	6.79	[M+H] <sup>+</sup>	368.1	145.0	115.0



Analyte	R <sub>t</sub>	Adduct	Precursor Ion m/z	Quant Ion m/z	Conf Ion m/z	Analyte	R <sub>t</sub>	Adduct	Precursor Ion m/z	Quant Ion m/z	Conf Ion m/z
Pirimicarb	4.24	[M+H] <sup>+</sup>	239.2	182.1	72.0	Spiromesifen	8.66	[M+NH <sub>4</sub> ] <sup>+</sup>	388.1	273.1	187.0
Pirimicarb Desmethyl	2.71	[M+H] <sup>+</sup>	225.1	168.2	72.1	Spiromesifen Alcohol	5.01	[M+H] <sup>+</sup>	273.2	187.1	179.1
Pirimiphos Methyl	7.34	[M+H] <sup>+</sup>	306.1	164.2	108.1	Spirotetramat	6.38	[M+H] <sup>+</sup>	374.2	302.3	216.2
Prallethrin	7.69	[M+H] <sup>+</sup>	301.2	133.0	151.2	Spiroxamine	5.95	[M+H] <sup>+</sup>	298.3	144.2	100.2
Prochloraz	7.39	[M+H] <sup>+</sup>	376.0	308.1	70.1	Sulfoxaflor	2.39	[M+NH <sub>4</sub> ] <sup>+</sup>	295.2	174.1	154.1
Profoxydim	7.71, 9.00	[M+H] <sup>+</sup>	466.2	280.0	180.0	Sulprofos	8.56	[M+H] <sup>+</sup>	323.0	219.1	139.1
Promecarb	5.88	[M+H] <sup>+</sup>	208.1	109.0	151.1	TCMTB	5.48	[M+H] <sup>+</sup>	239.0	180.0	136.0
Propamocarb	1.41	[M+H] <sup>+</sup>	189.1	102.0	144.0	Tebufenozide	6.78	[M+H] <sup>+</sup>	353.2	133.0	104.8
Propaquizafop	8.21	[M+H] <sup>+</sup>	444.1	299.2	371.2	Tebufenpyrad	8.19	[M+H] <sup>+</sup>	334.2	117.1	145.1
Propargite	8.74	[M+NH <sub>4</sub> ] <sup>+</sup>	368.2	231.2	175.1	Tebuthiuron	3.89	[M+H] <sup>+</sup>	229.1	172.0	116.0
Propetamphos	6.13	[M+H] <sup>+</sup>	282.1	138.1	156.1	Tepraloxymid	4.10, 6.19	[M+H] <sup>+</sup>	342.2	250.1	166.1
Propoxur (S)	3.69	[M+H] <sup>+</sup>	210.1	168.2	111.1	Terbufos Sulfone	5.46	[M+H] <sup>+</sup>	321.0	115.0	143.0
Prosulfuron	5.29	[M+H] <sup>+</sup>	420.1	167.1	141.1	Terbufos Sulfoxide	5.49	[M+H] <sup>+</sup>	305.1	97.0	187.0
Pymetrozine	1.44	[M+H] <sup>+</sup>	218.1	105.1	78.1	Terbutylazine	5.71	[M+H] <sup>+</sup>	230.1	174.1	104.1
Pyraclostrobin	7.30	[M+H] <sup>+</sup>	388.1	163.1	194.1	Tetrachlorvinphos	6.86	[M+2+H] <sup>+</sup>	366.9	127.1	206.0
Pyraflufen Ethyl	7.13	[M+H] <sup>+</sup>	413.0	339.0	253.1	Tetramethrin	7.91, 8.10	[M+H] <sup>+</sup>	332.2	164.1	135.1
Pyrazophos	7.31	[M+H] <sup>+</sup>	374.1	222.2	194.1	Thiabendazole	2.48	[M+H] <sup>+</sup>	202.0	175.0	131.1
Pyridaben	9.22	[M+H] <sup>+</sup>	365.1	309.0	147.1	Thiacloprid	2.55	[M+H] <sup>+</sup>	253.0	126.1	99.1
Pyridalyl	10.21	[M+2+H] <sup>+</sup>	492.0	110.9	164.0	Thiamethoxam	1.65	[M+H] <sup>+</sup>	292.0	211.1	181.1
Pyrimethanil	5.45	[M+H] <sup>+</sup>	200.1	107.1	168.1	Thifensulfuron Methyl	3.28	[M+H] <sup>+</sup>	388.0	167.1	205.0
Pyriproxyfen	8.39	[M+H] <sup>+</sup>	322.1	96.0	227.1	Thiobencarb	7.46	[M+H] <sup>+</sup>	258.1	125.0	89.0
Quinalphos	6.78	[M+H] <sup>+</sup>	299.1	163.1	147.1	Thiodicarb	4.34	[M+H] <sup>+</sup>	355.1	163.2	88.1
Quinoxifen	8.50	[M+H] <sup>+</sup>	308.0	197.1	214.1	Thionazin	4.74	[M+H] <sup>+</sup>	249.1	193.1	97.0
Quisqualofop Ethyl	8.01	[M+H] <sup>+</sup>	373.1	299.2	255.1	Topramezone	1.63	[M+H] <sup>+</sup>	364.1	334.1	125.1
Resmethrin	9.40	[M+H] <sup>+</sup>	339.2	128.1	171.1	Triadimefon	6.07	[M+H] <sup>+</sup>	294.1	197.0	225.0
Rimsulfuron	3.94	[M+H] <sup>+</sup>	432.1	182.1	139.0	Triadimenol	6.25	[M+H] <sup>+</sup>	296.1	70.2	99.0
Rotenone	6.71	[M+H] <sup>+</sup>	395.2	213.2	192.1	Triazophos	6.19	[M+H] <sup>+</sup>	314.1	162.1	119.1
Saflufenacil	5.32	[M+H] <sup>+</sup>	501.1	349.1	198.0	Tribenuron Methyl	4.59	[M+H] <sup>+</sup>	396.1	155.1	181.1
Sedaxane	6.20, 6.54	[M+H] <sup>+</sup>	332.2	159.0	139.0	Trichlorfon	2.26	[M+H] <sup>+</sup>	256.9	109.0	221.0
Sethoxydim	8.03	[M+H] <sup>+</sup>	328.2	178.0	220.1	Tricyclazole	2.80	[M+H] <sup>+</sup>	190.0	163.1	136.1
Simazine	3.66	[M+H] <sup>+</sup>	202.1	104.1	132.1	Trifloxystrobin	7.78	[M+H] <sup>+</sup>	409.1	186.2	206.2
Spinetoram	8.14	[M+H] <sup>+</sup>	748.5	142.1	203.1	Triflumizole	7.87	[M+H] <sup>+</sup>	346.1	278.0	73.0
Spinosad A	7.69	[M+H] <sup>+</sup>	732.5	142.1	98.0	Triforine	5.23	[M+2+H] <sup>+</sup>	434.9	213.0	98.2
Spinosad D	8.10	[M+H] <sup>+</sup>	746.5	142.1	98.0	Zoxamide	7.09	[M+H] <sup>+</sup>	336.0	187.0	159.0
Spirodiclofen	8.91	[M+H] <sup>+</sup>	411.1	313.1	71.1						



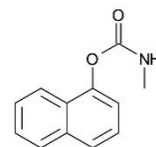
## Conditions

Column: ACE UltraCore 2.5 SuperC18  
 Dimensions: 50 x 2.1 mm  
 Part Number: CORE-25A-0502U  
 Mobile Phase: A: 0.1% formic acid + 5 mM ammonium formate in H<sub>2</sub>O/MeOH (90:10 v/v)  
 B: 0.1% formic acid + 5 mM ammonium formate in H<sub>2</sub>O/MeOH (10:90 v/v)

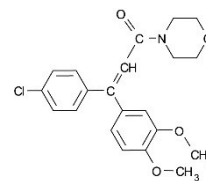
Time (mins)	%B
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0.00	0
1.00	0
15.00	100
18.00	100
18.05	0
20.00	0

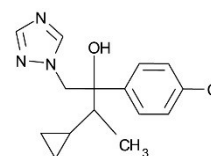
Flow Rate: 0.4 mL/min  
 Injection: 20 µL  
 Temperature: 40 °C  
 Detection: Agilent 6420 Triple Quadrupole MS,  
 +ve mode ESI  
 Dynamic MRM



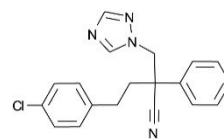
1. Carbaryl  
(*m/z* 202.10 → 145.10)



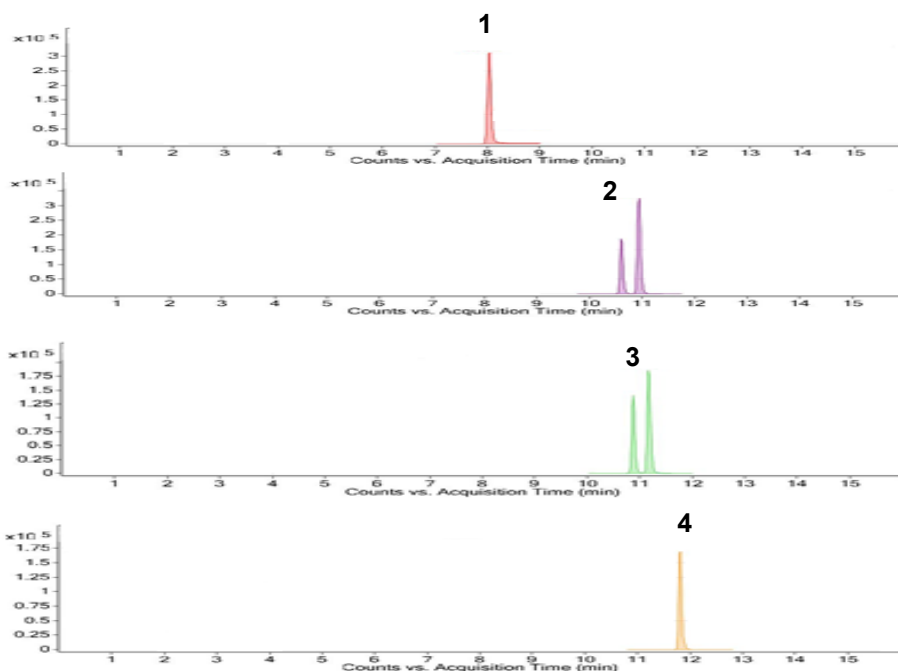
2. Dimethomorphs  
(*m/z* 388.10 → 301.10)



3. Cyproconazoles  
(*m/z* 292.10 → 70.00)



4. Fenbuconazole  
(*m/z* 337.10 → 70.00)



Also analysed under same conditions:

Acephate, Acetamiprid, Aldicarb, Aldicarb sulfone, Aldicarb sulfoxide, Benomyl, Carbendazim, Carbofuran, Clofentezine, Clothianidin, Cyfluthrin, Demeton S-methylsulfone, Demeton S-methylsulfoxide, Dicrotophos, Dimethoate, Dinotefuran, DMA, DMPF, Flubendiamide, Folpet, Formetanate, Hexaconazole, Hexaflumuron, Imidacloprid, Indoxacarb, Mandipropamid, Methamidophos, Methomyl, Monocrotophos, Nicotine, Omethoate, Oxamyl, Pencycuron, Prochloraz, Propargite, Thiabendazole, Thiocloprid, Thiamethoxam, Thiodicarb, Thiophanate methyl and Triflorine

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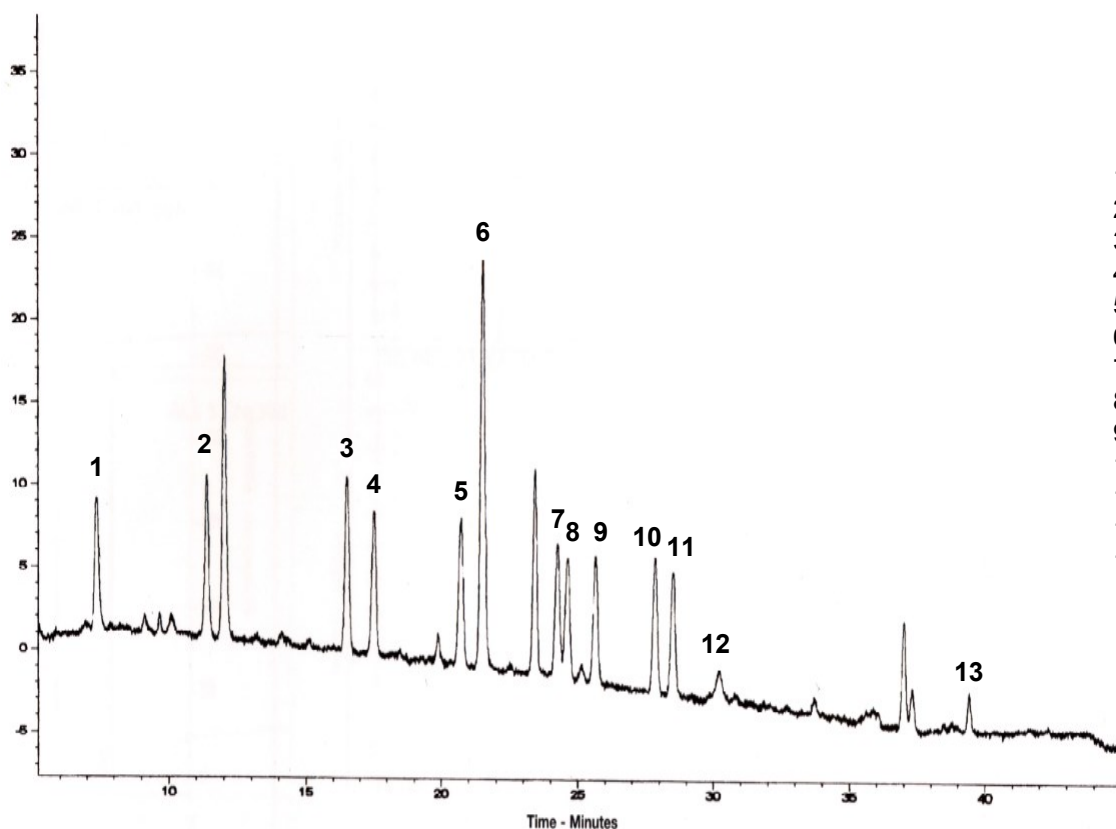
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## Conditions

Column: ACE 3 C18  
Dimensions: 150 x 2.1 mm  
Part Number: ACE-111-1502  
Mobile Phase: A: 0.1 M ammonium acetate in H<sub>2</sub>O  
B: MeCN

Time (mins)	%B
0	10
40	80
47	90
49	10

Flow Rate: 0.3 mL/min  
Injection: 25 µL  
Temperature: 40 °C  
Detection: UV, 220 nm (Pendimethalin at 245 nm)  
Sample: 0.05 µg/L standards in MeCN/H<sub>2</sub>O 10:90 v/v



1. Deisopropylatrazine
2. Desethylatrazine
3. Simazine
4. Cyanazine
5. Atrazine
6. Internal standard
7. Sebuthylazine
8. Propazine
9. Terbutylazine
10. Prometryn
11. Terbutryn
12. Alachlor
13. Pendimethalin

