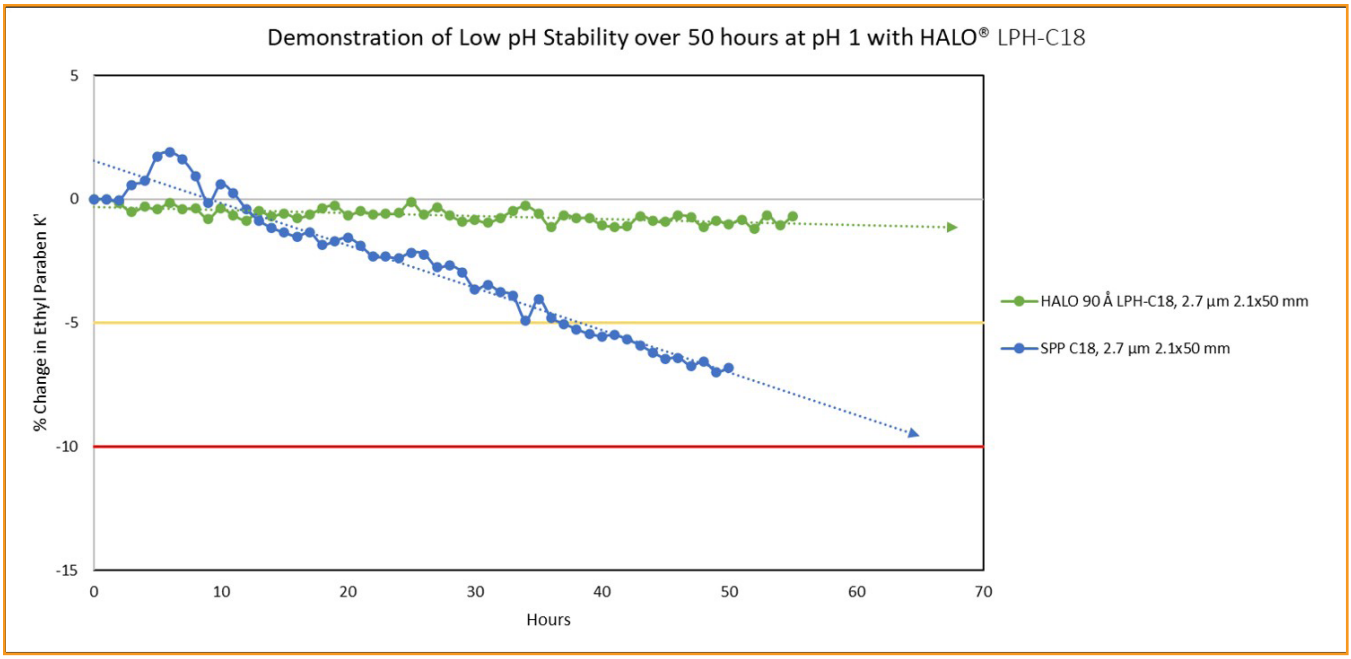
Low pH Stability with HALO® LPH-C18

294



TEST CONDITIONS:

Column: HALO 90 Å LPH-C18, 2.7 µm 2.1 x 50 mm
Part Number: 92822-416
Mobile Phase A: Water, 1% TFA (pH: 1)
Mobile Phase B: Acetonitrile
Gradient:

Time	%B
0.0	20
7.50	20
7.51	5
45.00	5
47.00	100
51.00	100
51.01	20
60.00	20

Flow Rate: 0.5 mL/min
Pressure: 108 bar
Temperature: 60 °C
Detection: UV 254 nm, PDA
Injection Volume: 0.4 µL
Sample Solvent: 25/75 ACN/ Water
Data Rate: 100 Hz
Response Time: 0.025 sec.
Flow Cell: 1 µl
LC System: Shimadzu Nexera X2

A separation of parabens is performed on a HALO 90 Å LPH-C18 column under low pH (pH 1) and high temperature conditions compared to a standard C18 SPP column. Due to the sterically protected ligand, the LPH-C18 column can withstand these conditions and maintain stable retention times while other columns show decreased retention over time indicating a loss of stationary phase.

