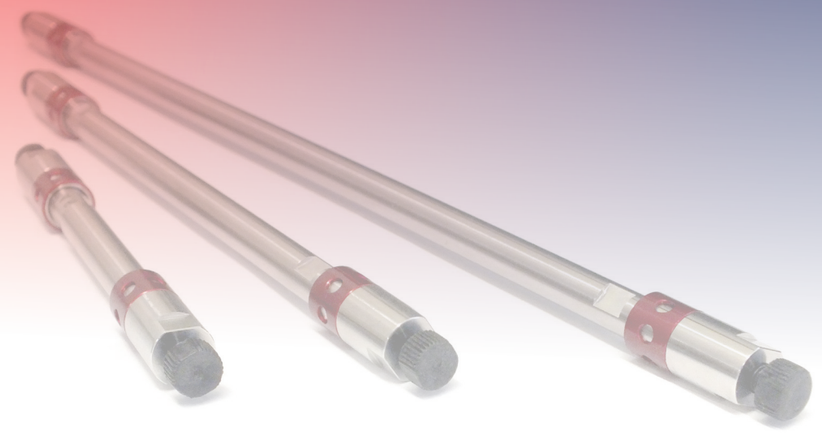
Monodisperse HPLC Particles

The Evolution of HPLC Columns

EVOSPHERE



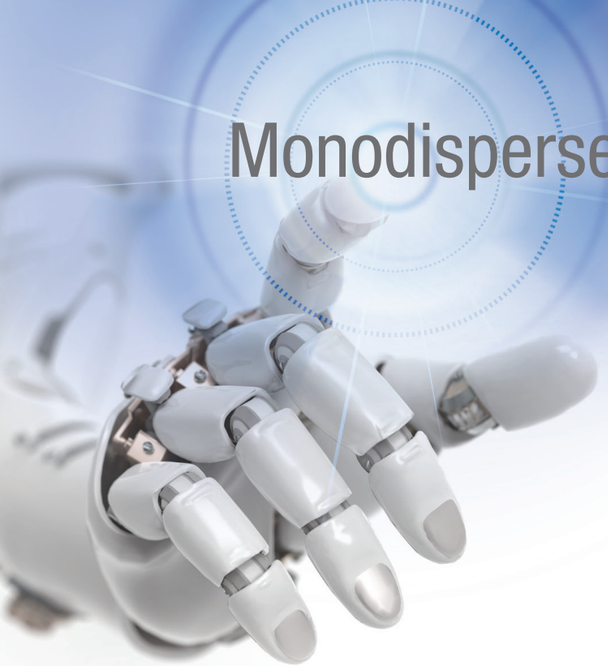
Monodisperse HPLC Columns

Fortis Technologies has designed a new fully porous monodisperse particle for use in HPLC columns. Combining this with a new range of selectivities gives the analyst the ability for high resolution, high efficiency separations.

Based upon a fully porous silica monodisperse particle, Evosphere® is the evolution of particle technology.
Combine a high efficiency particle with low backpressure, high loadability, scaleability and reproducibility and you have the ultimate combination.
Then add in novel selectivity options to provide enhanced resolution and selectivity and you have the capability to separate more compounds in less time with greater sensitivity.

By building on a pure silica substrate method development and method transfer become more robust and reproducible across platforms as you scale from capillary to preparative.

Monodisperse Particles



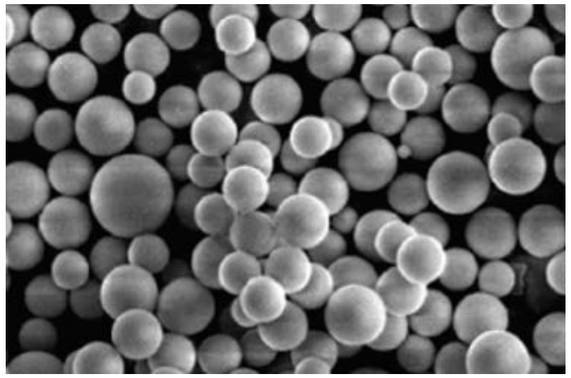
Particle Morphology

Evosphere silica particles are manufactured to provide a high degree of monodispersity with a uniform smooth surface. Monodispersity generates high efficiency HPLC columns due to the reduced flow path dispersion (Eddy diffusion)

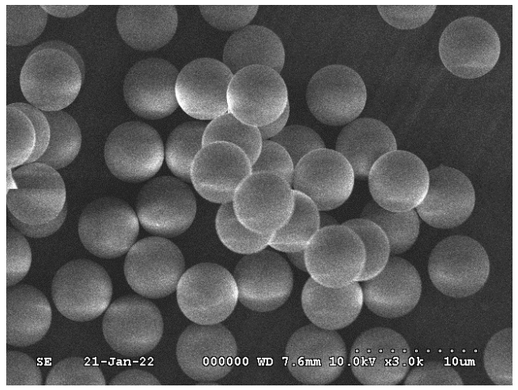
SEM imagery of the Evosphere in comparison with traditional particles highlights the much narrower size distribution.

Monodisperse Evosphere particles are available in 1.7µm, 3µm and 5µm particle sizes.

- **Unique silica particle nature**
- **Monodisperse**
- **High efficiency**
- **Scaling of particle sizes**



Traditional porous particles



Monodisperse porous particles

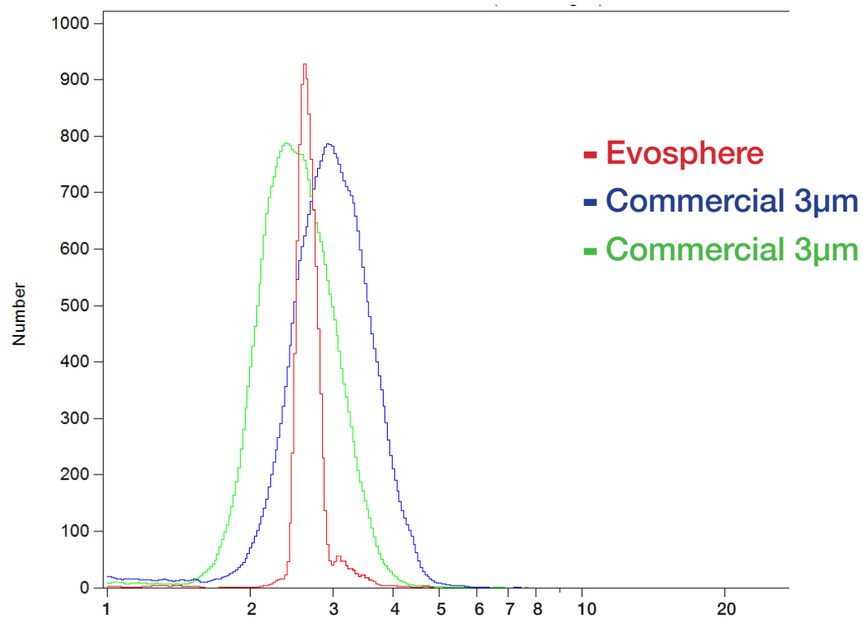
Particle size distribution (D90/10)

When assigning a measurement to characterise a particle size distribution the ratio of D90/10 is often quoted, and as such can be used to gauge the degree of size uniformity of the particles.

The parameter D90 signifies the point in the size distribution, up to and including which, 90% of the total volume of material in the sample is 'contained'. For example; if the D90 is 6µm, this means that 90% of the sample has size of 6µm or smaller. The definition for D50, is then the size point below which 50% of the material is contained. Similarly, the D10 is the size below which 10% of the material is contained. This description has long been used in size distribution measurements.

As the particle size distribution for chromatographic silica moves towards monodisperse then the D90 and D10 values become closer together and the D90/10 value tends towards a value of 1.