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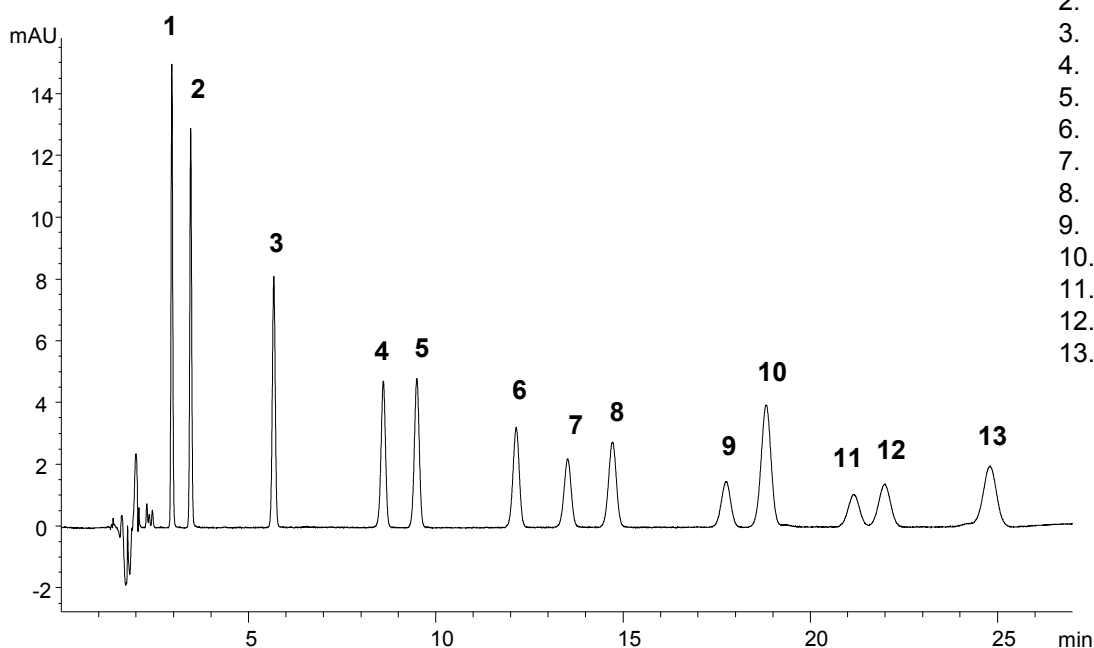
# Detection of 13 Phenolic Compounds in Ground Water & Landfill Leachates

**ACE**<sup>®</sup>  
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Application #AN3070

## Conditions

Column: ACE Excel 3 C18-Amide  
Dimensions: 150 x 4.6 mm  
Part Number: EXL-1112-1546U  
Mobile Phase: 0.1% formic acid v/v in H<sub>2</sub>O/MeCN (65:35 v/v)  
Flow Rate: 1mL/min  
Injection: 10 µL  
Temperature: 30 °C  
Detection: UV, 274 nm



1. Pyrocatechol
2. Resorcinol
3. Phenol
4. m-Cresol
5. o-Cresol
6. 2,4-Dimethylphenol
7. 3,4-Dimethylphenol
8. 3,5-Dimethylphenol
9. 1-Naphthol
10. 3,4,5-Trimethylphenol
11. 2,3,6-Trimethylphenol
12. 2,4,6-Trimethylphenol
13. 2-Naphthol

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Columns

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# Separation of Phenol and Phenoxy Acid Herbicides

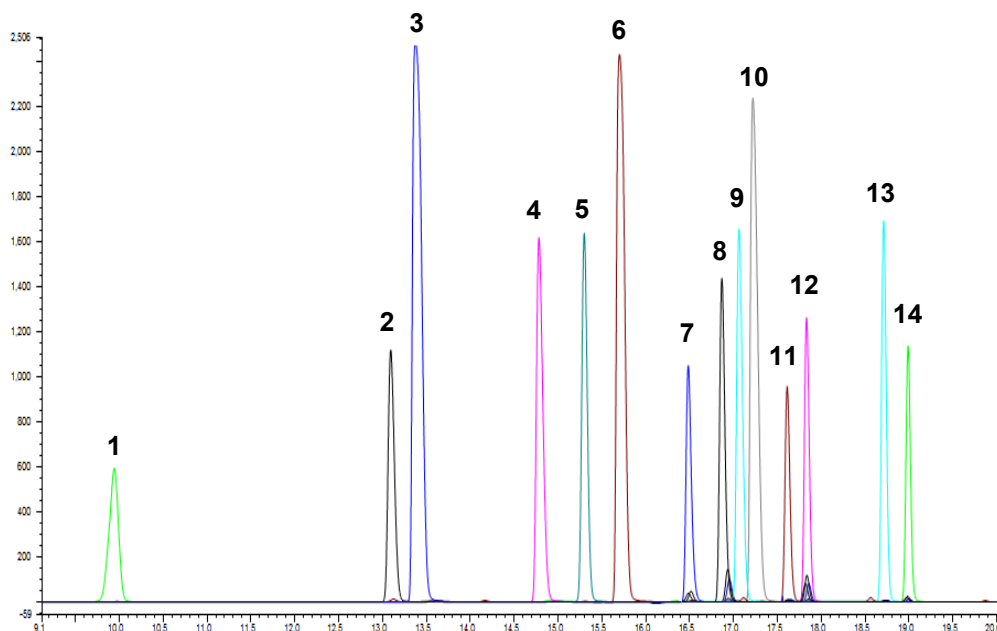
Application #AN2290

## Conditions

Column: ACE 3 C18-PFP  
Dimensions: 150 x 4.6 mm  
Part Number: ACE-1110-1546  
Mobile Phase: A: 0.1% formic acid in H<sub>2</sub>O  
B: MeOH

Time (mins)	%B
0.0	10
20.0	100

Flow Rate: 1 mL/min  
Injection: 10 µL  
Temperature: 35 °C  
Detection: UV, 280 nm



1. Phenol
2. o-Cresol
3. 2-Chlorophenol
4. 4-Chlorophenol
5. 2,6-Dichlorophenol
6. 6-CP
7. 2,4-D
8. MCPA
9. PCOC
10. 2,4-DCP
11. 2,4-DP
12. CMPP
13. 2,4-DB
14. MCPB



# Phenols in Purple Coneflower (*Echinacea Purpurea*)

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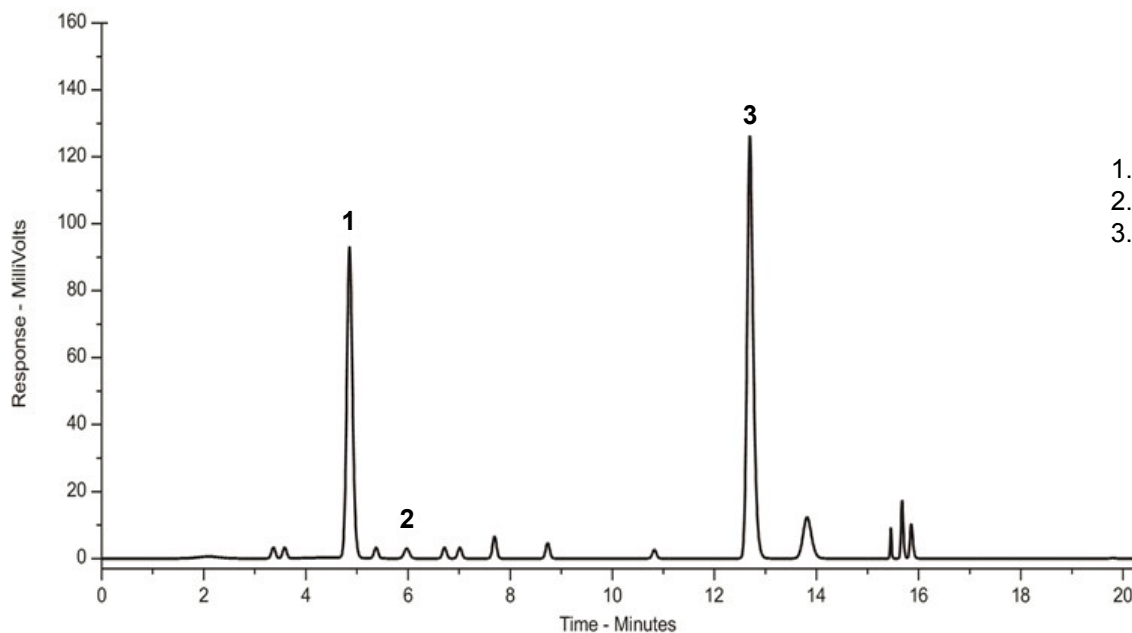
Application #AN2920

## Conditions

Column: ACE 5 C18  
Dimensions: 250 x 4.6 mm  
Part Number: ACE-121-2546  
Mobile Phase: A: 0.1% H<sub>3</sub>PO<sub>4</sub> in H<sub>2</sub>O  
B: MeCN

Time (mins)	%B
0	10
13	22
14	40

Flow Rate: 1.5 mL/min  
Injection: 10 µL  
Temperature: 35 °C  
Detection: UV, 330 nm



1. Caftaric acid
2. Chlorogenic acid
3. Cichoric acid

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[www.ace-hplc.com](http://www.ace-hplc.com) or email: [info@ace-hplc.com](mailto:info@ace-hplc.com)

# LC-MS/MS of Phytoestrogens from Hop Extract

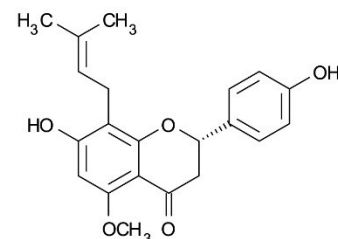
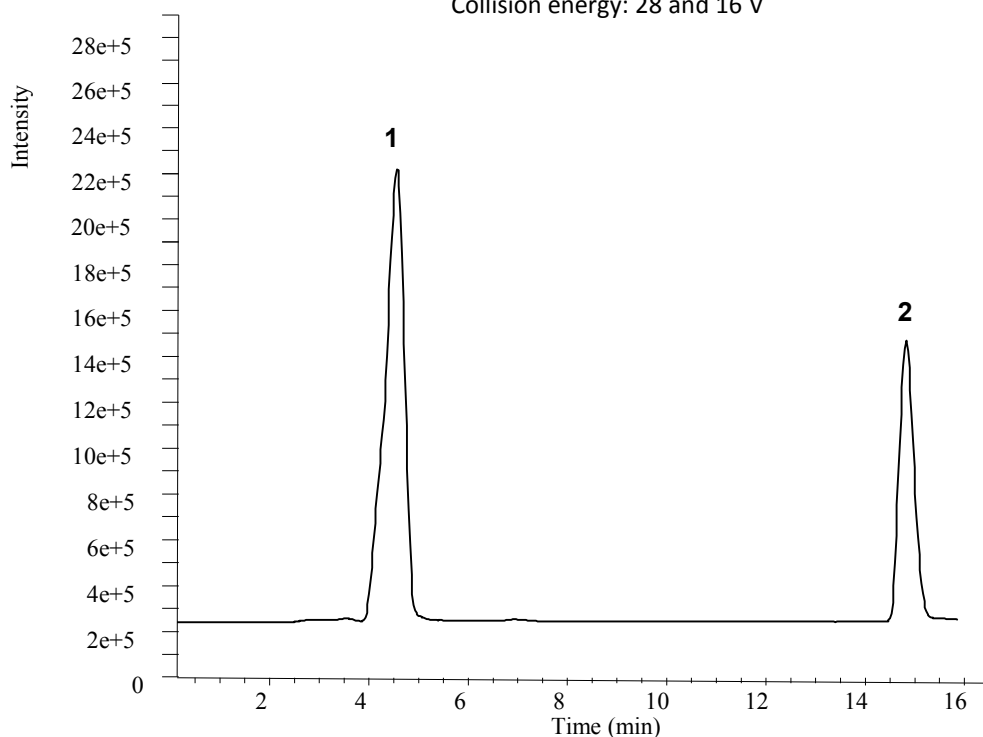
Application #AN1160

## Conditions

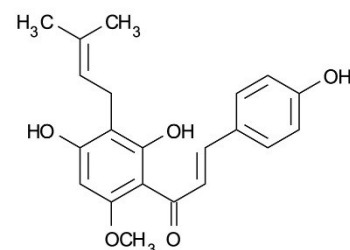
Column: ACE 3 C18-AR  
Dimensions: 150 x 4.6 mm  
Part Number: ACE-119-1546  
Mobile Phase: A: 1% formic acid in MeCN  
B: 1% formic acid in MeOH  
C: 1% formic acid in H<sub>2</sub>O  
D: MeOH

Time (mins)	%A	%B	%C	%D
0	56	0	44	0
8	51	5	44	0
10	51	5	44	0
17	95	5	0	0
22	95	0	0	5

Flow Rate: 0.6 mL/min  
Detection: TSQ-Quantum triple quad ESI  
Spray voltage: -4500 V  
Precursor ion: 355.4 [M+H]<sup>+</sup>  
MRM transition ions: 179 and 299  
Collision energy: 28 and 16 V



1. Isoxanthohumol  
LOQ 0.07 µg/mL

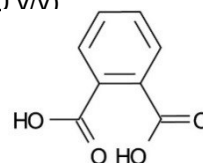


2. Xanthohumol  
LOQ 0.01 µg/mL

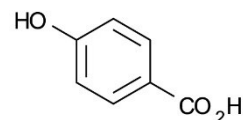


## Conditions

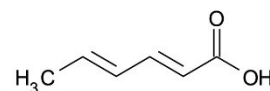
Column:	ACE Excel 1.7 C18
Dimensions:	50 x 3.0 mm
Part Number:	EXL-171-0503U
Mobile Phase:	20 mM potassium phosphate pH 2.5 in MeCN/H <sub>2</sub> O (30:70 v/v)
Flow Rate:	0.43 mL/min
Injection:	0.7 µL
Temperature:	20 °C
Detection:	UV, 230 nm