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CANNABIS

Separation of 18 Cannabinoids using HALO® LPH-C18

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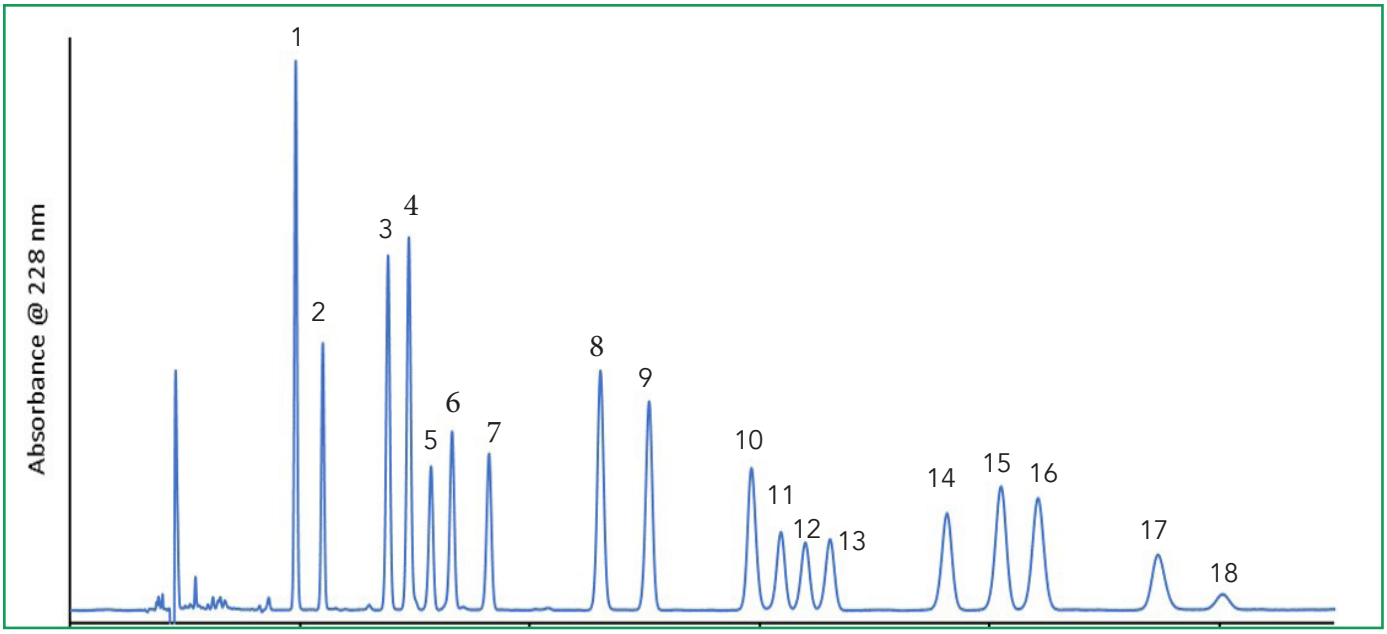

TEST CONDITIONS:

Column: HALO 90 Å LPH-C18, 2.7 µm, 4.6 x 150 mm
Part Number: 92824-716
Mobile Phase A: 5 mM Ammonium Formate, 0.1% Formic Acid
Mobile Phase B: Acetonitrile, 0.1% Formic Acid
Isocratic: 75 %B
Flow Rate: 1.5 mL/min
Pressure: 232 bar
Temperature: 30°C
Detection: PDA, UV: 228 nm
Injection Volume: 3 µL
Sample Solvent: 75/25 MeOH/ Water
Data Rate: 100 Hz
Response Time: 0.025 sec.
Flow Cell: 1 µl
LC System: Shimadzu Nexera X2

PEAK IDENTITIES:

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

A HALO® LPH-C18 column is used to separate a mixture of eighteen cannabinoids, showing fast results and high resolution within critical pairs. Cannabinoids are a class of chemical compounds primarily found in the marijuana plant. Many of these compounds have been found to provide medicinal benefits such as reduction in pain and inflammation.