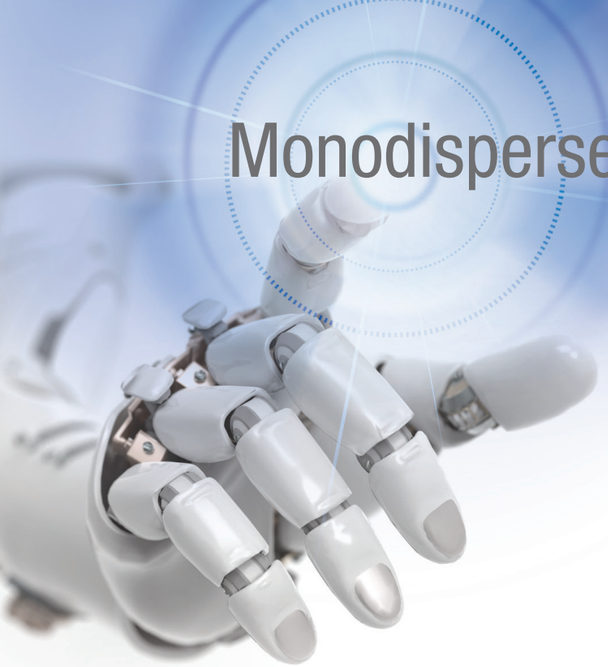
Particle Size Distribution



	Monodisperse Silica	Commercial 3µ Silica-A	Commercial 3µ Silica-B
Median Particle size (d50)*	2.66µm *	2.48µm	2.97µm
SEM Particle Size	3.0µm	2.8µm	3.3µm
D90/10	**1.12**	**1.58**	**1.61**
Pore Volume	0.89	0.88	0.89

* Measured by Coulter Counter

Monodisperse Particles



EVOSPHERE

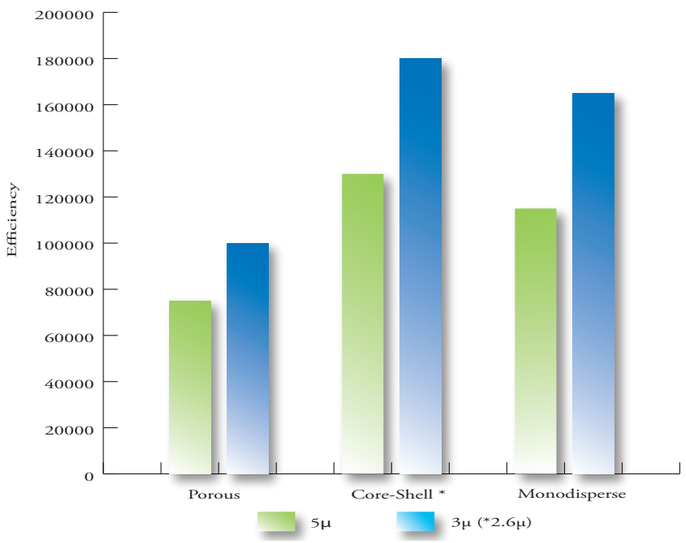
Efficiency of Monodisperse particles

Analyst have had two ways of improving efficiency in the past. Move to a smaller particle with associated high backpressure and the need to buy a UHPLC instrument, or move to core-shell particles but with a compromise in loading and scaleability.

Evosphere fully porous monodisperse particles have vastly increased efficiency over equivalent porous particle sizes. Due to maintaining high surface area, loading and retention time are not compromised as seen with core-shell particles.

- **High Efficiency**
- **High Loading**
- **Scaleable - capillary to Prep**
- **Robust**
- **Reproducible**

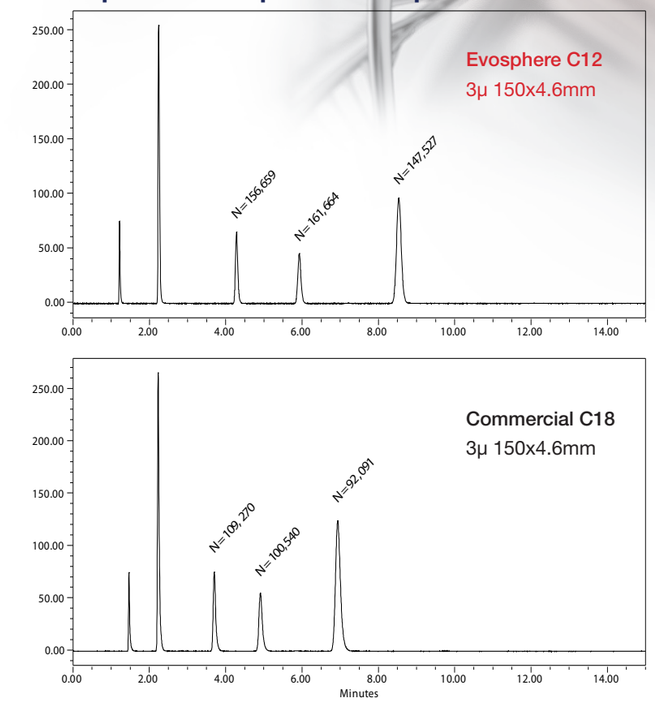
Typical Efficiencies of HPLC particles



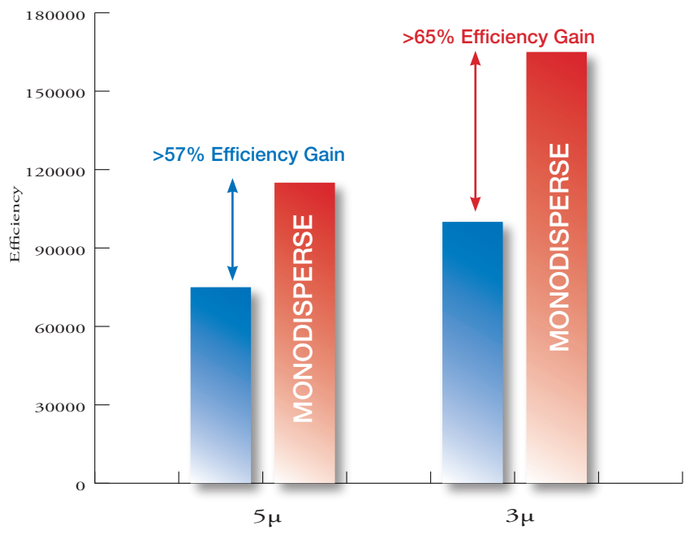
Efficiency Gains

The monodisperse nature of Evosphere coupled with our ability to pack the column more efficiently allows for a significant increase in efficiency and therefore resolution over traditional silica particles.

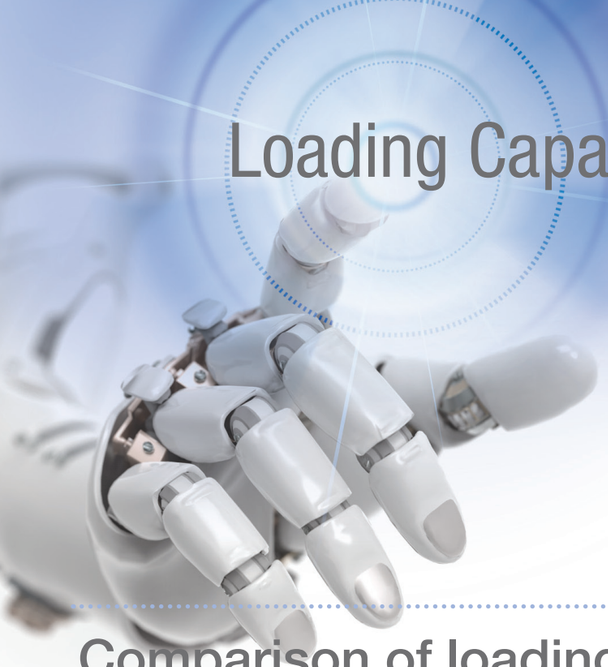
3µ Monodisperse vs 3µ Traditional



Efficiency



Loading Capacity

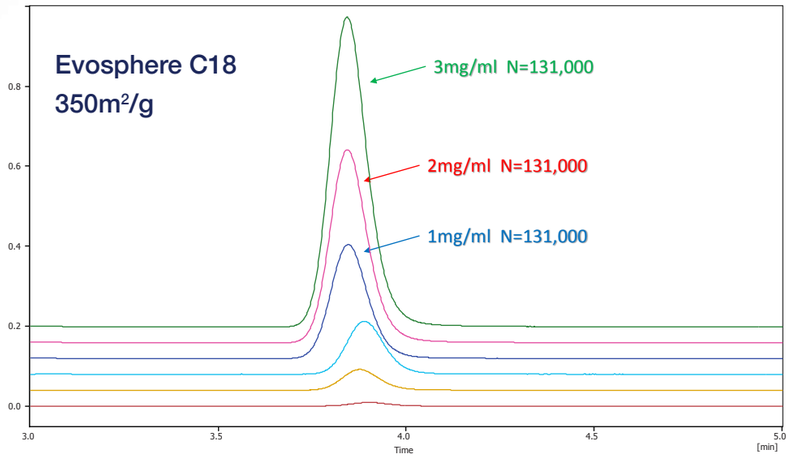


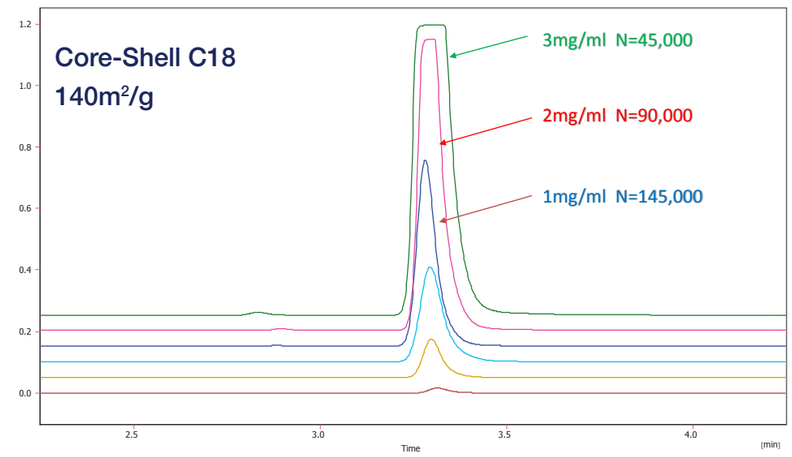
Fortis Evosphere® has a high surface area (350m²/g) as per many modern Type B porous silica's, this allows loadability of compounds to be increased for purification purposes.