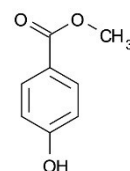
1. Phthalic acid



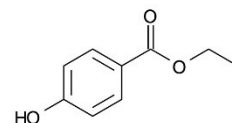
2. 4-Hydroxybenzoic acid



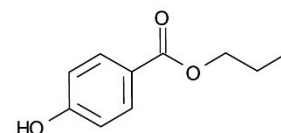
3. Sorbic acid



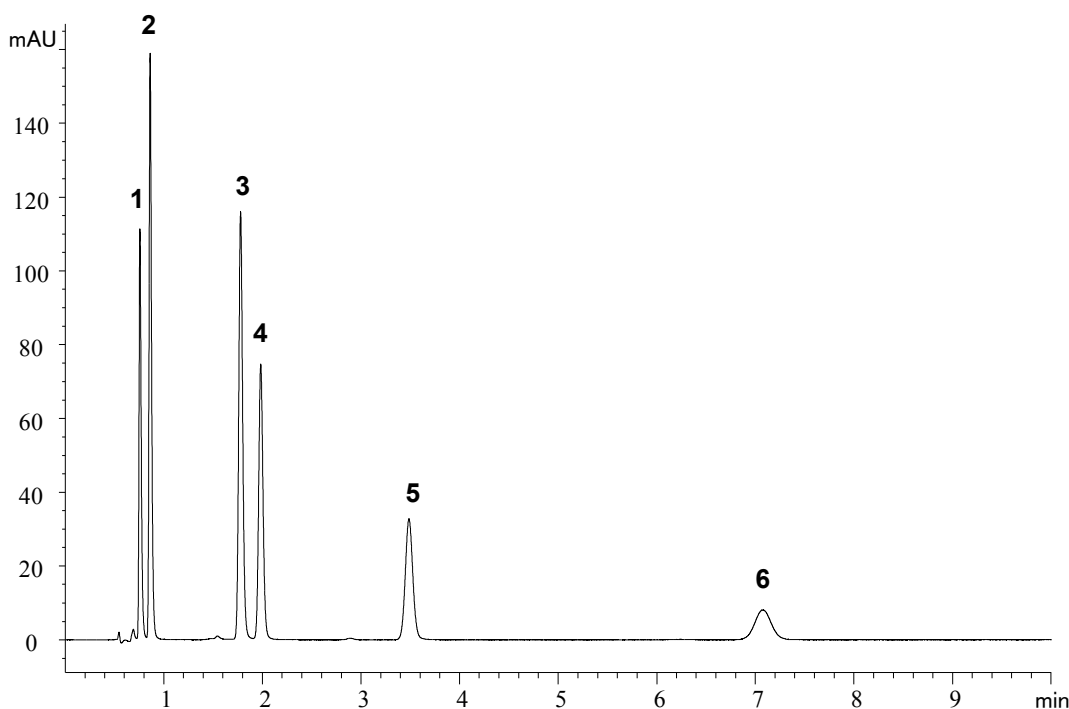
4. Methyl paraben



5. Ethyl paraben



6. Propyl paraben

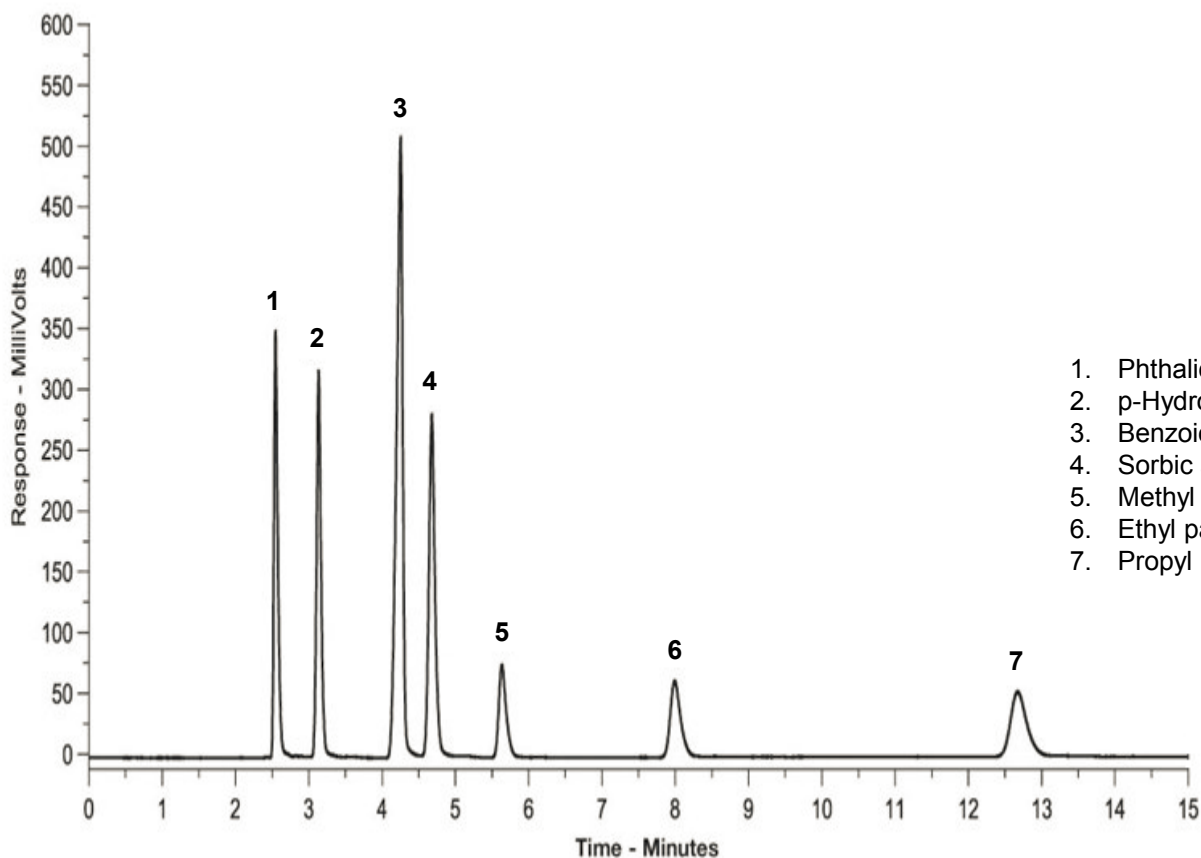


# Separation of Seven Preservatives

Application #AN3040

## Conditions

Column: ACE 5 C18  
Dimensions: 250 x 4.6 mm  
Part Number: ACE-121-2546  
Mobile Phase: MeCN/50 mM KH<sub>2</sub>PO<sub>4</sub> pH 4.4 in H<sub>2</sub>O (40:60 v/v)  
Flow Rate: 1 mL/min  
Temperature: Ambient  
Detection: UV, 230 nm



# Sennosides in Traditional Chinese Medicine

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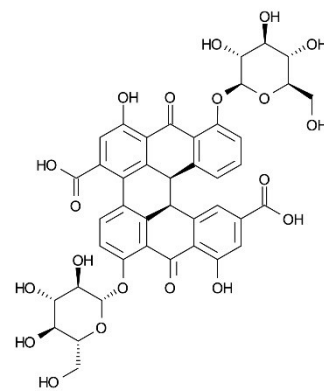
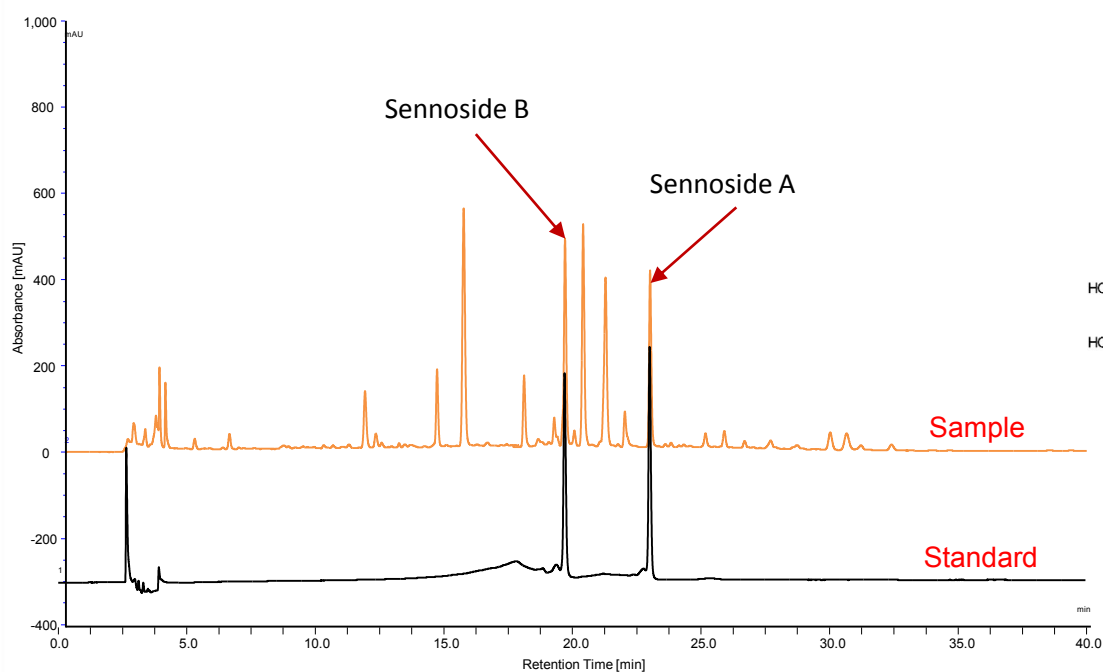
Application #AN1390

## Conditions

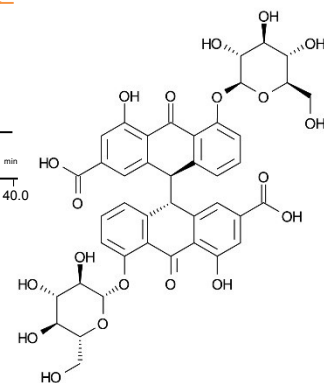
Column: ACE 3 C18-PFP  
Dimensions: 150 x 4.6 mm  
Part Number: ACE-1110-1546  
Mobile Phase: A: 0.75% acetic acid in H<sub>2</sub>O  
B: MeCN/MeOH (90:10 v/v)

Time (mins)	%B
0	9
23	28
40	28

Flow Rate: 0.6 mL/min  
Temperature: 35 °C  
Detection: UV, 271 nm  
Sample: Herbal tea bag containing Folium Sennae, Peppermint, Folium Mori, Folium Nelumbinis, Glycyrrhiza Uralensis and Lelang Grass Rhizome



Sennoside A



Sennoside B

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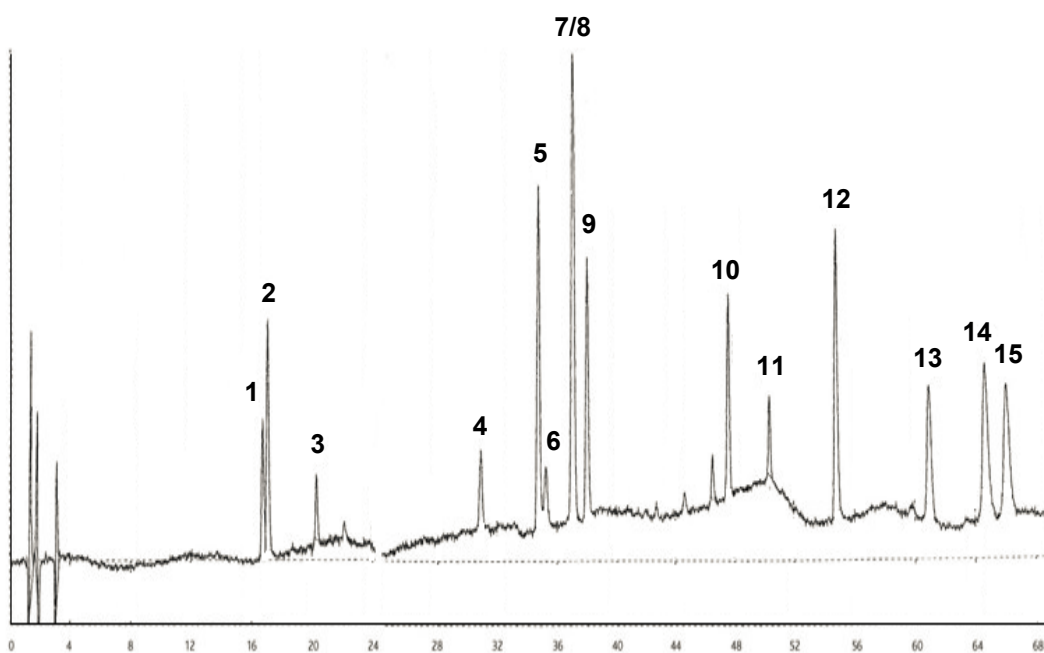
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[www.ace-hplc.com](http://www.ace-hplc.com) or email: [info@ace-hplc.com](mailto:info@ace-hplc.com)

## Conditions

Column: ACE 3 C18  
 Dimensions: 100 x 4.6 mm  
 Part Number: ACE-111-1046  
 Mobile Phase: A: H<sub>2</sub>O  
 B: MeOH  
 C: 0.06 M Tetrabutylammonium bromide and 0.5 M KH<sub>2</sub>PO<sub>4</sub> in H<sub>2</sub>O pH 2.55

Time (mins)	%A	%B	%C
0	45	50	5
45	3	92	5
65	3	92	5
66	45	50	5
75	45	50	5

Flow Rate: 1 mL/min  
 Injection: 10 µL  
 Temperature: Ambient  
 Detection: UV-Vis, 420 nm, 520 nm and 600 nm



1. Rhodamine B
2. Orange II
3. Metanil Yellow
4. Butter Yellow
5. Para Red
6. Sudan Orange G
7. Toluidine Red
8. Sudan I
9. Sudan Red G
10. Sudan II
11. Sudan Black
12. Sudan III
13. Sudan Red 7B
14. Sudan Red B
15. Sudan IV

# Separation of Sulfonamides

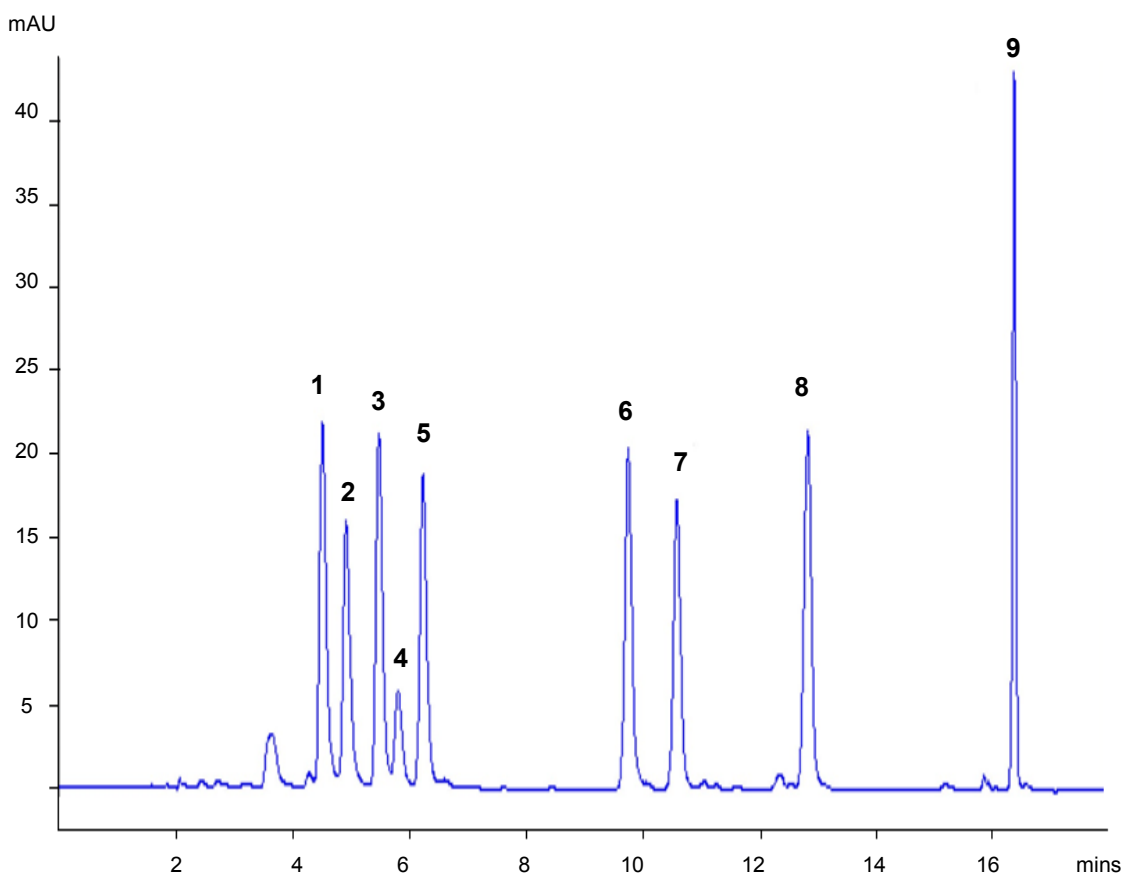
Application #AN1610

## Conditions

Column: ACE Excel 3 C18-PFP  
Dimensions: 150 x 4.6 mm  
Part Number: EXL-1110-1546U  
Mobile Phase: A: H<sub>2</sub>O  
B: MeCN  
C: 10% formic acid