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Peak #	Compound	Transition	CE
1	Carbendazim	192>160.1	-21
2	Dicrotophos	238>112	-22
3	Azamethiphos	324.9>183	-17
4	Pyrimethanil	200.10>107.2	-25
5	Carbofuran	222>123	-22
6	Dodemorph	282.2>116.1	-25
7	Atrazine	216.03>174.1	-17
8	Diuron	232.94>72	-17
9	Iprovalicarb	321.1>119	-30
10	Azoxystrobin	404.04>372.1	-14
11	Fluopram	396.98>208	-25
12	Methoxyfenozide	369.1>149.1	-25
13	Flutolanil	324>242.1	-28
14	Picoxystrobin	368>145.1	-25

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FOOD / BEVERAGE

Separation of Common Catechins and Caffeine Found in Tea via LC-UV

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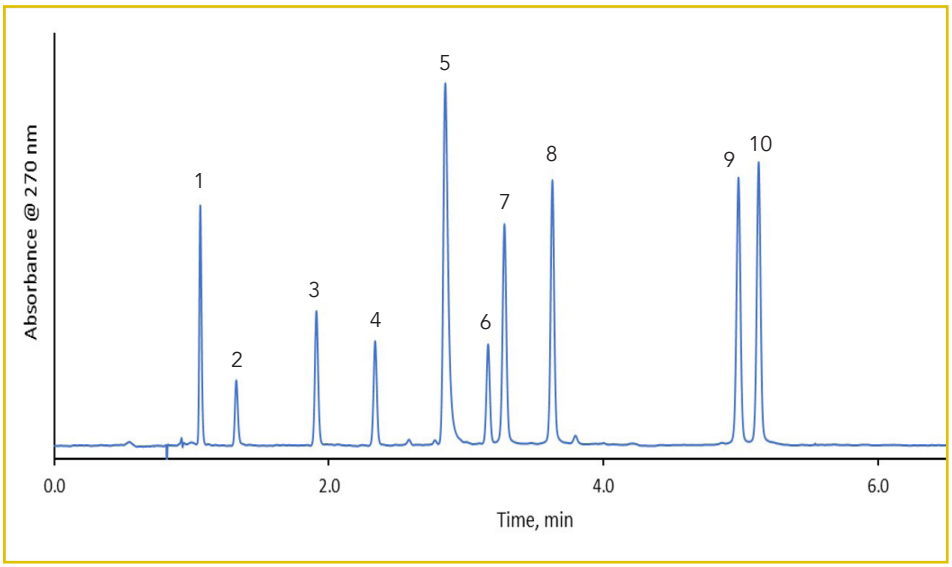

PEAK IDENTITIES

1. Gallic Acid
2. Gallocatechin
3. Epigallocatechin
4. Catechin
5. Caffeine
6. Epicatechin
7. Epigallocatechin Gallate
8. Gallocatechin Gallate
9. Epicatechin Gallate
10. Catechin Gallate

TEST CONDITIONS:

Column: HALO 90 Å LPH-C18 2.7 µm, 4.6 x150 mm
Part Number: 92824-716
Mobile Phase A: Water, 0.2% Formic Acid (pH: 2.45)
Mobile Phase B: Acetonitrile, 0.2% Formic Acid
Gradient:

Time	%B
0.0	10
0.5	10
6.0	23
7.0	23

Flow Rate: 1.8 mL/min
Pressure: 395 bar
Temperature: 40 °C
Detection: PDA, UV 270 nm
Injection Volume: 5 µL
Sample Solvent: 90/10 Water/ Acetonitrile
LC System: Shimadzu Nexera X2

Catechins belong to the subgroup of polyphenols called flavonoids. These compounds contain antioxidant properties and exist in food and medicinal plants, including tea. A UV separation of catechin and caffeine standards shows excellent resolution on a HALO® LPH-C18 column. This column is ideal for low pH separations due to its sterically protected ligand, preventing acid hydrolysis and reducing retention drift over time.