If you compare this to core-shell particles which typically have a surface area in the region of 130m²/g you will quickly see overload and compromised peak shapes, meaning scale up of methods can be difficult.

Evosphere is available from capillary scale dimensions all the way up to preparative columns.

Comparison of loading capacity

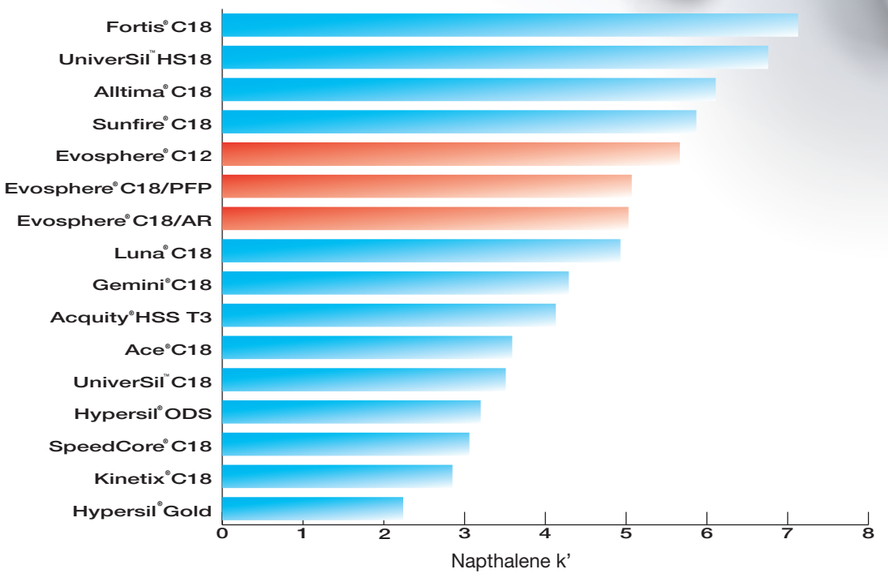




Hydrophobicity

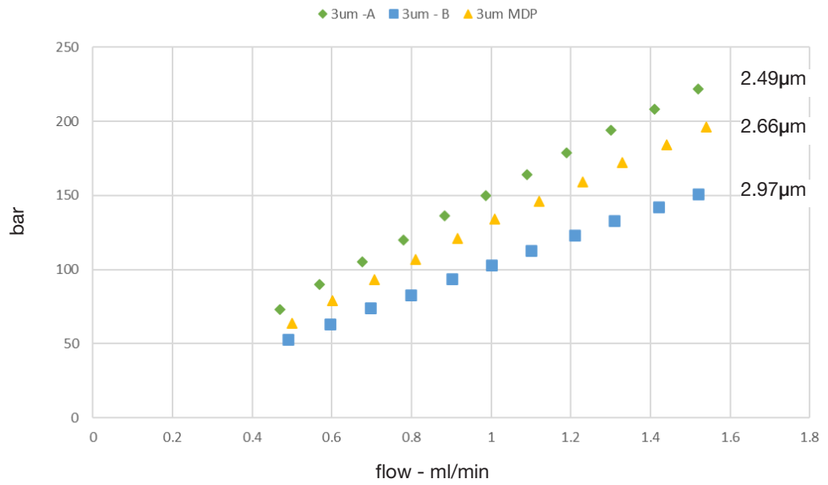
Evosphere® being a fully porous silica particle maintains a high surface area (350m2/g) this means high retentive effect for analytes, as well as high loading capacity.

Evosphere C12 shows high hydrophobicity due to its high surface coverage, made possible by less steric hindrance when bonded.



Backpressure

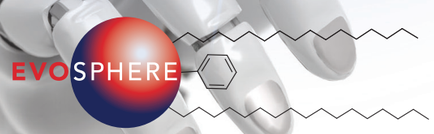
Column impedance highlights how backpressure will remain the same for monodisperse particles as it will for polydisperse traditional particles. Backpressure in identically packed columns will only be effected by the nominal particle size.



Stationary Phase Choice

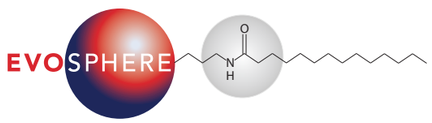
Evosphere C18/PFP
Orthogonal Selectivity
Method development starting point

Evosphere C18/PFP is designed to provide characteristics which will enhance method development. It provides the ability to obtain sharp peak shapes whilst retaining and separating a wide variety of compounds both hydrophobic and hydrophilic.



Evosphere C18/AR
Orthogonal Selectivity
Method development starting point

Evosphere C18/AR is designed to provide increased resolution between compounds, having a combination of hydrophobicity and aromatic selectivity will lead to enhanced resolution. USP L1 column.



Evosphere RP18-Amide
Orthogonal Selectivity
Excellent method development option

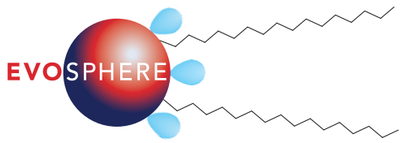
Evosphere RP18-Amide is designed to provide polar characteristics which will enhance resolution in method development. It provides orthogonal selectivity to alkyl chain phases due to its polar-embedded group. Sharp peak shapes, extra selectivity and increased retention can all be obtained.

Evosphere Diphenyl
Separate positional isomers
Stable ligand, No “MS” bleed

Evosphere Diphenyl is designed to provide pi-pi, steric and hydrophobic characteristics which will enhance selectivity and the ability to develop methods. Particularly suited to positional isomers and other closely related species such as metabolites.

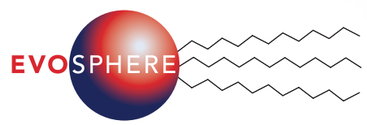
Evosphere Phenyl-Hexyl
Separate metabolites
Excellent resolution

Evosphere Phenyl-Hexyl is designed to provide characteristics which will enhance selectivity. It provides alternate selectivity to a pure hydrophobic stationary phase whilst still maintaining the key attributes of robustness and reproducibility.



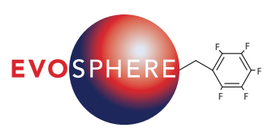
Evosphere AQUA
Separate polar species
Excellent stability

Evosphere AQUA is designed to provide characteristics which will enhance retention of highly polar analytes. Reproducible surface characteristics provide robust separations. Combination of hydrophobic and hydrophilic nature.



Evosphere C12
Ultra High Efficiency
Method development starting point

Evosphere C12 is designed to provide characteristics which will enhance method development. The dense C12 ligand provides the ability to obtain sharp peak shapes whilst retaining and separating a wide variety of acid, base and neutral compounds with excellent robustness.



Evosphere PFP
Orthogonal Selectivity
Combined with Ultra High Efficiency particles

Evosphere PFP (PentaFluoroPhenyl) is designed to provide characteristics which will enhance selectivity. It provides alternate selectivity to a hydrophobic stationary phase whilst still maintaining the key attributes of robustness and reproducibility.

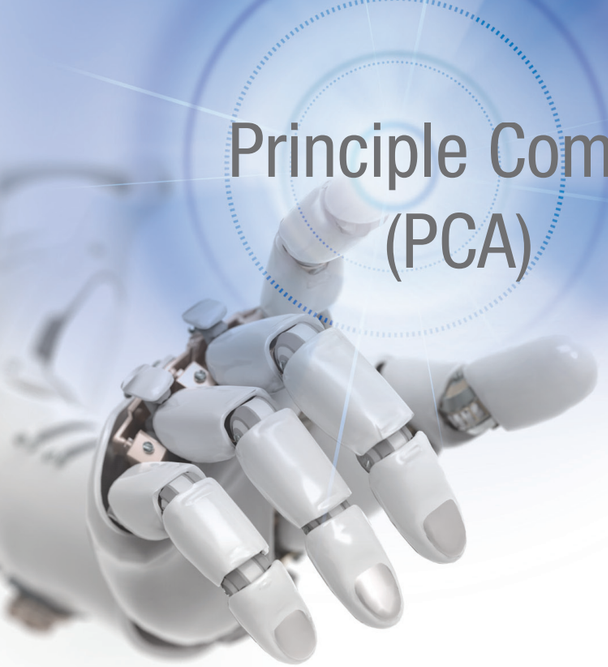
Evosphere HILIC
High polarity compounds
Combined with Ultra High Efficiency particles

Evosphere HILIC is designed to provide characteristics which will enhance retention of polar compounds. Hydrophilic interaction chromatography uses partition, ion-exchange and hydrogen bonding to retain high polarity analytes.