Time (mins)	%A	%B	%C
0	84	15	1
12	74	25	1
14	59	40	1
16	84	15	1
18	84	15	1

Flow Rate: 1 mL/min  
Detection: UV, 268 nm



1. Sulfadiazine
2. Sulfapyridine
3. Sulfamerazine
4. Sulfamoxole
5. Sulfamethazine
6. Sulfamonomethoxine
7. Sulfachloropyridazine
8. Sulfamethoxazole
9. Sulfadimethoxine





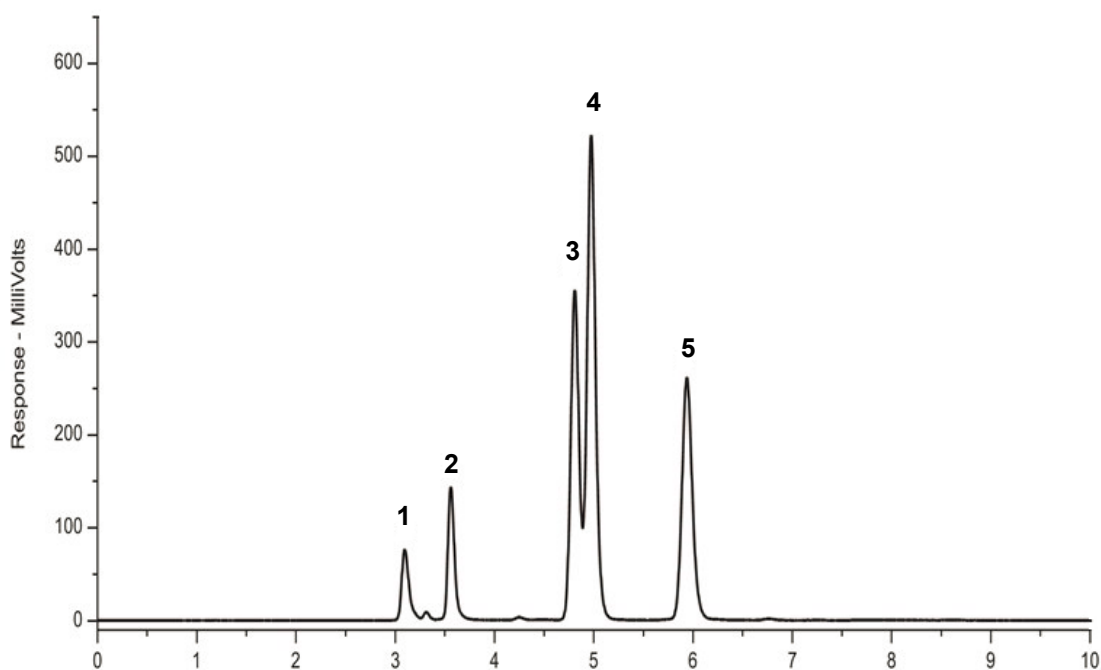
# Separation of Tocopherols

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Application #AN2790

## Conditions

Column: ACE 5 SIL  
Dimensions: 250 x 4.6 mm  
Part Number: ACE-127-2546  
Mobile Phase: Hexane/IPA (98:2 v/v)  
Flow Rate: 1 mL/min  
Injection: 1  $\mu$ L  
Temperature: Ambient  
Detection: UV-Vis, 450 nm

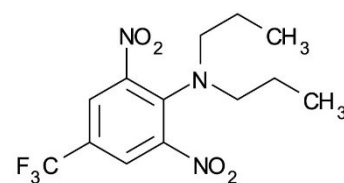
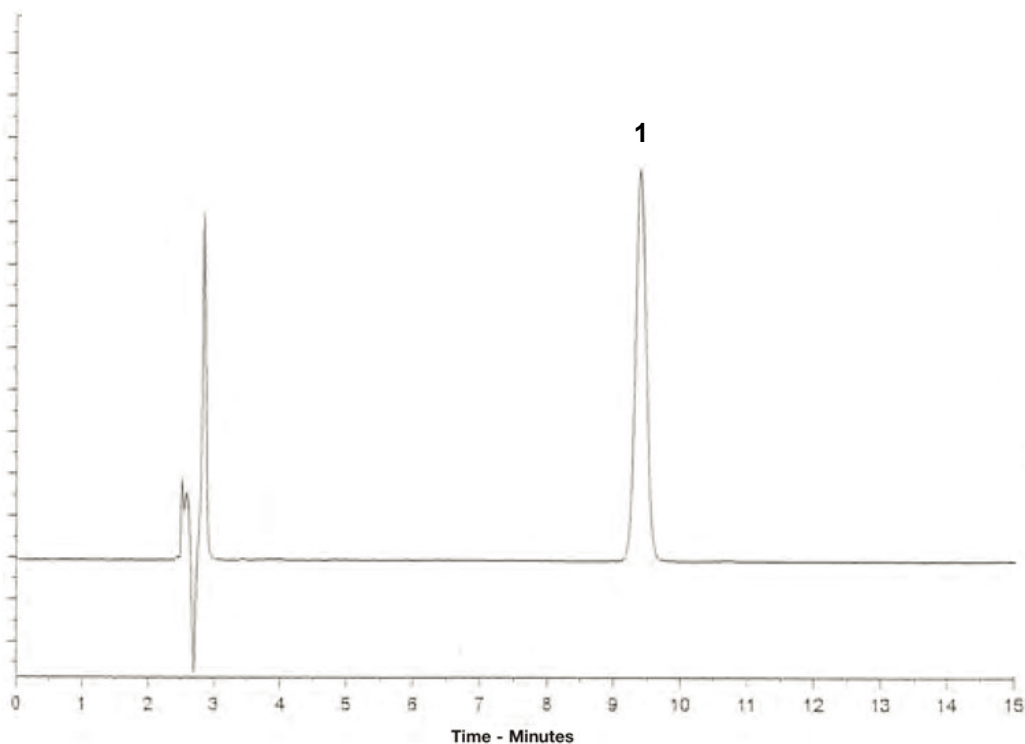


1.  $\gamma$ -Tocopherol
2.  $\alpha$ -Tocopherol
3.  $\beta$ -Tocopherol
4.  $\beta$ -Tocopherol
5.  $\delta$ -Tocopherol



## Conditions

Column: ACE 5 C18  
Dimensions: 250 x 4.6 mm  
Part Number: ACE-121-2546  
Mobile Phase: H<sub>2</sub>O/MeOH (15:85 v/v)  
Flow Rate: 1 mL/min  
Temperature: Ambient  
Detection: UV, 254 nm



1. Trifluralin

# BSA Tryptic Digest Profiling

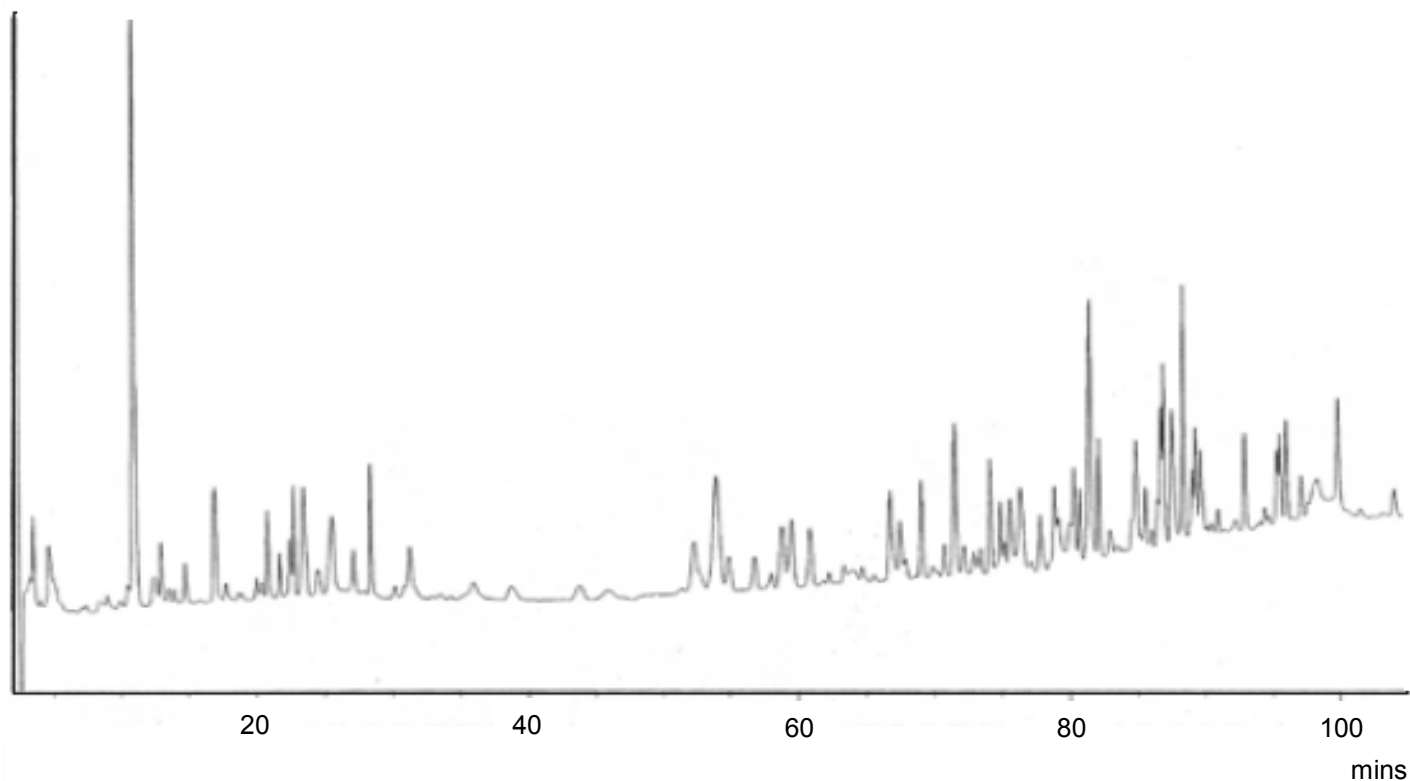
Application #AN2000

## Conditions

Column: ACE 5 C18-300  
Dimensions: 150 x 4.6 mm  
Part Number: ACE-221-1546  
Mobile Phase: A: 1% TFA in H<sub>2</sub>O  
B: 1% TFA in MeCN/H<sub>2</sub>O (1:1 v/v)

Time (mins)	%B
0	4
5	4
25	20
45	20
75	40
95	65
115	70
120	4

Flow Rate: 1 mL/min  
Temperature: Ambient  
Detection: UV, 214 nm

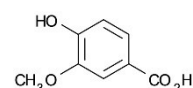
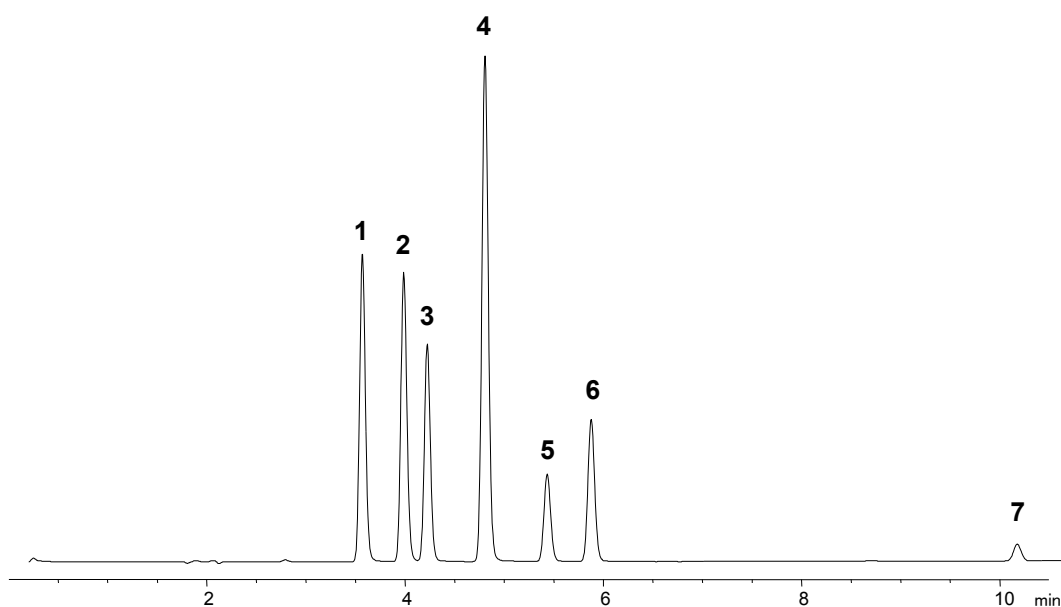


## Conditions

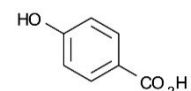
Column: ACE 3 C18-Amide  
Dimensions: 150 x 4.6 mm  
Part Number: EXL-1112-1546U  
Mobile Phase: A: 0.1% formic acid in H<sub>2</sub>O  
B: 0.1% formic acid in MeCN

Time (mins)	%B
0.0	30
10.0	55
10.5	55
15.0	30
Post time 5 minutes	

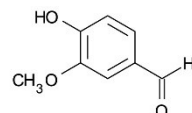
Flow Rate: 1 mL/min  
Injection: 5 µL  
Temperature: 40 °C  
Detection: UV, 260 nm