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FOOD / BEVERAGE

LC-MS Separation of Common Catechins Found in Tea

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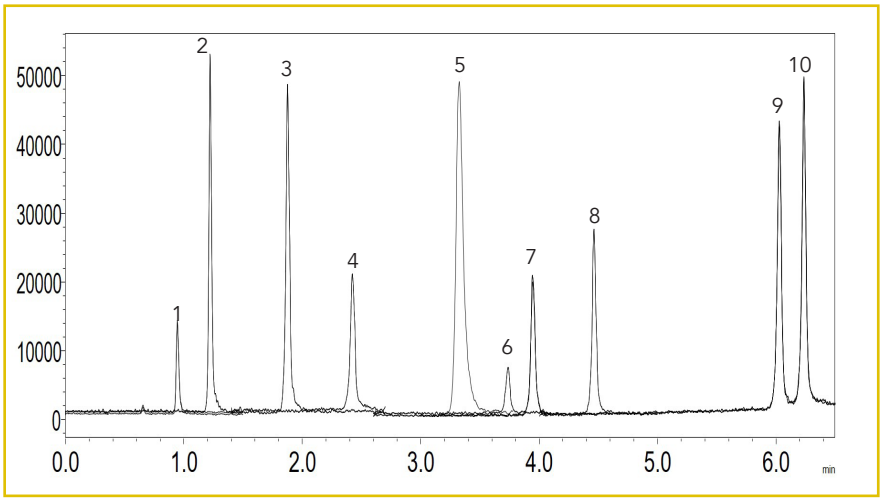

Peak #	Compound	M/Z
1	Gallic Acid	169
2	Gallocatechin	305
3	Epigallocatechin	305
4	Catechin	289
5	Caffeine	195
6	Epicatechin	289
7	Epigallocatechin Gallate	457
8	Gallocatechin Gallate	457
9	Epicatechin Gallate	441
10	Catechin Gallate	441

TEST CONDITIONS:

Column: HALO 90 Å LPH-C18 2 µm, 2.1 x1 00 mm
Part Number: 91822-616
Mobile Phase A: Water, 0.2% Formic Acid (pH 2.45)
Mobile Phase B: Acetonitrile, 0.2% Formic Acid
Gradient:

Time	%B
0.0	10
1.0	10
6.0	21
7.0	21

Flow Rate: 0.3 mL/min
Pressure: 438 bar
Temperature: 40 °C
Detection: +/- ESI MS/MS
Injection Volume: 2 µL
Sample Solvent: Water
MS System: Shimadzu 8040
LC System: Shimadzu Nexera X2

MS CONDITIONS:

Nebulizer Gas Flow: 2 L/min
DL Temperature: 250 °C
Heat Block Temperature: 400 °C
Drying Gas Flow: 10 L/min

Catechins belong to the subgroup of polyphenols called flavonoids. These compounds contain antioxidant properties and exist in food and medicinal plants, including tea. An LC-MS separation of catechins and caffeine is demonstrated on a HALO® LPH-C18 column showing excellent resolution using purified standards. This column is ideal for low pH separations due to its sterically protected ligand, preventing acid hydrolysis and reducing retention drift over time.