Evosphere Monodisperse Particles

	Particle Size	Surface Area	Pore Size	% C	pH range	USP
Evosphere C12	1.7µm 3µm 5µm	350m²/g	100Å	17	1-11	L87
Evosphere C18/AR	1.7µm 3µm 5µm	350m²/g	100Å	17	2-9	L1
Evosphere C18/PFP	1.7µm 3µm 5µm	350m²/g	100Å	17	2-9	L1
Evosphere RP18-Amide	1.7µm 3µm 5µm	350m²/g	100Å	20	2-9	L60
Evosphere Phenyl-Hexyl	1.7µm 3µm 5µm	350m²/g	100Å	14	2-9	L11
Evosphere Diphenyl	1.7µm 3µm 5µm	350m²/g	100Å	15	2-9	L11
Evosphere PFP	1.7µm 3µm 5µm	350m²/g	100Å	13	2-9	L43
Evosphere AQUA	1.7µm 3µm 5µm	350m²/g	100Å	18	2-9	L96
Evosphere HILIC	1.7µm 3µm 5µm	350m²/g	100Å	n/a	2-7	L3

Principle Component Analysis (PCA)



PCA analysis

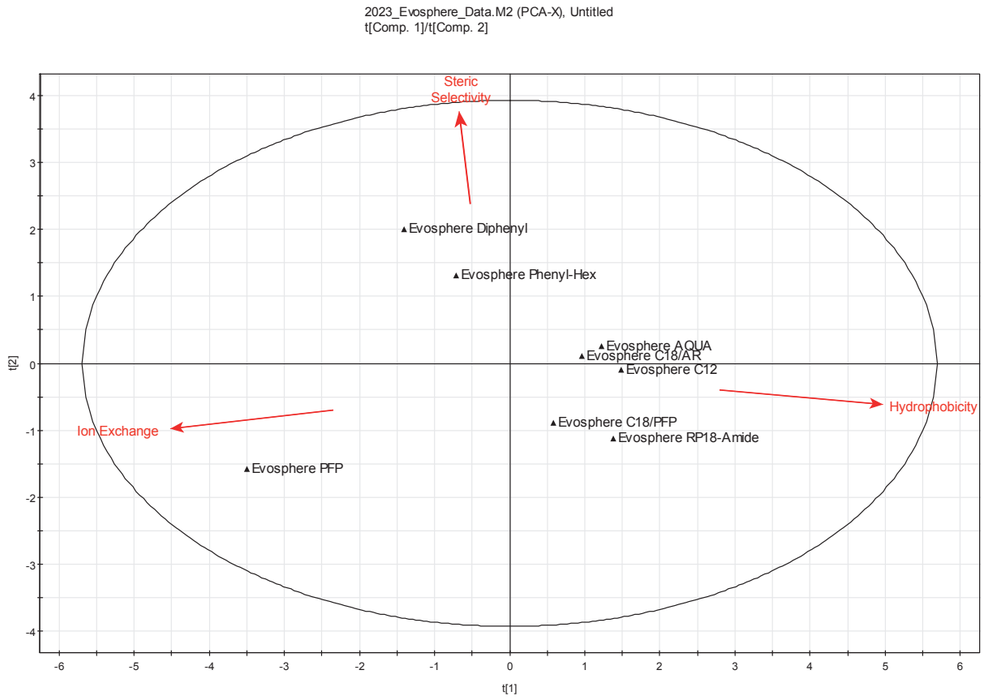
Principle component analysis has been used to differentiate columns for use in Chromatography for a number of years,* first developed by Euerby and Petersson based around tests suggested by Tanaka. A systematic approach to column charecterisation allows the analyst to choose from a diverse (or similar) range of columns.

* M.Euerby, P.Petersson, LC-GC Europe (Sept 2000) 665-677

Factors characterised:

- **Hydrophobicity**
- **Steric selectivity**
- **Hydrogen bonding capacity**
- **Ion-exchange capacity**

PCA analysis has been show below to highlight the diversity of the stationary phases in the Evosphere range.
Choose a phase based on orthogonal selectivity to your current column or by mechanism to match the analytes

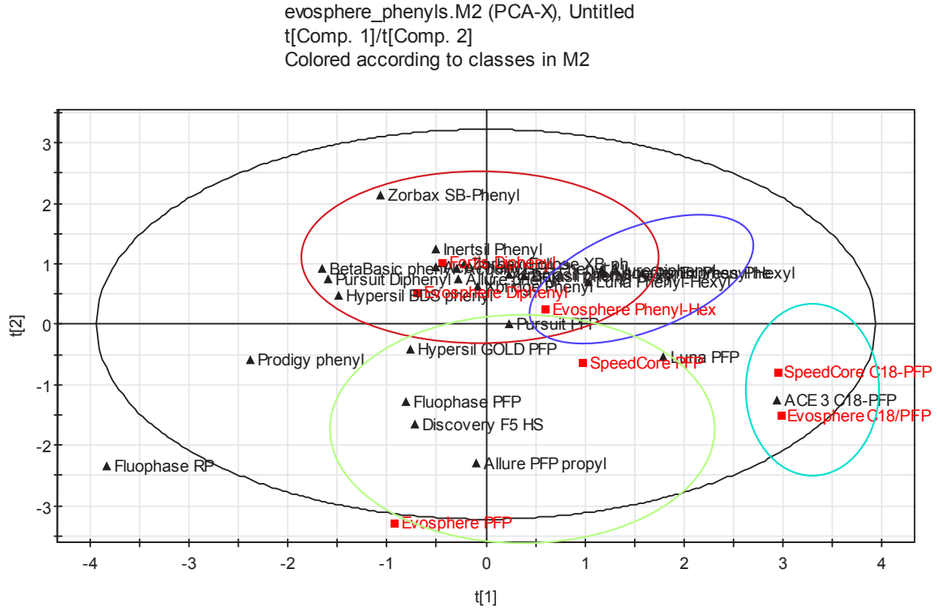


Evosphere PCA

Factors characterised:

- **k' PB** Retention factor of Pentylbenzene, an indicator of ligand density
- **Steric selectivity** Retention factor ratio between triphenylene and o-terphenyl $\alpha T/O = k_T/k_O$ this is a measure of the shape selectivity and functionality of the silylating reagent.
- **Hydrophobic selectivity** αCH_2 Retention factor between pentylbenzene and butylbenzene. A measure of the surface coverage of the phase, differentiated by one methylene group is dependant upon the ligand density.
- **Hydrogen bonding capacity** $\alpha C/P$ retention factor between caffeine and phenol. A indicator of the degree of endcapping
- **Ion-exchange capacity** $\alpha k_b/k_p$ Retention factor between benzylamine and phenol at both pH 2.7 (acidic activity of silanols) and pH 7.6 an estimate of total silanol activity.

In the example below PCA analysis can be used to show the differences between several commercial Phenyl type phases. It can be seen how the new C18-PFP phase adds a new dimension being predominantly hydrophobic in nature but offering alternate selectivity due to the mixed C18 and PFP ligands.
Evosphere Phenyl-Hexyl also offers a new selectivity to the range combining hydrophobicity and pi-pi interactions together.