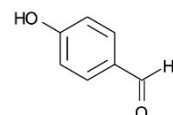
1. Vanillic acid



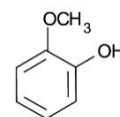
2. 4-Hydroxybenzoic acid



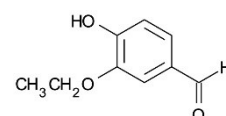
3. Vanillin



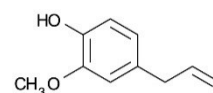
4. 4-Hydroxybenzaldehyde



5. Guaiacol



6. Ethyl Vanillin



7. Eugenol

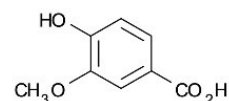
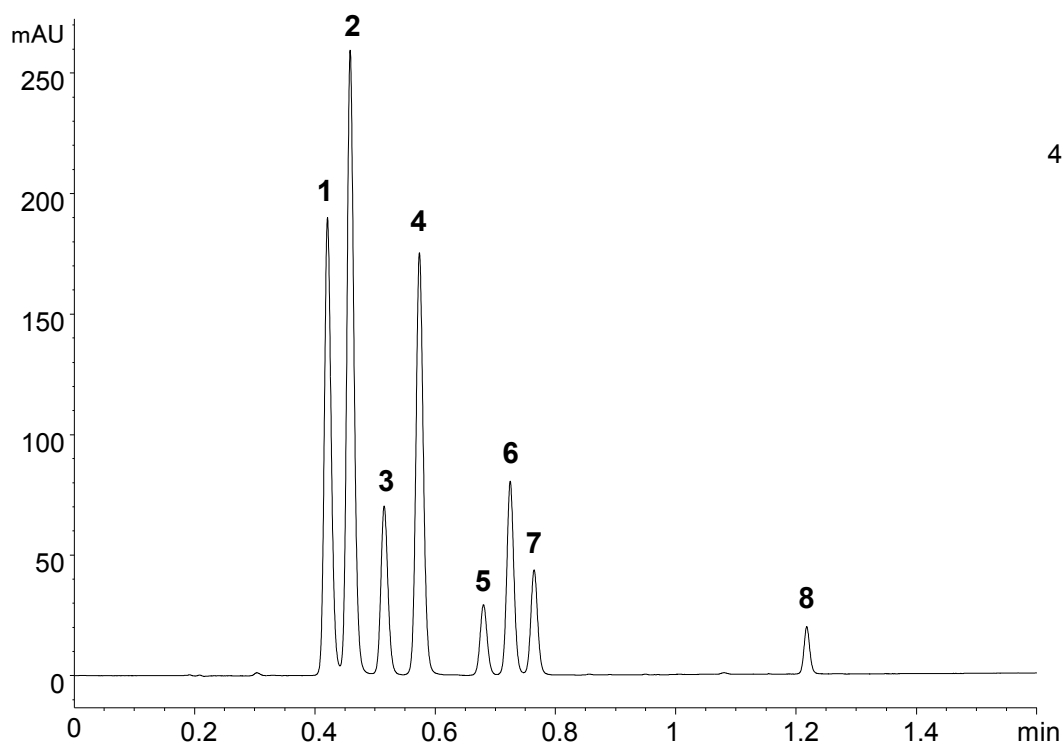
## Application #AN2240

### Conditions

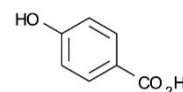
Column: ACE Excel 1.7 C18-Amide  
Dimensions: 50 x 3.0 mm  
Part Number: EXL-1712-0503U  
Mobile Phase: A: 0.1% formic acid in H<sub>2</sub>O  
B: 0.1% formic acid in MeCN

Flow Rate: 1.3 mL/min  
Injection: 1 µL  
Temperature: 45 °C  
Detection: UV, 260 nm

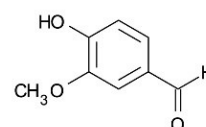
Time (mins)	%B
0.00	25
1.32	75
1.49	75
1.60	25



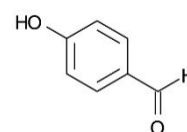
1. Vanillic acid



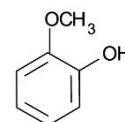
2. 4-Hydroxybenzoic acid



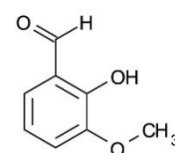
3. Vanillin



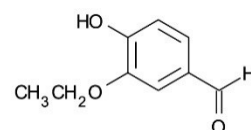
4. 4-Hydroxybenzaldehyde



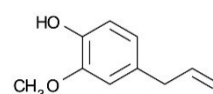
5. Guaiacol



6. o-Vanillin



7. Ethyl vanillin



8. Eugenol

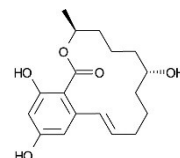
## Application #AN1830

### Conditions

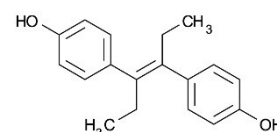
Column: ACE UltraCore 2.5 SuperC18  
Dimensions: 100 x 2.1 mm  
Part Number: CORE-25A-1002U  
Mobile Phase: A: 0.01 mM ammonium fluoride + 0.001% formic acid  
B: MeCN

Time (mins)	%B
0.0	25
0.5	25
7.0	35
7.5	35
10.5	60
12.5	90

Flow Rate: 0.5 mL/min  
Temperature: 45 °C  
Detection: Positive or negative ESI  
MRM data

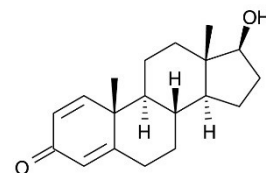


1.  $\alpha$ - and  $\beta$ -Zearalenol  
( $m/z$  319.17  $\rightarrow$  275.12)

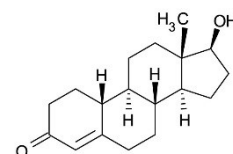


2. Diethylstilbestrol-d8  
( $m/z$  275.23  $\rightarrow$  245.09)

Also analysed in -ESI:  
Talaranol and zeranone-d4  
Talaranol and zeranone  
Zearalenone  
Hexestrol  
Diethylstilbestrol  
Dienesterol

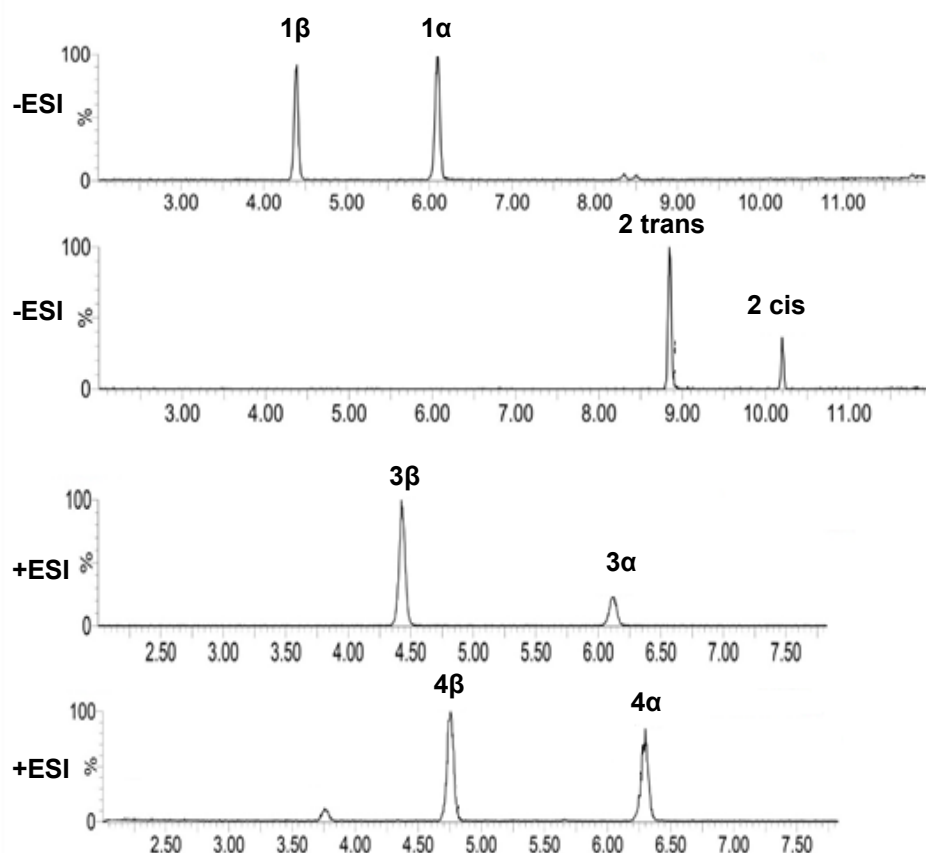


3.  $\alpha$ - and  $\beta$ -Boldenone  
( $m/z$  287.17  $\rightarrow$  121.12)



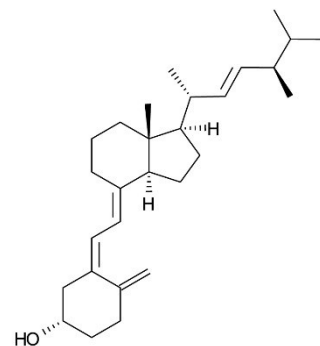
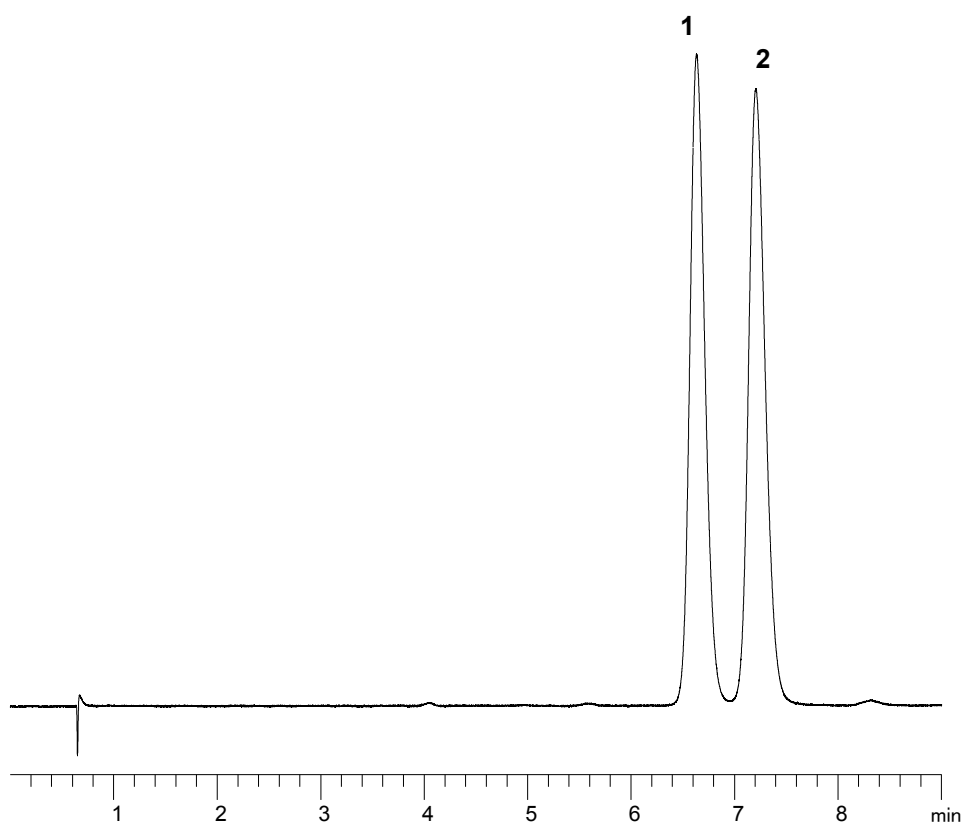
4.  $\alpha$ - and  $\beta$ -Nortestosterone  
( $m/z$  275.23  $\rightarrow$  109.09)

Also analysed in +ESI:  
Hydroxystanozolol  
Hydroxystanozolol-d3  
Methyltestosterone  
Methyltestosterone-d3  
 $\beta$ -Nortestosterone-d3  
 $\beta$ -Trenbolone  
 $\alpha$ -Trenbolone

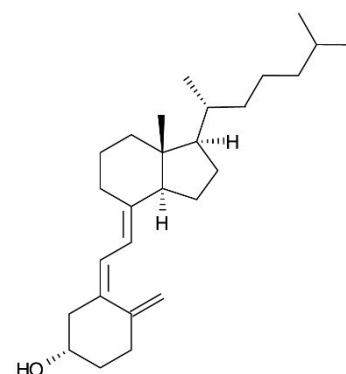


## Conditions

Column:	ACE Excel 2 C18-Amide
Dimensions:	50 x 3.0 mm
Part Number:	EXL-1012-0503U
Mobile Phase:	100% MeCN
Flow Rate:	0.43 mL/min
Injection:	2 µL
Temperature:	20 °C
Detection:	UV, 265 nm



1. Ergocalciferol (D2)



2. Cholecalciferol (D3)

# 25-Hydroxy Vitamin D in Serum by LC-MS/MS

**ACE**<sup>®</sup>  
Ultra-inert  
UHPLC & HPLC Columns

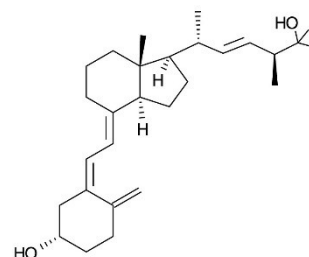
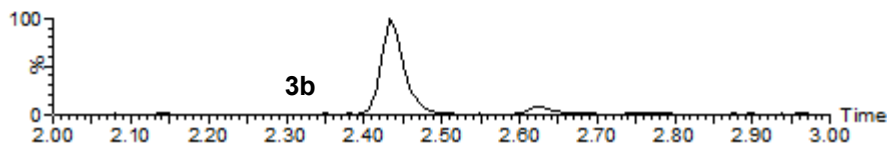
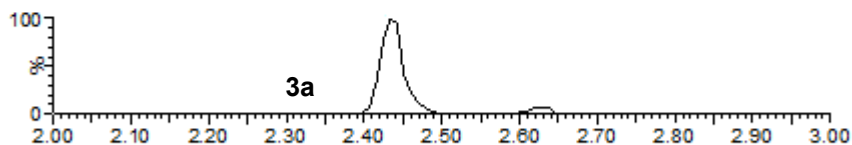
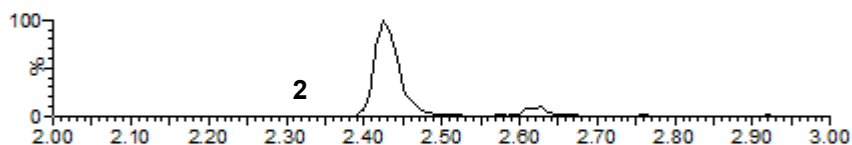
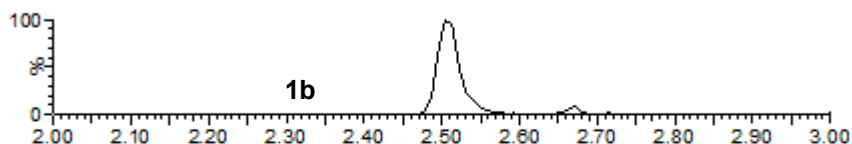
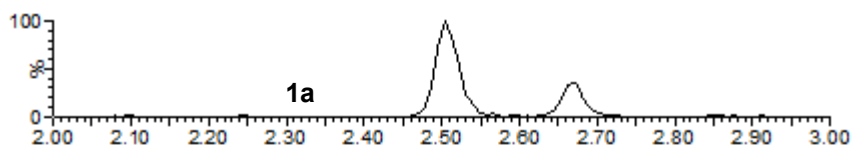
Application #AN2390

## Conditions

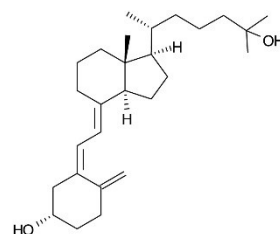
Column: ACE Excel 2 C18-PFP  
Dimensions: 100 x 2.1 mm  
Part Number: EXL-1010-1002U  
Mobile Phase: A: 2 mM ammonium acetate, 0.1% formic acid in H<sub>2</sub>O  
B: 0.1% formic acid in MeOH

Time (mins)	%B
0.0	75
3.0	100
4.0	100

Flow Rate: 0.4 mL/min  
Injection: 15 µL  
Temperature: 40 °C  
Detection: Quattro Premier XE triple quad MS  
MRM positive ESI mode  
Desolvation temperature: 450 °C  
Ion source temperature: 150 °C