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ENVIRONMENTAL

Pesticide Screening of Barley: HALO 90 Å LPH-C18

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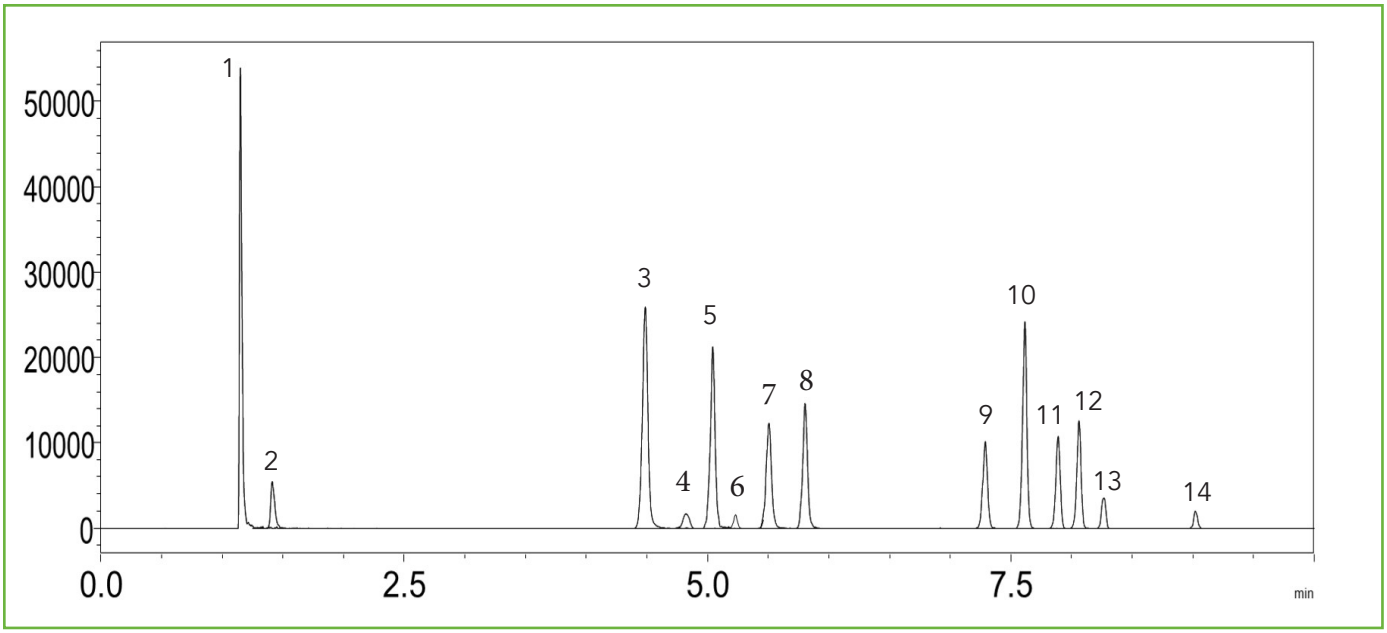

TEST CONDITIONS:

Column: HALO 90 Å LPH-C18 2 µm, 2.1 x 100 mm
Part Number: 91822-616
Mobile Phase A: Water, 0.1% Formic Acid
Mobile Phase B: Acetonitrile, 0.1% Formic Acid
Gradient:

Time	%B
0.0	30
1.0	30
12.0	100
16.0	100

Flow Rate: 0.2 mL/min
Pressure: 235 bar
Temperature: 30 °C
Detection: +ESI MS/MS
Injection Volume: 2 µL
Sample Solvent: Methanol
MS System: Shimadzu 8040
LC System: Shimadzu Nexera X2

MS CONDITIONS:

Nebulizer Gas Flow: 3 L/min
DL Temperature: 250 °C
Heat Block Temperature: 400 °C
Drying Gas Flow: 18 L/min

Pesticide screening methods can help show whether there is a concern with your soil, crops, and even water supply. A pesticide screening is performed on a sample of barley using a HALO 90 Å LPH-C18 column. This column is ideal for low pH testing conditions based on its sterically protected ligand which helps reduce acid hydrolysis of the stationary phase leading to an increase in column lifetime.