HPLC/UHPLC Phase Selectivity Chart

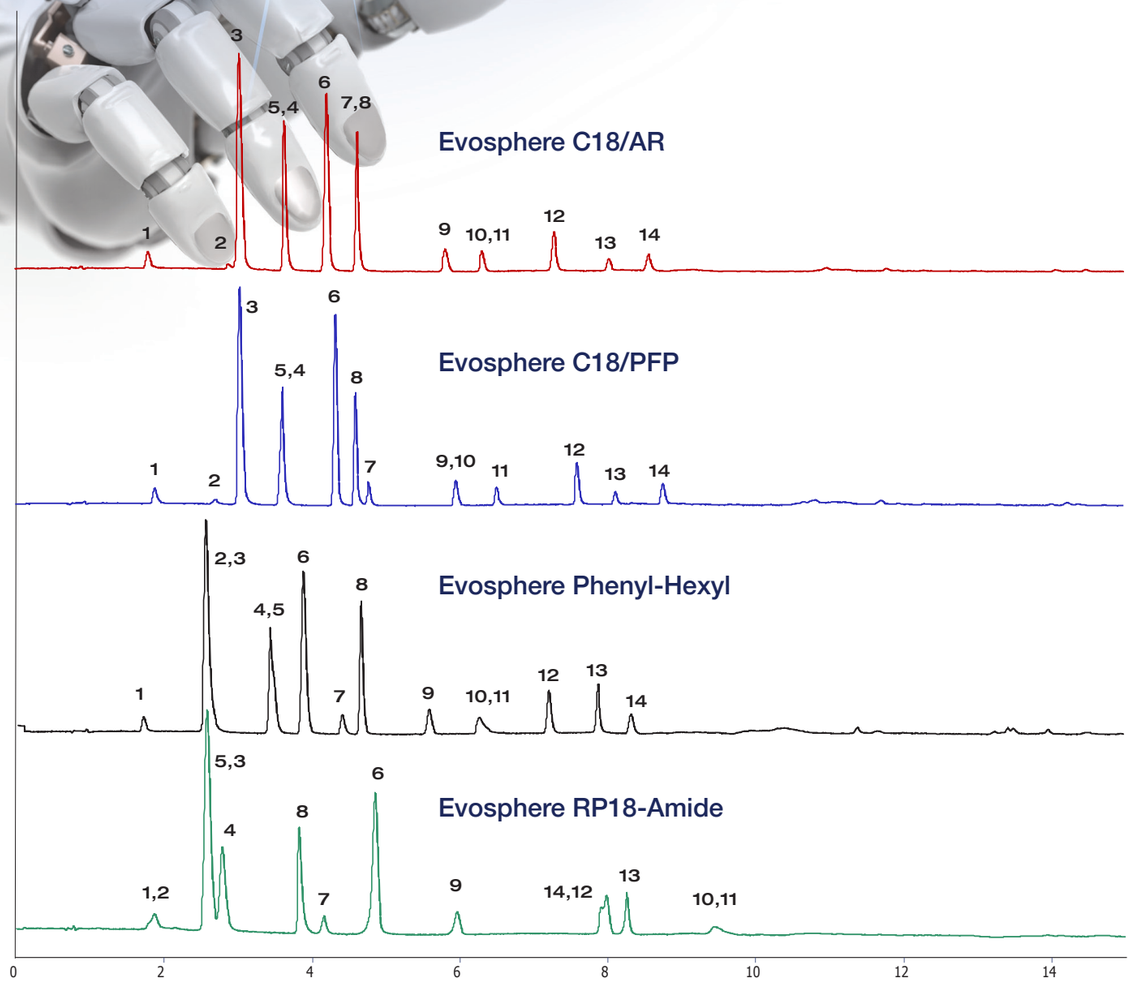
POLAR

EVOSPHERE HILIC	Hydrophilic Interaction chromatography	Retention of very high polarity analytes by partition, ion-exchange and hydrogen bonding
EVOSPHERE AQUA	Polar Endcapped C18	Amino acids Organic acids High aqueous mobile phases
EVOSPHERE PFP	Pentafluorophenyl Selectivity	Selectivity of aromatic compounds. Orthogonal fluorine enhanced
EVOSPHERE RP18-AMIDE	Polar Embedded C18	Strong acid retention Sharp peak shape for basics
EVOSPHERE DIPHENYL	Dual Phenyl for Steric selectivity	Isomers Metabolites Closely related species
EVOSPHERE PHENYL-HEXYL	Balanced aromatic and hydro-phobic selectivity	Balanced hydrophobic and aromatic selectivity. Hydrogen accepting for acids
EVOSPHERE C18/PFP	Pentafluorophenyl and C18 ligands	Enhanced retention with electron-rich molecules
EVOSPHERE C18/AR	Balanced Phenyl and C18 ligands	Aromatic as well as hydrophobic retention
EVOSPHERE C12	C12 high coverage stable ligand	Most Hydrophobic Sharper peak shapes High pH stable

HYDROPHOBIC

Evosphere Selectivity

When developing a new method in chromatography having a diverse range of selectivities to choose from can help in deciding how peaks resolve and which is the best starting point. In this example a gradient run across several stationary phase shows orthogonal selectivity for many of the peaks.



1. Hydroquinone
2. Theobromine
3. Paracetamol
4. Theophylline
5. Paraxanthine
6. 4-Hydroxybenzoic acid
7. 2-Acetamidophenol
8. Caffeine
9. Phenol
10. Aspirin
11. 2-hydroxybenzoic acid
12. 4-nitrophenol
13. 4-Chloracetanilide
14. 2-nitrophenol

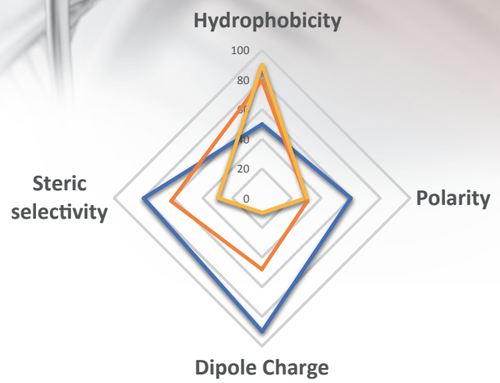
Mobile phase A:
10mM ammonium formate pH3.0
Mobile phase B:
10mM ammonium formate pH3.0 in ACN
Flow rate : 0.4ml/min
Wavelength : 254nm
Temperature : 40°C

* All columns 3µm 100x2.1mm

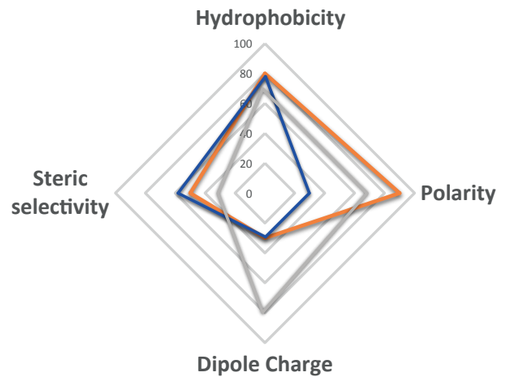
Method Development Screening Kits

When developing a new method in chromatography having a diverse range of selectivities allows a choice to be made dependant upon initial knowledge of the compound types and classes: choose phases based on similarity i.e. Evosphere C18/AR and C18/PFP both having a high hydrophobicity, but subtle changes in steric terms. Or choose stationary phases that are as orthogonal as possible from each other allowing for the best probability of a generic gradient screen to ascertain the best starting column to then be taken forward for further optimisation.