- 1a. 25-OH Vitamin D2  
(*m/z* 395.5 → 269.5)
- 1b. 25-OH Vitamin D2  
(*m/z* 395.5 → 119.2)
2. d6-25-OH Vitamin D3 (IS)  
(*m/z* 389.6 → 263.5)



- 3a. 25-OH Vitamin D3  
(*m/z* 383.5 → 257.5)
- 3b. 25-OH Vitamin D3  
(*m/z* 383.5 → 107.2)

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Columns

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[www.ace-hplc.com](http://www.ace-hplc.com) or email: [info@ace-hplc.com](mailto:info@ace-hplc.com)

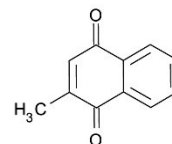


# Separation of Fat Soluble Vitamins

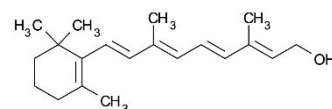
## Application #AN2420

### Conditions

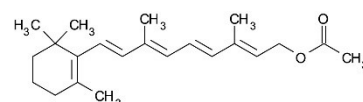
Column: ACE 3 C18-Amide  
Dimensions: 150 x 4.6 mm  
Part Number: EXL-1112-1546U  
Mobile Phase: MeOH/MeCN (90:10 v/v)  
Flow Rate: 1 mL/min  
Temperature: 20 °C  
Detection: UV, 280 nm



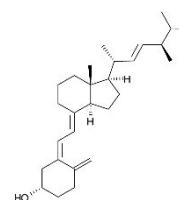
1. Menadione (Vitamin K3)



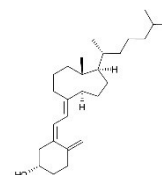
2. Retinol (Vitamin A)



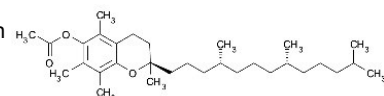
3. Vitamin A acetate



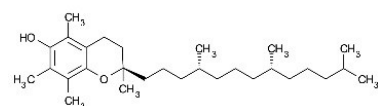
4. Ergocalciferol (Vitamin D2)



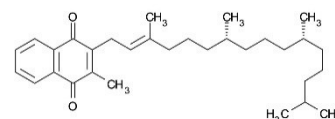
5. Cholecalciferol (Vitamin D3)



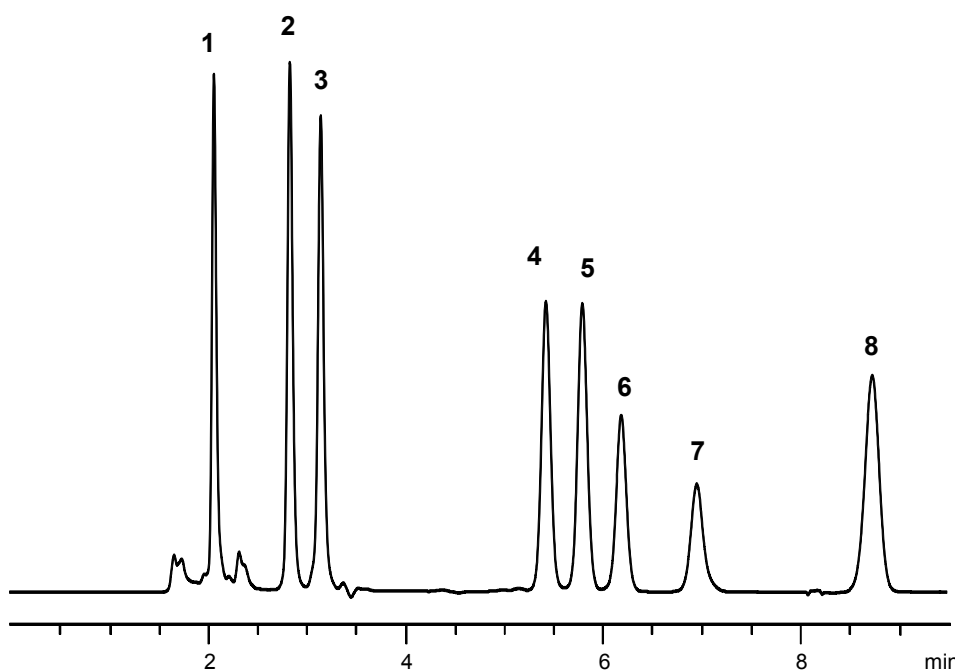
6. Vitamin E acetate



7.  $\alpha$ -Tocopherol (Vitamin E)



8. Vitamin K1



# Fast LC-MS Analysis of Multivitamin Fruit Juice

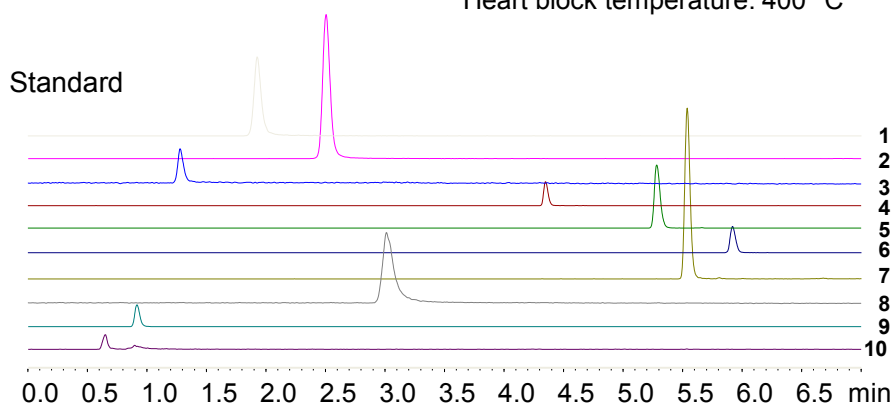
Application #AN2610

## Conditions

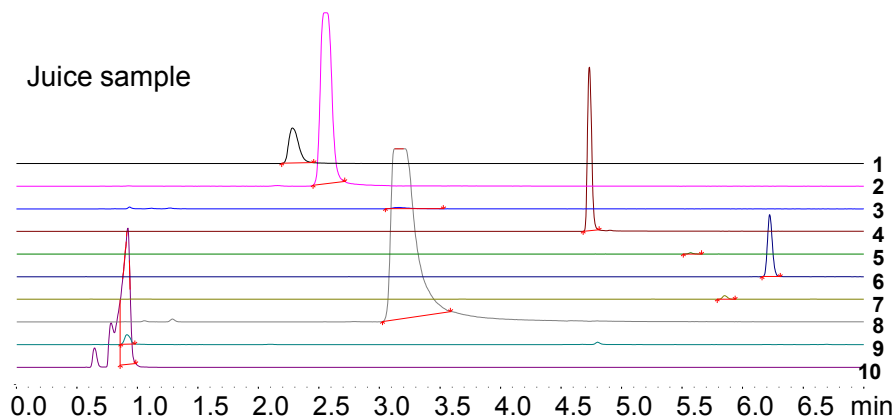
Column: ACE Excel 3 C18-PFP  
 Dimensions: 100 x 2.1 mm  
 Part Number: EXL-1110-1002U  
 Mobile Phase: A: 15 mM formic acid, adjusted to pH 3.8 with ammonia solution  
 B: MeOH

Time (mins)	%B
0.00	1
1.00	1
3.00	8
3.10	25
6.00	50
6.50	50
6.51	1
9.00	1

Flow Rate: 0.4 mL/min  
 Temperature: 30 °C  
 Detection: LCMS-8040 triple quad MS  
 ESI positive mode (ESI negative for ascorbic and citric acid)  
 DL temperature: 250 °C  
 Heart block temperature: 400 °C



1. Thiamine (Vitamin B1)  
(*m/z* 266.10 → 122.15)
2. Pyridoxine (Vitamin B6)  
(*m/z* 170.20 → 152.15)
3. Nicotinic acid (Vitamin B3)  
(*m/z* 124.00 → 78.00)
4. Pantothenic acid (Vitamin B5)  
(*m/z* 220.30 → 90.05)
5. Cyanocobalamin (Vitamin B12)  
(*m/z* 678.50 → 147.05)
6. Riboflavin (Vitamin B2)  
(*m/z* 377.20 → 243.10)
7. Biotin (Vitamin B7)  
(*m/z* 245.10 → 227.05)
8. Nicotinamide (Vitamin B3)  
(*m/z* 123.20 → 80.05)
9. Ascorbic acid (Vitamin C)  
(*m/z* 175.10 → 114.80)
10. Citric acid  
(*m/z* 191.10 → 87.15)

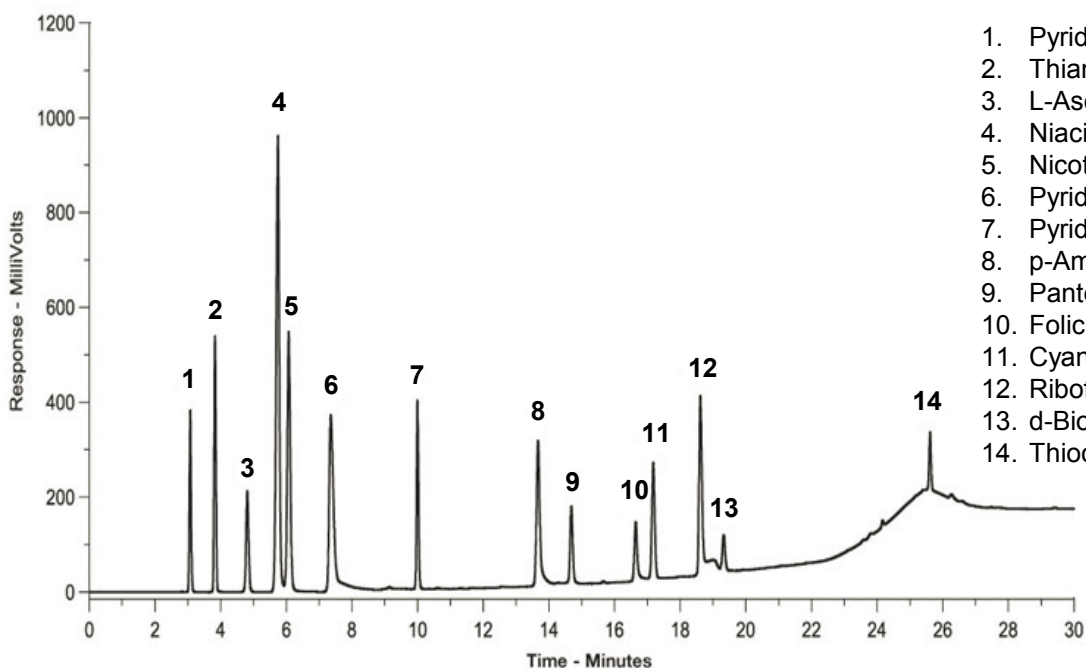


## Conditions

Column: ACE 5 C8  
 Dimensions: 250 x 4.6 mm  
 Part Number: ACE-122-2546  
 Mobile Phase: A: 50 mM KH<sub>2</sub>PO<sub>4</sub> pH 2.5 in H<sub>2</sub>O  
 B: MeOH

Time (mins)	%B
0.0	0
3.0	0
16.5	45
19.5	80

Flow Rate: 1 mL/min  
 Temperature: Ambient  
 Detection: UV, 205 nm



1. Pyridoxamine
2. Thiamine (Vitamin B1)
3. L-Ascorbic acid (Vitamin C)
4. Niacinamide (Vitamin B3)
5. Nicotinic acid
6. Pyridoxal
7. Pyridoxine
8. p-Aminobenzoic acid
9. Pantothenic acid (Vitamin B5)
10. Folic acid (Vitamin B9)
11. Cyanocobalamin (Vitamin B12)
12. Riboflavin (Vitamin B2)
13. d-Biotin (Vitamin B7)
14. Thiocctic acid



# Separation of 13 Water Soluble Vitamins using a Gradient

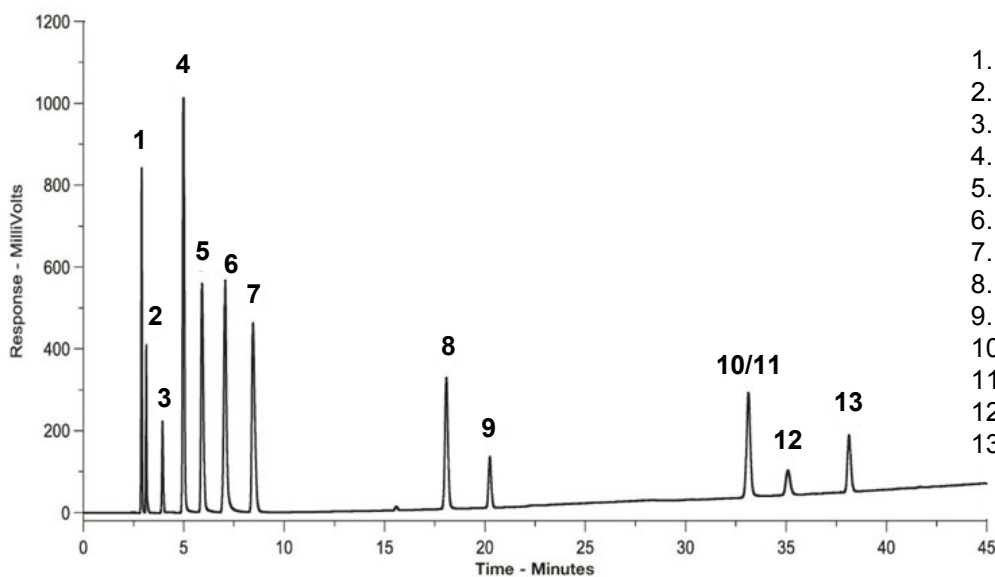
Application #AN2930

## Conditions

Column: ACE 5 C18  
Dimensions: 250 x 4.6 mm  
Part Number: ACE-121-2546  
Mobile Phase: A: 50 mM KH<sub>2</sub>PO<sub>4</sub> pH 3.0 in H<sub>2</sub>O  
B: MeOH

Time (mins)	%B
0	3
5	3
45	45
50	80

Flow Rate: 1 mL/min  
Temperature: Ambient  
Detection: UV, 205 nm



1. Pyridoxamine
2. Thiamine (Vitamin B1)
3. L-Ascorbic acid (Vitamin C)
4. Nicotinic acid
5. Pyridoxal
6. Impurity
7. Pyridoxine
8. p-Aminobenzoic acid
9. Pantothenic acid (Vitamin B5)
10. Folic acid (Vitamin B9)
11. Cyanocobalamin (Vitamin B12)
12. d-Biotin (Vitamin B7)
13. Riboflavin (Vitamin B2)