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Peak #	Compound	Transition	CE
1	Carbendazim	192>160.1	-21
2	Dicrotophos	238>112	-22
3	Azamethiphos	324.9>183	-17
4	Pyrimethanil	200.10>107.2	-25
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13	Flutolanil	324>242.1	-28
14	Picoxystrobin	368>145.1	-25

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FOOD / BEVERAGE

Separation of Polyphenols in Wine

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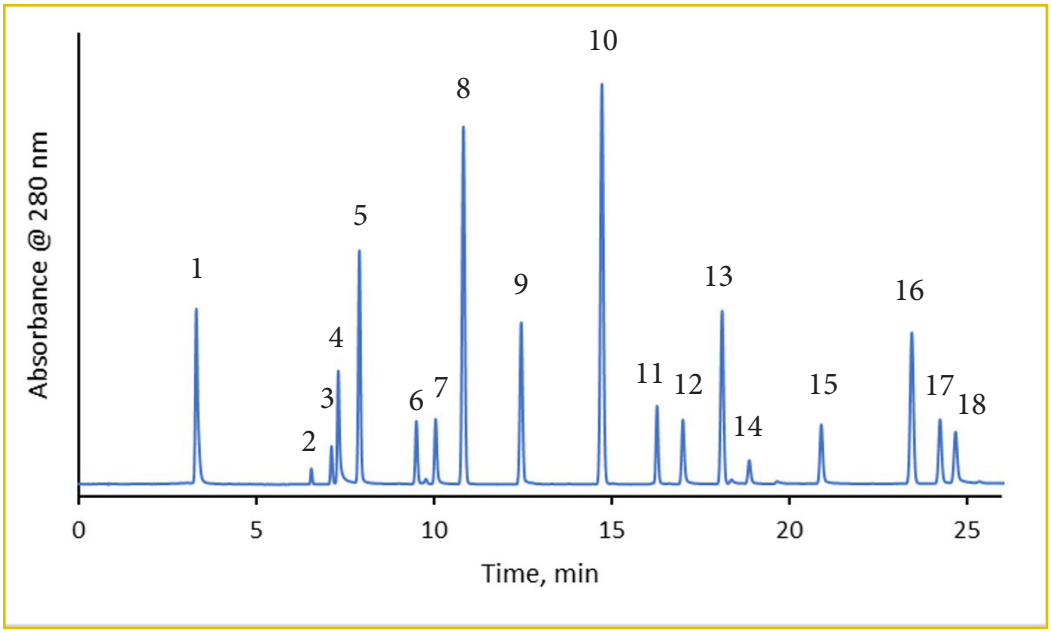

PEAK IDENTITIES

1. Gallic Acid
2. Epigallocatechin
3. Chlorogenic Acid
4. Catechin
5. Caffeic Acid
6. Epicatechin
7. Epigallocatechin Gallate
8. p-Coumaric Acid
9. Ferulic Acid
10. o-Coumaric Acid
11. Quercitrin
12. Myricetin
13. Resveratrol
14. Morin
15. Quercetin
16. Naringenin
17. Apigenin
18. Kaempferol

TEST CONDITIONS:

Column: HALO 90 Å LPH-C18, 2.7 µm 2.1 x 100 mm
Part Number: 92822-616
Mobile Phase A: Water/ 0.1% Formic Acid
Mobile Phase B: Acetonitrile/ 0.1% Formic Acid

Gradient:

Time (min)	%B
0.0	0
3.5	8
7.1	10
25.0	30
26.0	40
27.0	100
29.0	100
30.0	0
35.0	0

Flow Rate: 0.3 mL/min
Pressure: 159 bar
Temperature: 30 °C
Detection: UV 280 nm, PDA
Injection Volume: 0.7 µL
Sample Solvent: Water
Data Rate: 100 Hz
Response Time: 0.025 sec.
Flow Cell: 1 µL
LC System: Shimadzu Nexera X2

Polyphenols can be found in a wide variety of plant-based foods and are packed with antioxidants and potential health benefits. There are more than 8,000 of these types of compounds which contain multiples of phenol units. Common polyphenols found in wine are separated using a HALO 90 Å LPH-C18 column using analytical standards. This stationary phase contains a sterically protected ligand which is ideal for high stability under low pH conditions.