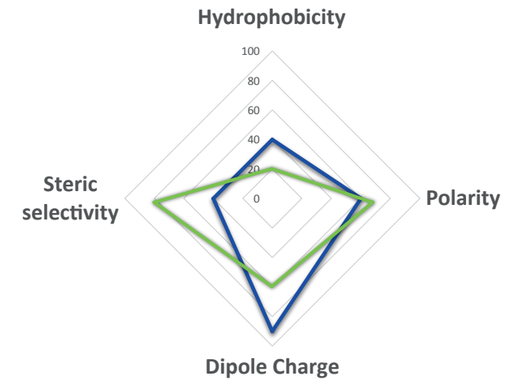
C12 Diphenyl C18/PFP



AQUA C18/AR RP18-Amide



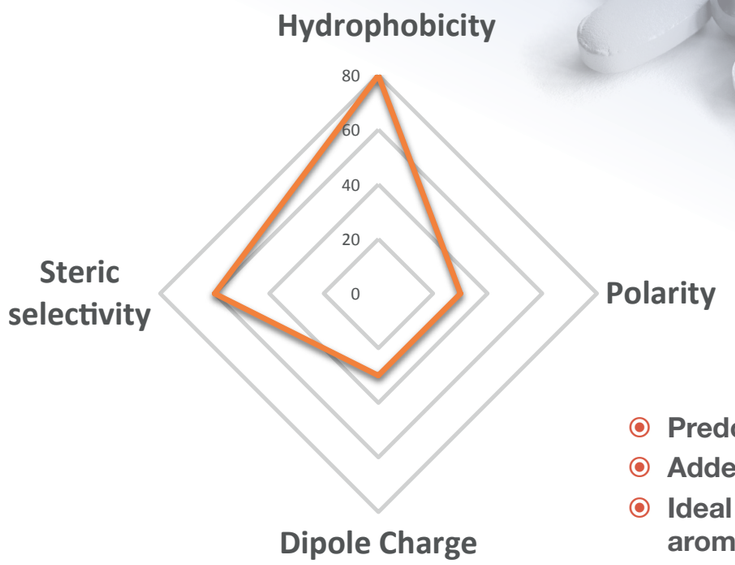
PFP Phenyl-Hexyl



Evosphere C18/AR

- Evosphere C18/AR
- Orthogonal Selectivity
- Method development starting point

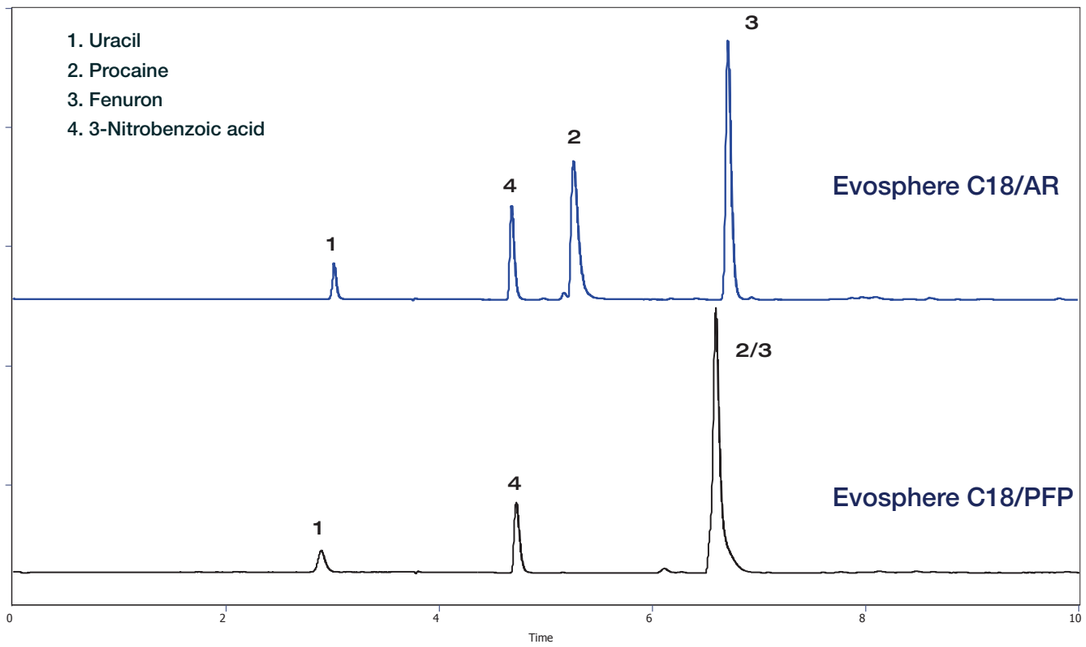
Evosphere C18/AR is designed to provide increased resolution between compounds, having a combination of hydrophobicity and aromatic selectivity will lead to enhanced resolution. USP L1 column.



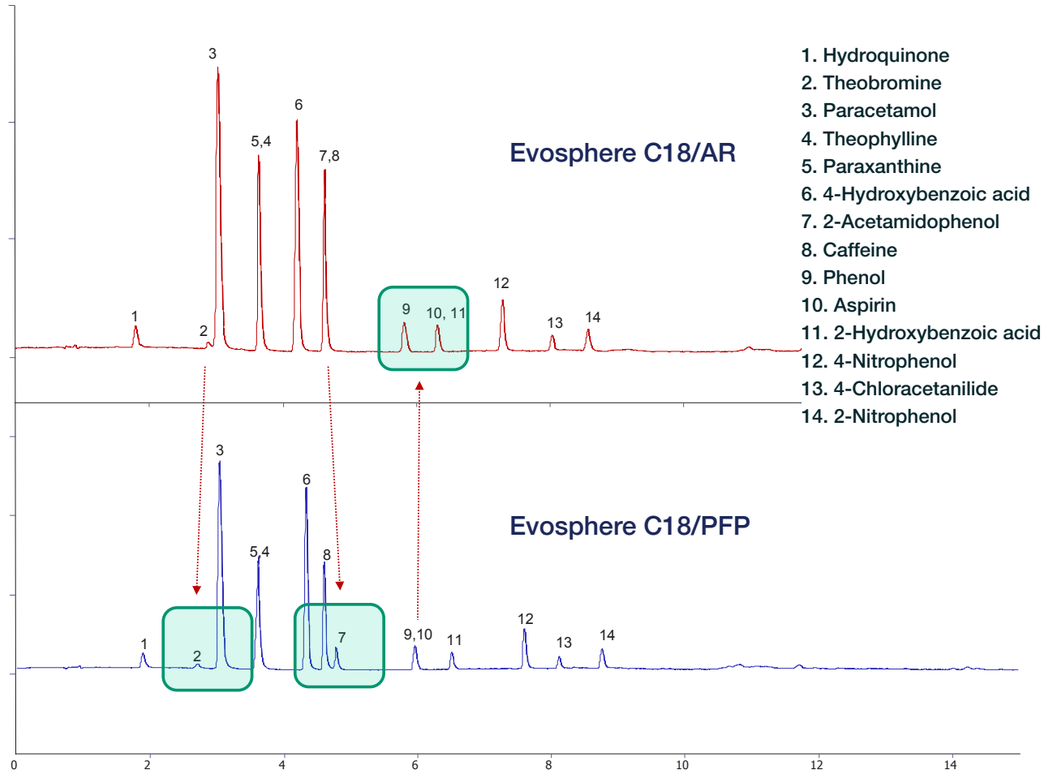
- Predominantly Hydrophobic
- Added Steric selectivity
- Ideal for mixtures of neutrals and aromatic analytes

Evosphere Selectivity

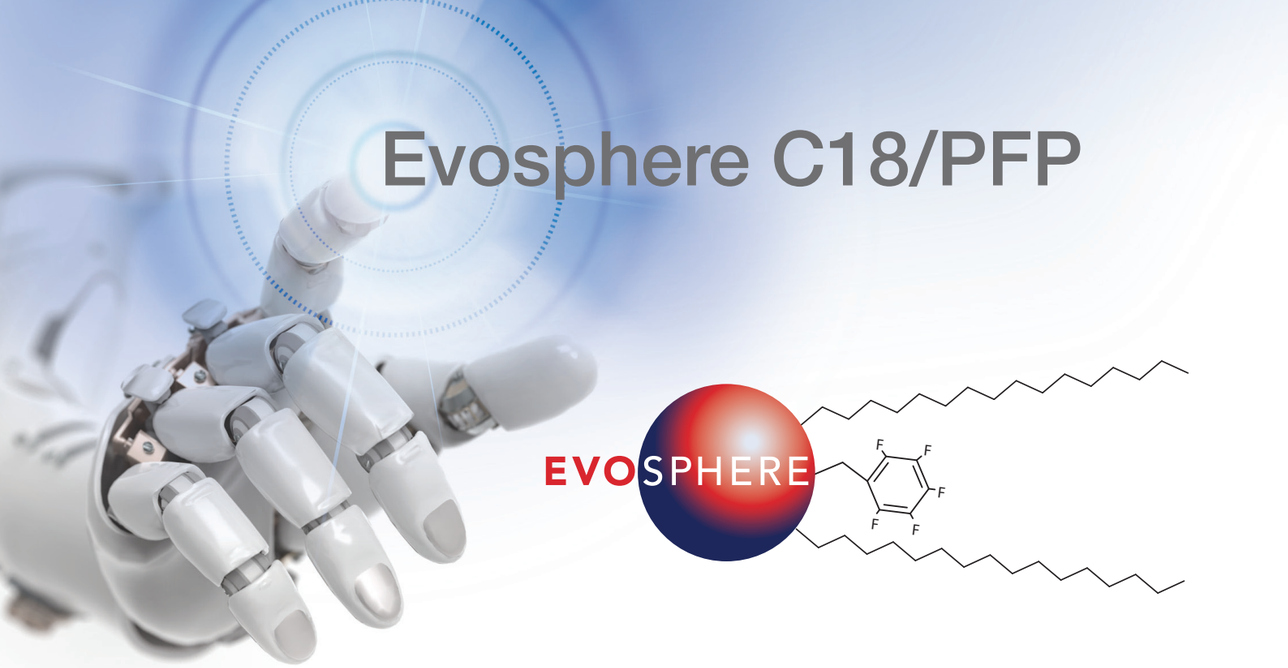
When developing a new method in chromatography having a diverse range of selectivities to choose from can help in deciding how peaks resolve and which is the best starting point. In this example Evosphere C18/AR highlights orthogonal selectivity for acid and basic molecules.



Evosphere C18/AR and Evosphere C18/PFP are both USP L1 columns, however they are designed to enhance separation capabilities by offering different mechanisms of interaction to each other, leading to orthogonal separations.

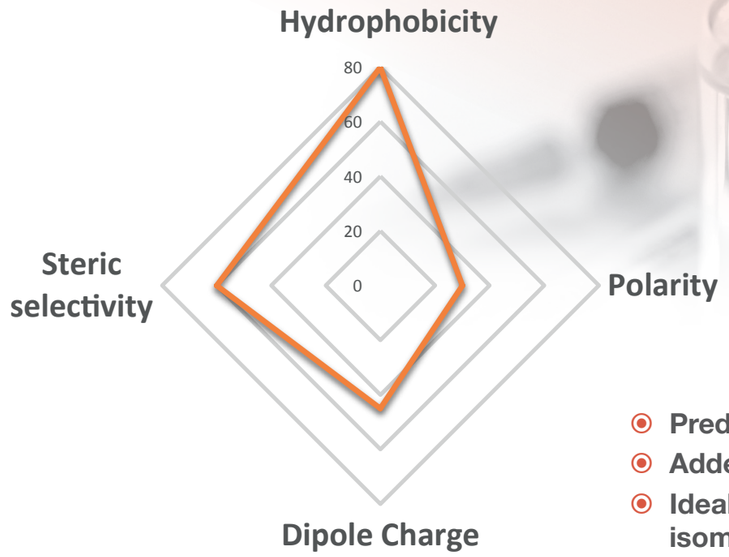


Evosphere C18/PFP



- Evosphere C18/PFP
- Orthogonal Selectivity
- Method development starting point

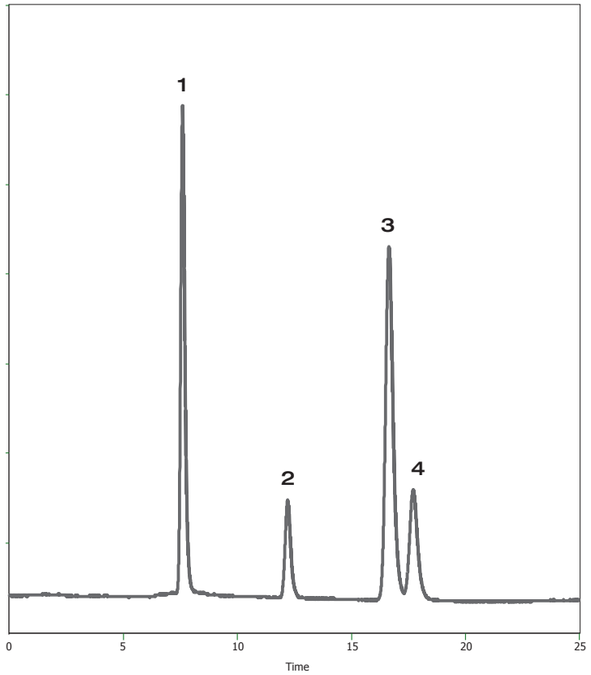
Evosphere C18/PFP is designed to provide characteristics which will enhance method development. It provides the ability to obtain sharp peak shapes whilst retaining and separating a wide variety of compounds both hydrophobic and hydrophilic. USP L1 column.