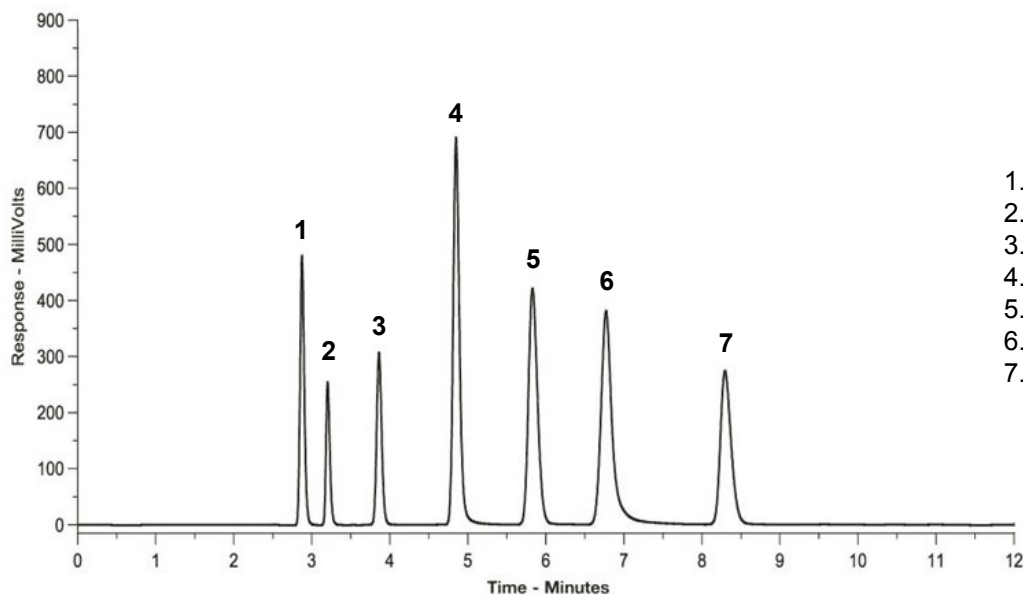


# Separation of Seven Water Soluble Vitamins using Isocratic Conditions (I)

Application #AN2990

## Conditions

Column: ACE 5 C18  
Dimensions: 250 x 4.6 mm  
Part Number: ACE-121-2546  
Mobile Phase: 50 mM KH<sub>2</sub>PO<sub>4</sub> pH 3.0 in H<sub>2</sub>O/MeOH (97:3 v/v)  
Flow Rate: 1 mL/min  
Temperature: Ambient  
Detection: UV, 205 nm



1. Pyridoxamine
2. Thiamine (Vitamin B1)
3. L-Ascorbic acid (Vitamin C)
4. Nicotinic acid
5. Pyridoxal
6. Impurity
7. Pyridoxine

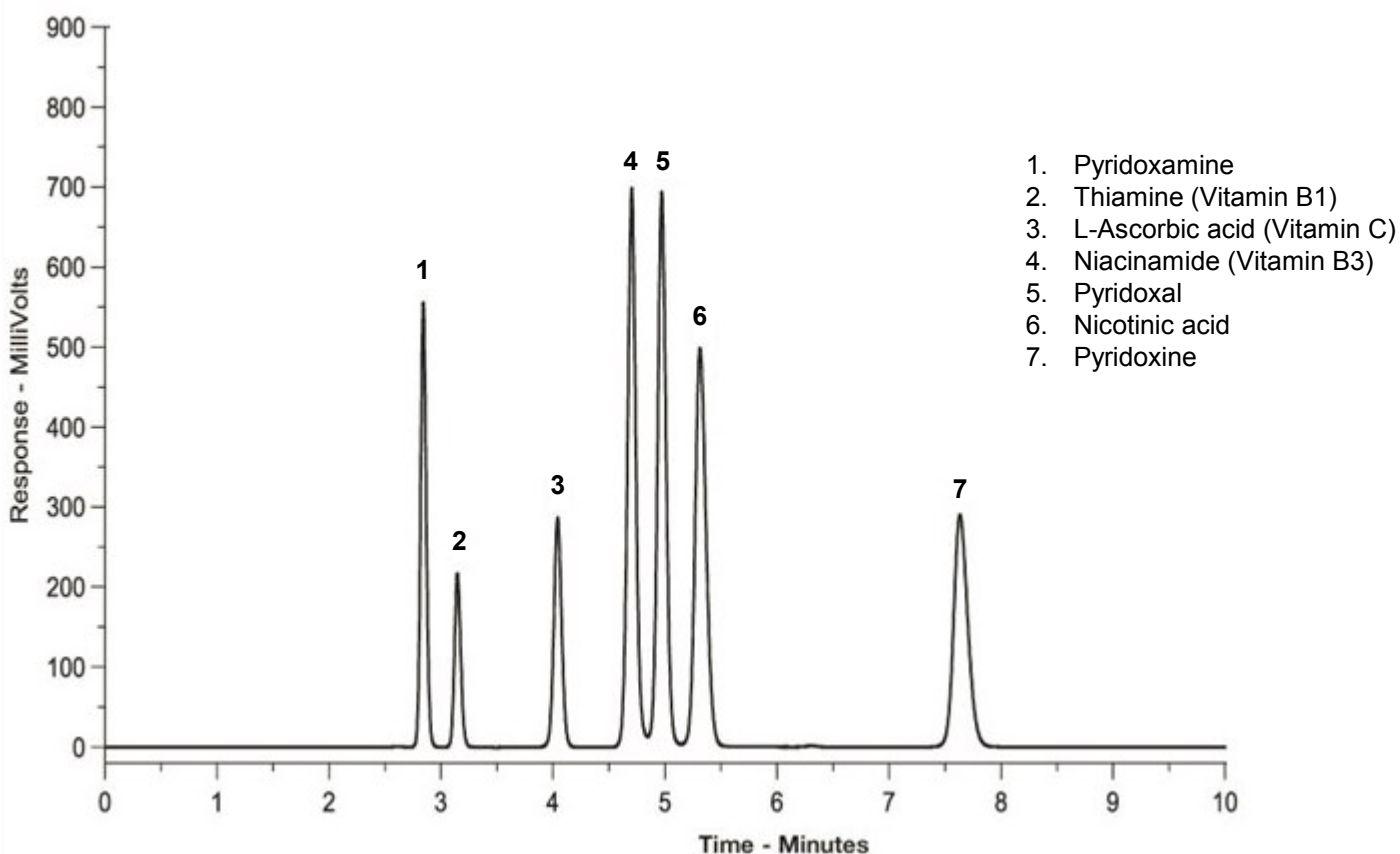


# Separation of Seven Water Soluble Vitamins using Isocratic Conditions (II)

Application #AN2980

## Conditions

Column: ACE 5 C8  
Dimensions: 250 x 4.6 mm  
Part Number: ACE-122-2546  
Mobile Phase: 50 mM KH<sub>2</sub>PO<sub>4</sub> pH 2.5 in H<sub>2</sub>O/MeOH (97:3 v/v)  
Flow Rate: 1 mL/min  
Temperature: Ambient  
Detection: UV, 205 nm



## Application #AN1870

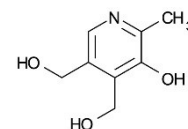
### Conditions

Column: ACE 3 C18-AR  
Dimensions: 150 x 4.6 mm  
Part Number: ACE-119-1546  
Mobile Phase:

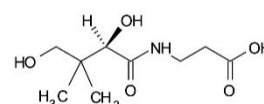
ACE 3 C18-AR  
150 x 4.6 mm  
ACE-119-1546  
A: 20 mM potassium phosphate pH 2.83 in H<sub>2</sub>O  
B: 20 mM potassium phosphate pH 2.83 in MeOH/H<sub>2</sub>O  
(50:50 v/v)

Flow Rate: 1.5 mL/min  
Injection: 1 µL  
Temperature: 40 °C  
Detection: UV, 205 nm

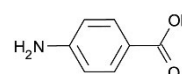
Time (mins)	%B
0	20
15	70



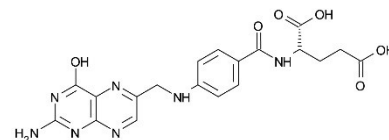
1. Pyridoxine  
(Vitamin B6)



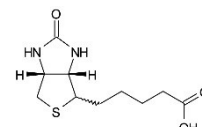
2. Pantothenic acid  
(Vitamin B5)



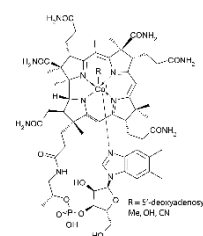
3. p-Aminobenzoic acid



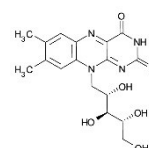
4. Folic acid  
(Vitamin B9/ Vitamin M)



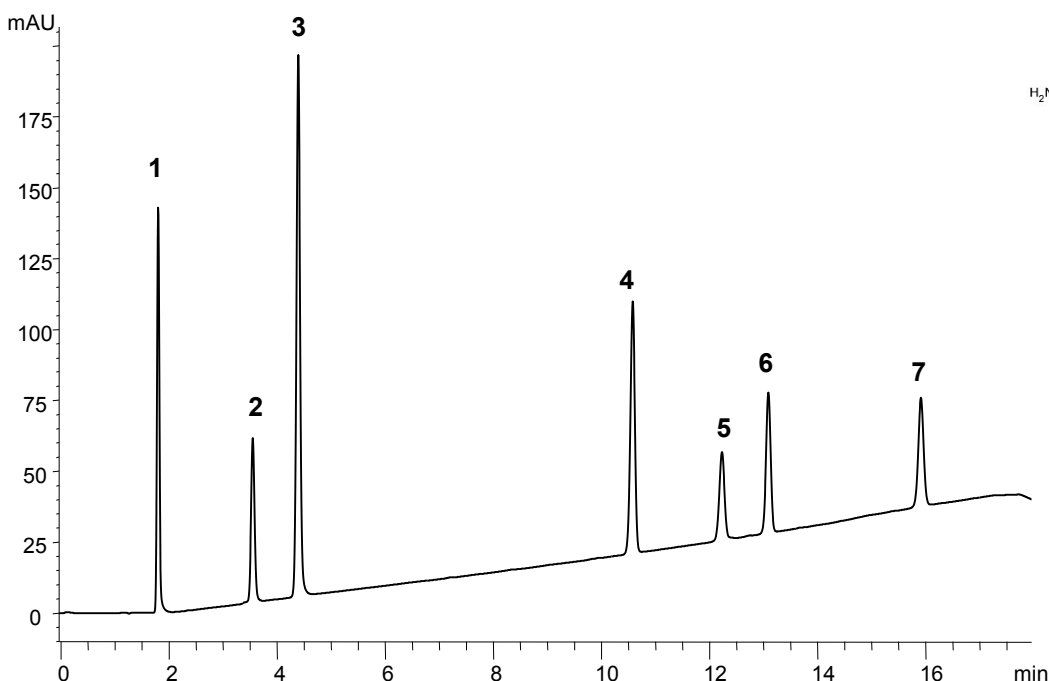
5. D-Biotin  
(Vitamin B7/ Vitamin H)



6. Cyanocobalamin  
(Vitamin B12)



7. Riboflavin  
(Vitamin B2)



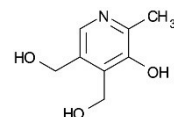
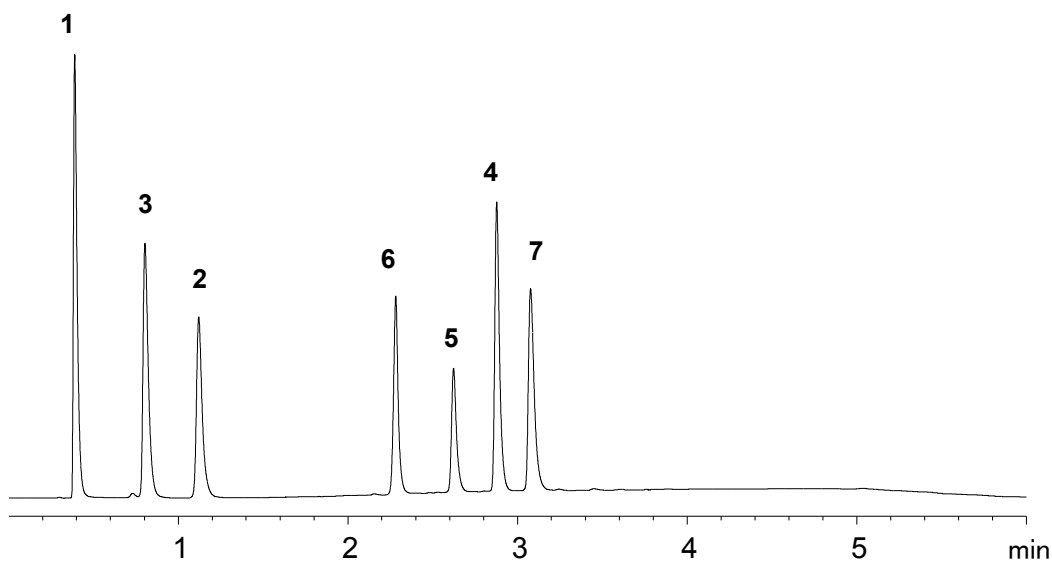
## Application #AN1880

### Conditions

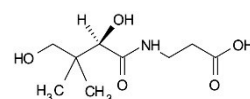
Column: ACE Ultracore 2.5 SuperPhenylHexyl  
Dimensions: 50 x 2.1 mm  
Part Number: CORE-25B-0502U  
Mobile Phase: A: 20 mM KH<sub>2</sub>PO<sub>4</sub>, pH 2.7  
B: 20 mM KH<sub>2</sub>PO<sub>4</sub>, pH 2.7 in MeOH/H<sub>2</sub>O (50:50 v/v)

Time (mins)	%B
0.00	20
1.50	60
3.00	70
3.75	70
4.50	20
Post time 4.5 minutes	

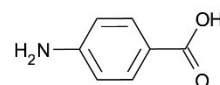
Flow Rate: 0.4 mL/min  
Injection: 1 µL  
Temperature: 40 °C  
Detection: UV, 205 and 254 nm