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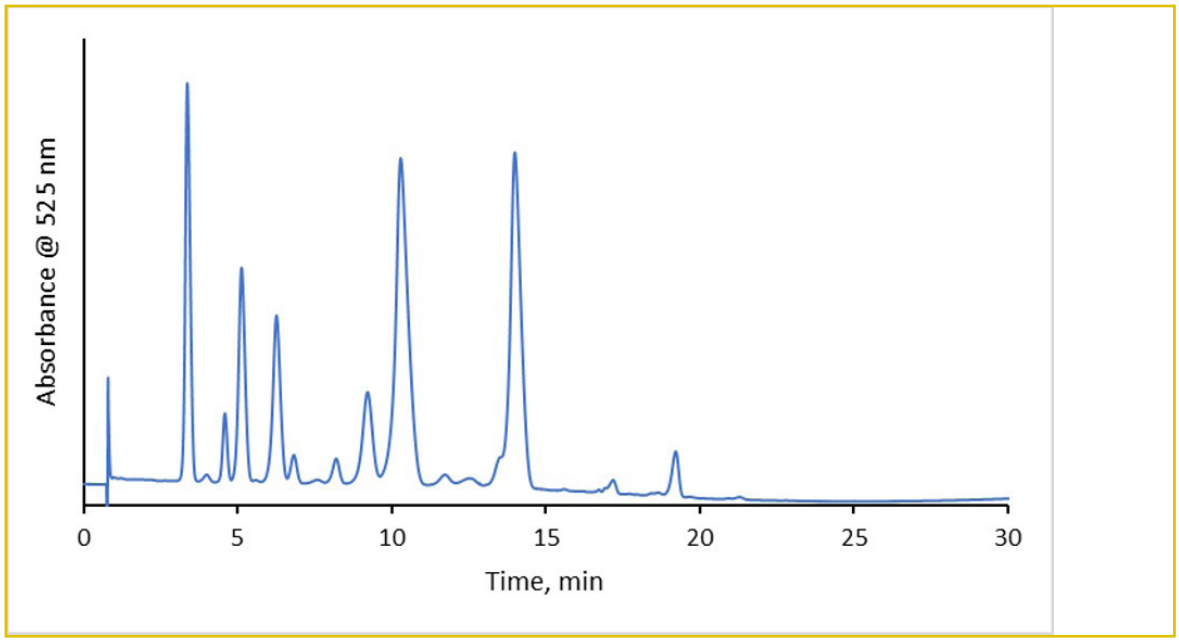
FOOD / BEVERAGE

Separation of Anthocyanins in Blueberries



TEST CONDITIONS:

Column: HALO 90 Å LPH-C18, 2.7 µm 2.1 x 100 mm
Part Number: 92822-616
Mobile Phase A: Water/ 3% Phosphoric Acid (pH: 1.4)
Mobile Phase B: Methanol
Gradient:

Time	%B
0.0	23
10.8	26
29.8	60

Flow Rate: 0.27 mL/min
Pressure: 144 bar
Temperature: 30 °C
Detection: UV 525 nm, PDA
Injection Volume: 4.5 µL
Sample Solvent: Water
Data Rate: 100 Hz
Response Time: 0.025 sec.
Flow Cell: 1 µl
LC System: Shimadzu Nexera X2

Anthocyanins, a category of polyphenols, are a type of pigment found in plants that offer several health benefits. These flavonoids have antioxidant effects that can be found in a variety of different fruits and vegetables, including blueberries. A separation of anthocyanins is performed on a HALO 90 Å LPH-C18 column, which is ideal for the low pH conditions of this method. Blueberries were mixed with methanol, water, and formic acid followed by being spun down and filtered. Due to the sterically protected ligand, the LPH-C18 column can withstand these low pH conditions and maintain stable retention times while standard C18 columns will show retention loss over time.

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