- Predominantly Hydrophobic
- Added Steric and Dipole selectivity
- Ideal for mixtures of neutrals and isomeric species

Evosphere Selectivity

When developing a new method in chromatography having a diverse range of selectivities to choose from can help in deciding how peaks resolve and which is the best starting point. In this example Evosphere C18/PFP highlights orthogonal selectivity for halogenated positional isomers.

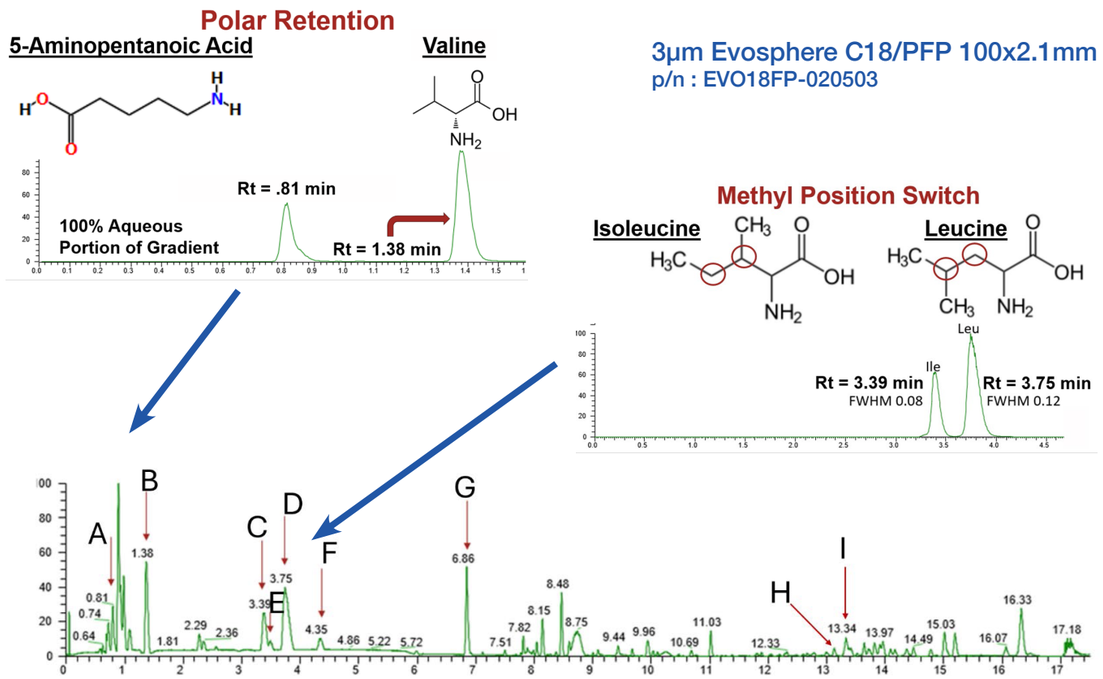


Evosphere C18/PFP
5µ 150x4.6mm
p/n: EVO18FP-050705
Mobile phase: 50:50 Water:MeOH
Flow: 1ml/min
Temp: 20°C
Wavelength: 254nm

1. Acetophenone
2. 2-Chloroacetophenone
3. 4-Chloroacetophenone
4. 3-Chloroacetophenone

Untargeted Metabolomics

Metabolomics can offer a challenge in conventional chromatography due to the diverse nature of the analytes. Evosphere C18/PFP was chosen due to its combination of regioisomer and hydrophobic selectivity as well as polar retention capacity.

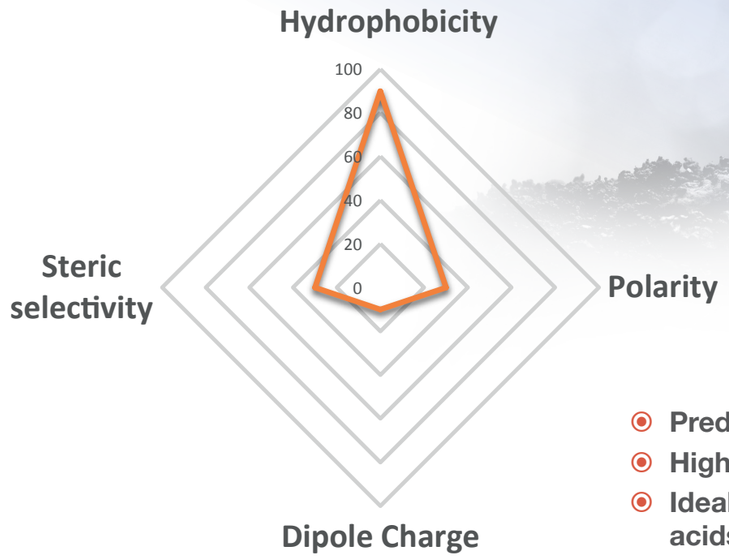


Data courtesy: Dr Tim Garrett, University of Florida

Evosphere C12

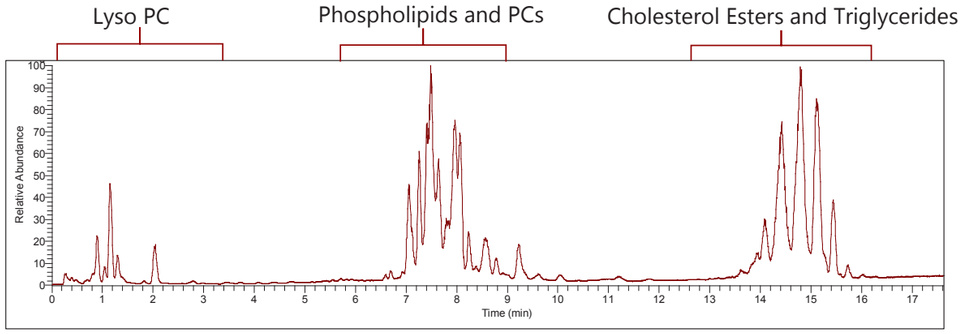
- Evosphere C12
- Ultra High Efficiency
- Method development starting point

Evosphere C12 is designed to provide characteristics which will enhance method development. The dense C12 ligand provides the ability to obtain sharp peak shapes whilst retaining and separating a wide variety of acid, base and neutral compounds with excellent robustness.

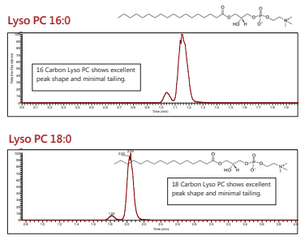


- Predominantly Hydrophobic
- High surface protection = higher pH
- Ideal for mixtures of neutrals and acids and bases

Lipidomics Charecterisation

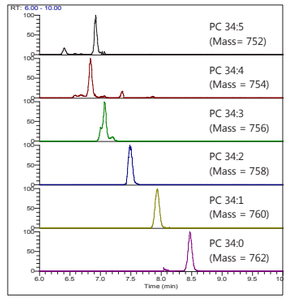


Lyso PC 16:0 & 18:0



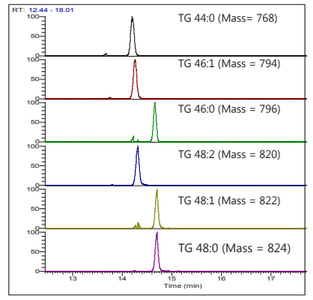
16 & 18 Carbon Lyso PC show excellent peak shape and selectivity

PCs with different degrees of Unsaturation



Phosphotidylcholine - Evosphere is able to separate different degrees of unsaturation