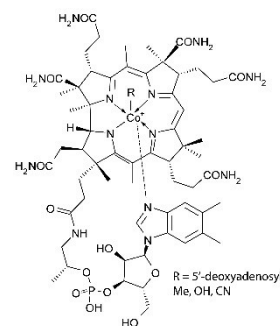
1. Pyridoxine



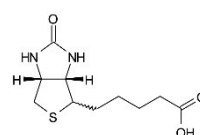
2. Pantothenic acid



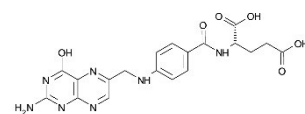
3. p-Aminobenzoic acid



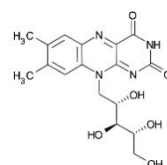
4. Cyanocobalamin



5. d-Biotin



6. Folic acid



7. Riboflavin



# Water Soluble Vitamins in Green Vegetables by LC-MS/MS

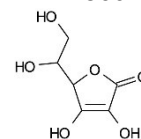
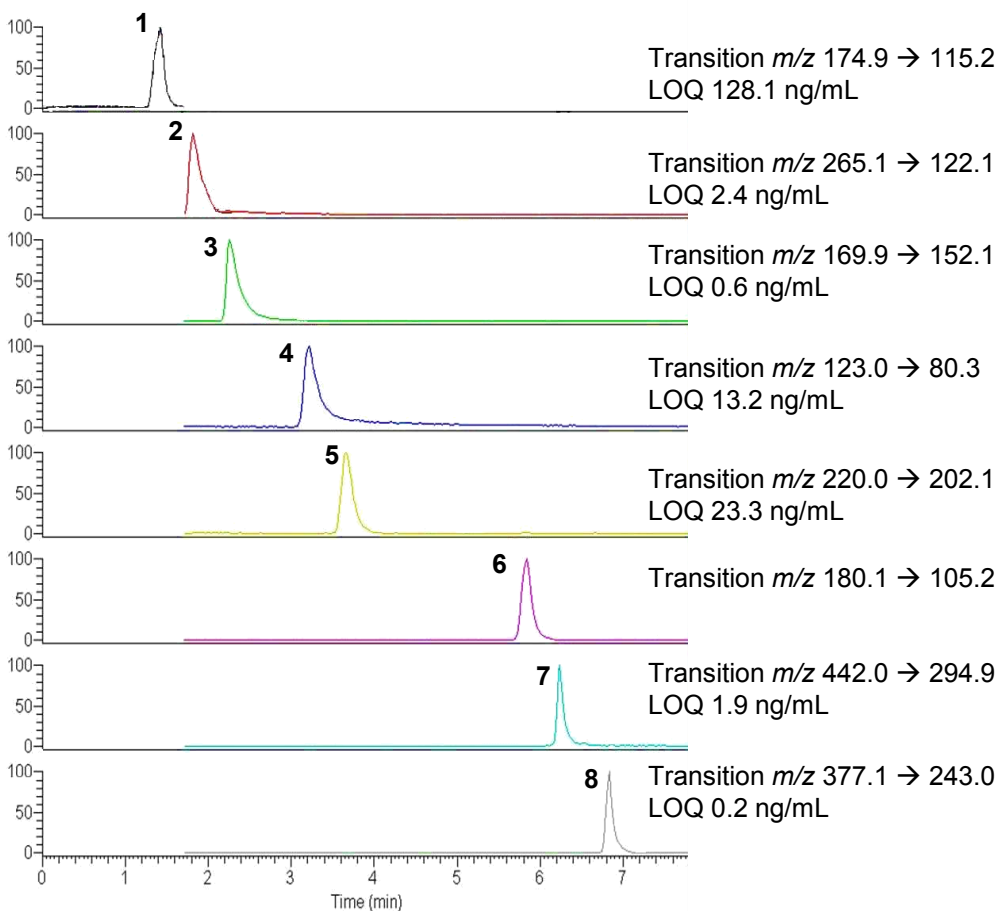
## Application #AN1860

### Conditions

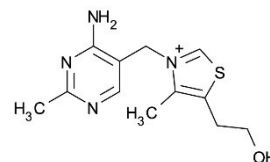
Column: ACE 3 C18  
Dimensions: 100 x 2.1 mm  
Part Number: ACE-111-1002  
Mobile Phase: A: 10 mM ammonium acetate in H<sub>2</sub>O, pH 4.5  
B: 0.1% acetic acid in MeOH  
C: 0.3% acetic acid in MeOH

Time (mins)	%A	%B	%C
0	90	10	0
3	90	10	0
4	50	0	50
7	50	0	50
10	0	100	0

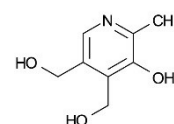
Flow Rate: 0.2 mL/min  
Injection: 10 µL  
Temperature: 20 °C  
Detection: TSQ triple quad MS; SRM mode  
-ESI for vitamin C  
+ESI for B vitamins



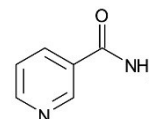
1. Ascorbic acid



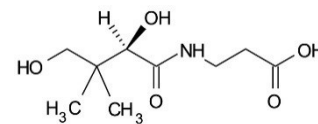
2. Thiamine



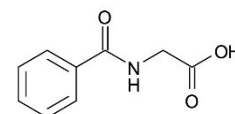
3. Pyridoxine



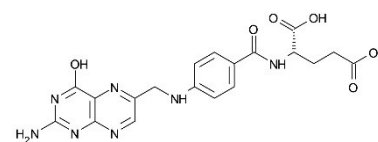
4. Nicotinamide



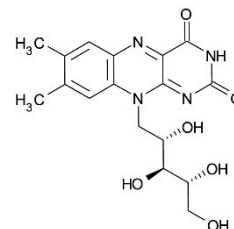
5. Pantothenic acid



6. Hippuric acid (IS)



7. Folic acid



8. Riboflavin

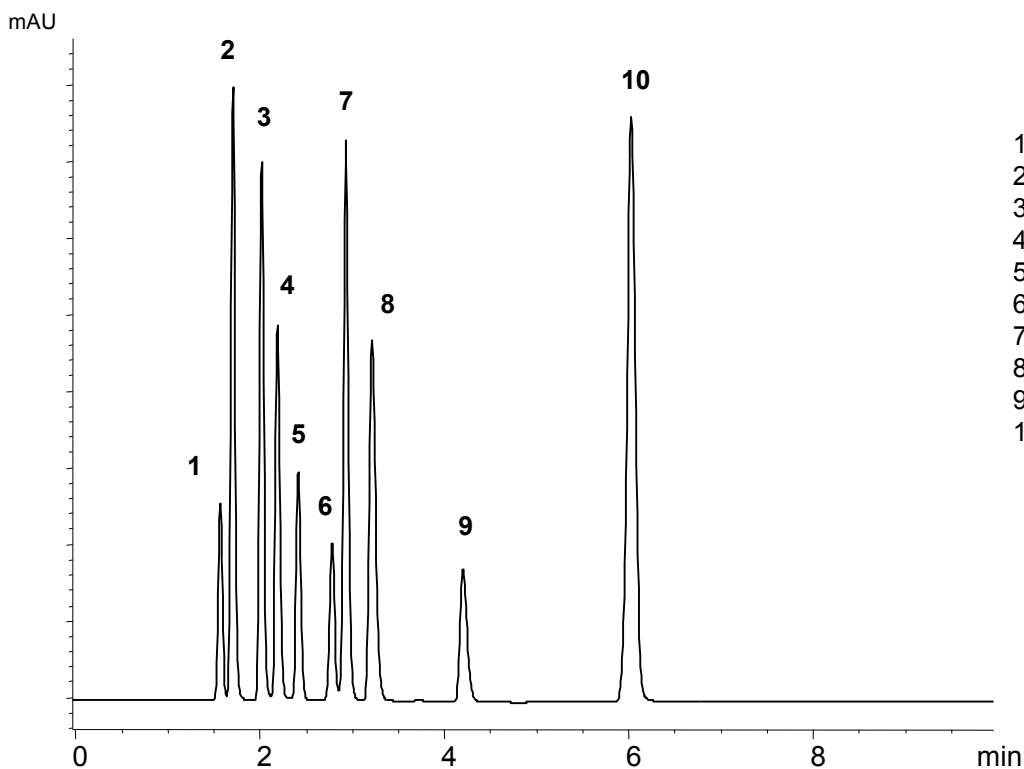
# Water Soluble Vitamins and Polar Molecules

**ACE**<sup>®</sup>  
Ultra-inert  
UHPLC & HPLC Columns

Application #AN1850

## Conditions

Column: ACE 3 C18-AR  
Dimensions: 150 x 4.6 mm  
Part Number: ACE-119-1546  
Mobile Phase: 0.1 % phosphoric acid in H<sub>2</sub>O/MeOH (96.5:3.5 v/v)  
Flow Rate: 1 mL/min  
Injection: 2 µL  
Temperature: 22 °C  
Detection: UV, 260 nm



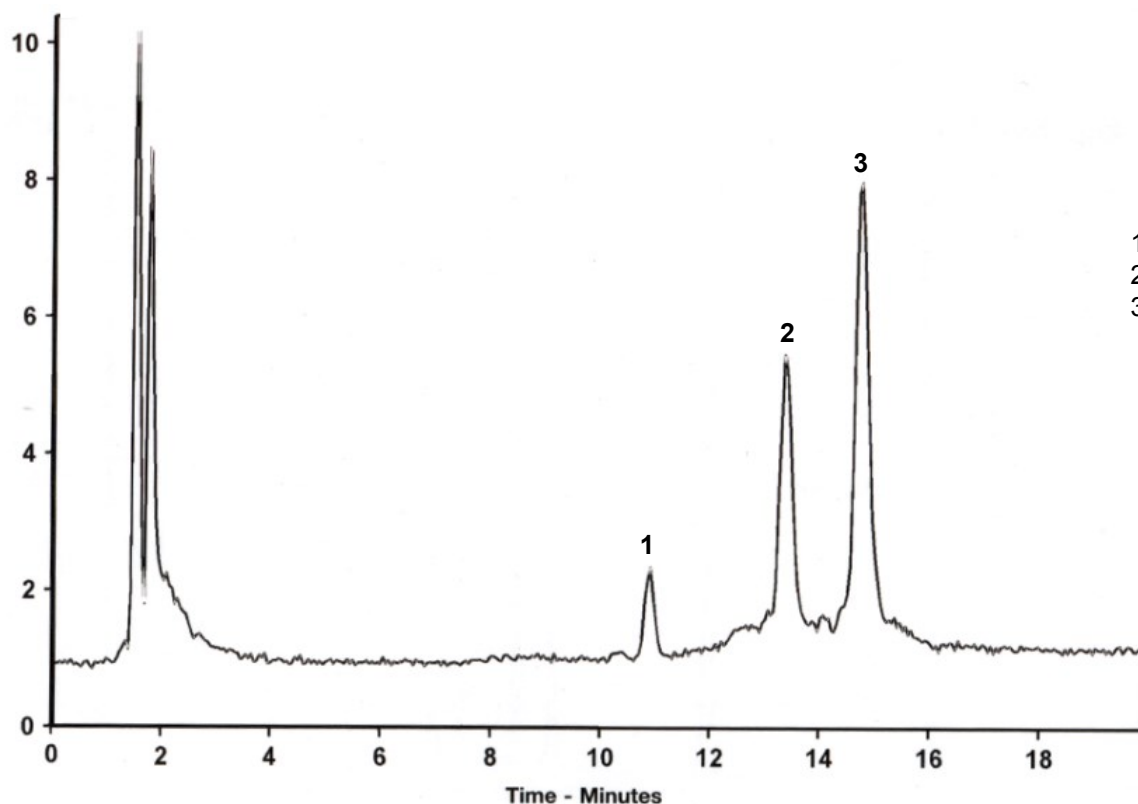
1. Pyridoxamine (Vitamin B6)
2. Thiamine (Vitamin B1)
3. Isonicotinamide
4. Nicotinamide
5. L-Ascorbic acid (Vitamin C)
6. Orotic Acid
7. Hypoxanthine
8. Pyridoxal (Vitamin B6)
9. Pyridoxine (Vitamin B6)
10. p-Aminobenzoic acid

## Conditions

Column: ACE 3 C4-300  
Dimensions: 150 x 2.1 mm  
Part Number: ACE-213-1502  
Mobile Phase: A: 0.5% formic acid in H<sub>2</sub>O  
B: 0.5% formic acid in MeCN

Time (mins)	%B
0	35
16	43
17	80
20	80
21	35
31	35

Flow Rate: 0.4 mL/min  
Injection: 10 µL  
Temperature: 40 °C  
Detection: ESI-MS (+ve)

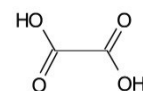
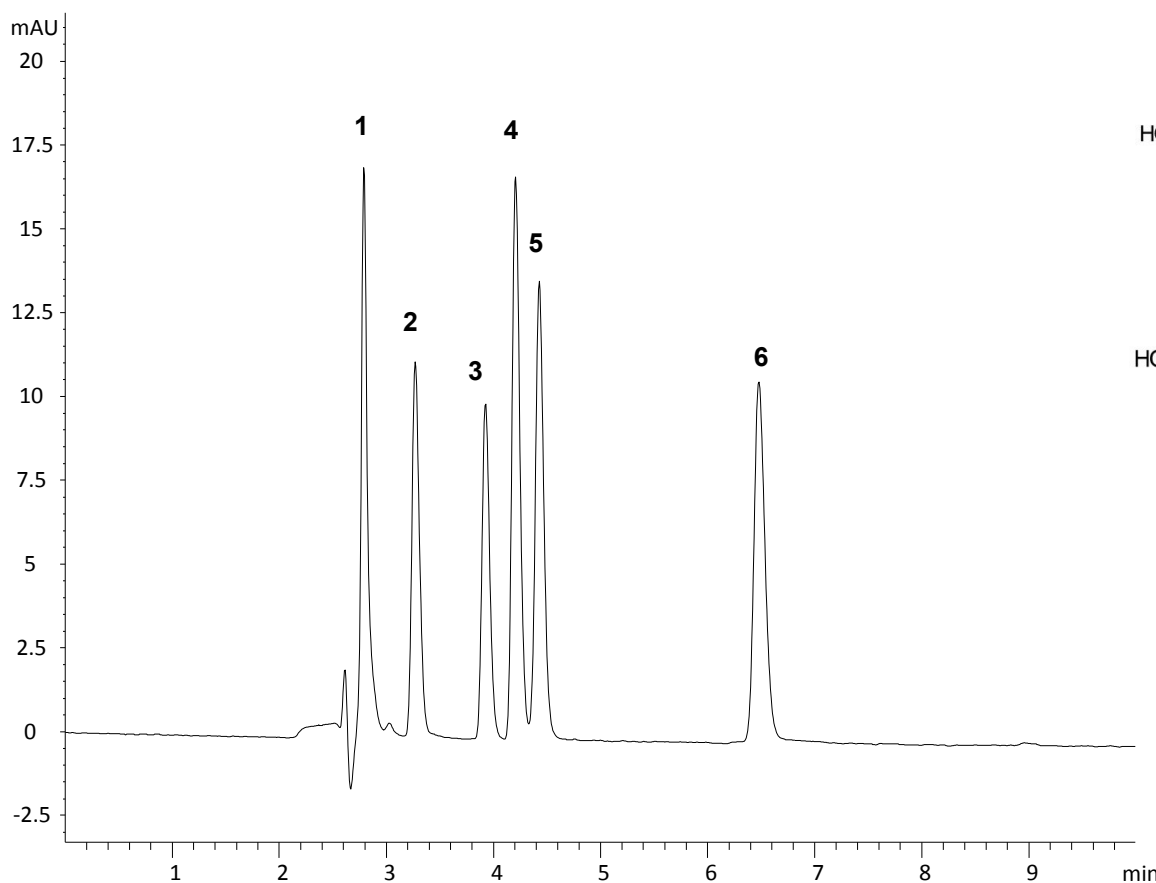


1. α-Lactalbumin
2. β-Lactoglobulin B
3. β-Lactoglobulin A

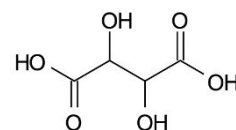


## Conditions

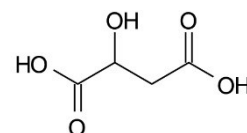
Column: ACE Excel 3 C18-Amide  
 Dimensions: 250 x 2.1 mm  
 Part Number: EXL-1112-2502U  
 Mobile Phase: 40 mM ammonium phosphate pH 2.5 in H<sub>2</sub>O  
 Flow Rate: 0.21 mL/min  
 Injection: 5 µL  
 Temperature: 25 °C  
 Detection: UV, 214 nm



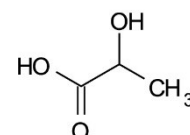
1. Oxalic acid



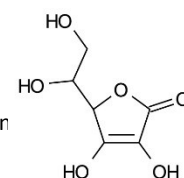
2. Tartaric acid



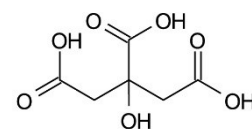
3. Malic acid



4. Lactic acid



5. Ascorbic acid



6. Citric acid

For further details please contact:



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