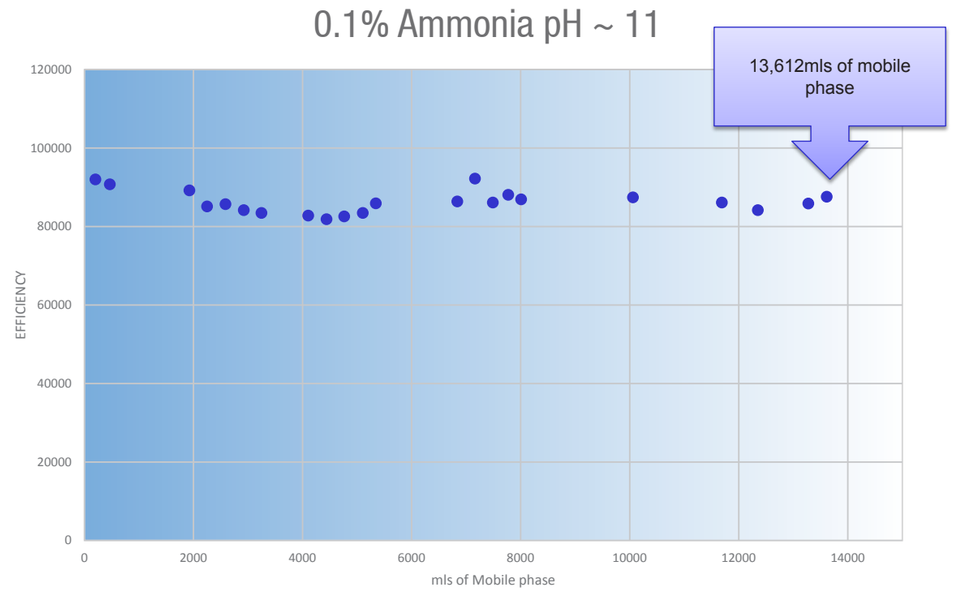
Triglycerides with 44-48 Carbons



Triglcerides with different degrees of saturation are well seperated with excellent peak shapes as compared to traditional methods.

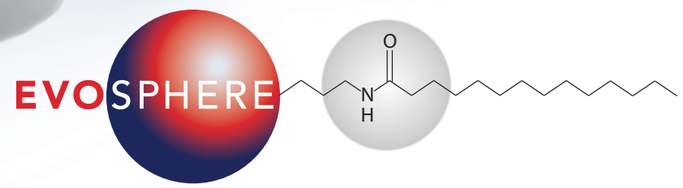
Evosphere High pH Stability

Evosphere C12 is designed to offer hydrophobic retention but with an increase of coverage of ligand, this leads to a high retentive, highly stable stationary phase which can be used in new method development. Its selectivity has been used to provide sharper peak shapes due to the high surface surface protection. The high surface protection also adds increased high pH stability to the phase.



5µm Evosphere C12 50x3.0mm Mobile phase: 70:30 0.1% NH_3 : ACN

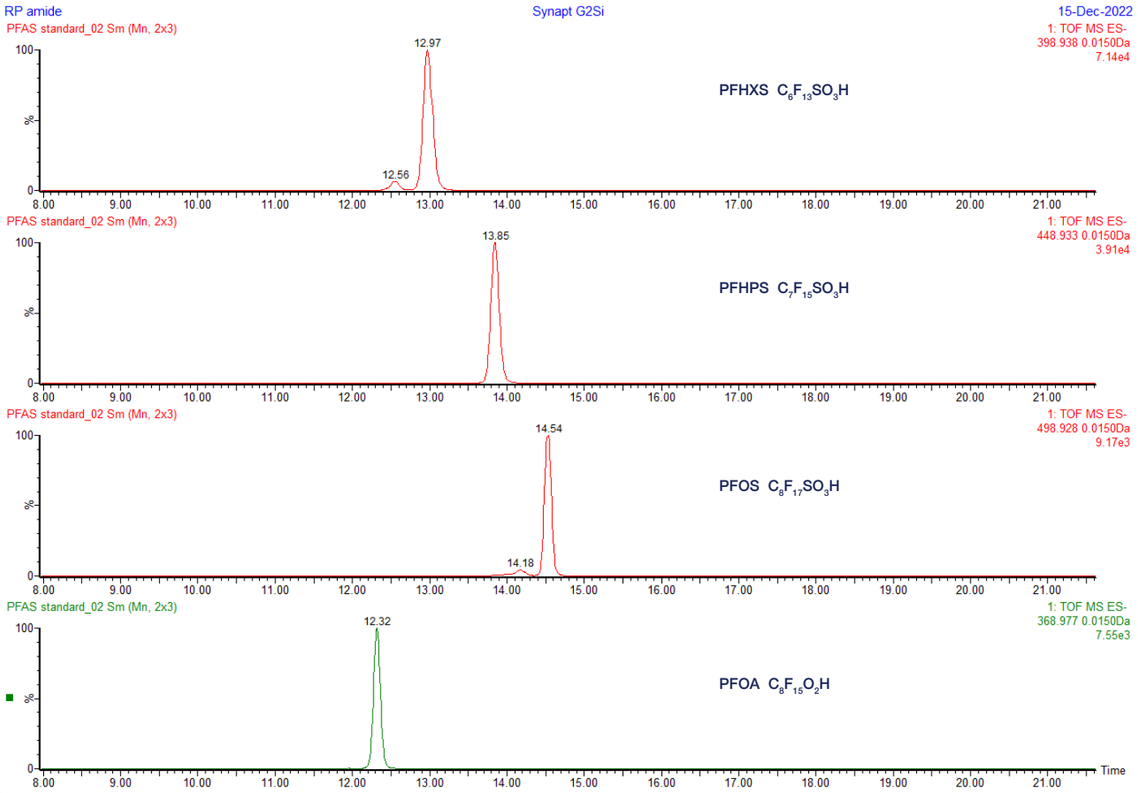
Evosphere RP18-Amide

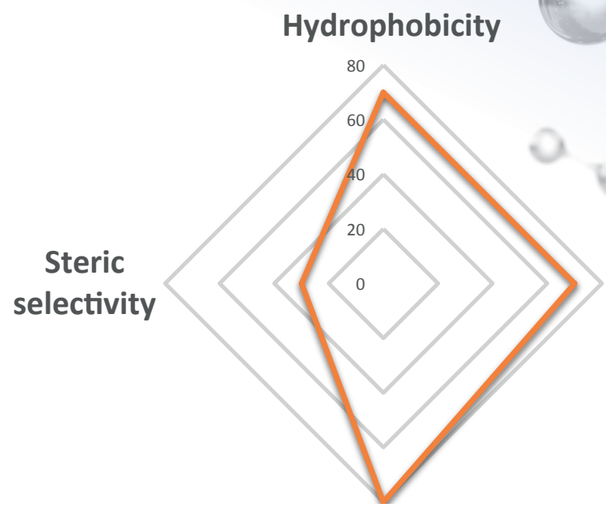


- Evosphere RP18-Amide
- Orthogonal Selectivity
- Excellent method development option

Evosphere RP18-Amide is designed to provide polar characteristics which will enhance resolution in method development. It provides orthogonal selectivity to alkyl chain phases due to its polar-embedded group. Sharp peak shapes, extra selectivity and increased retention can all be obtained.

PFAS Selectivity

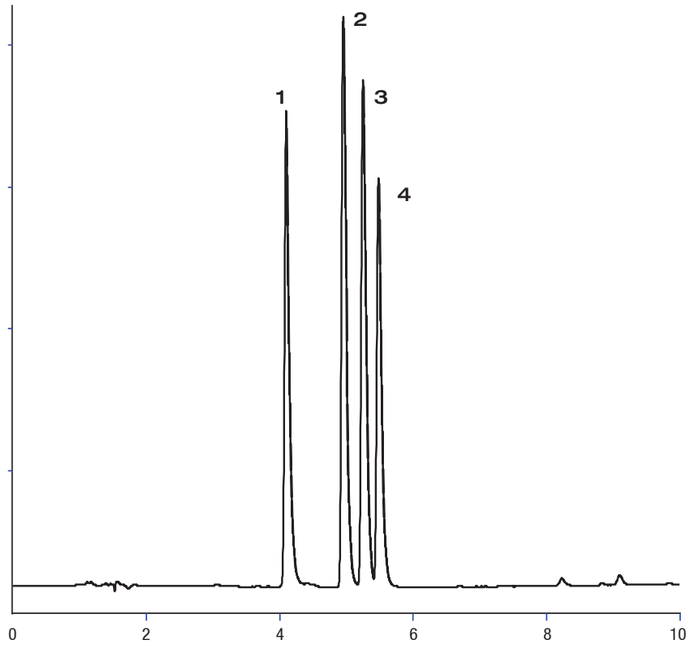




- Hydrophobic and Hydrophilic
- Added dipole for charged species
- Ideal for mixtures of acids, bases and neutrals

Excellent Peak Shapes

Evosphere RP18-Amide will offer the sharpest peak shapes for basic analytes. The positive charge of the amide functionality in the stationary phase stopping any tailing from occurring. This stationary phase will also give strong retention of small polar acid* compounds due to their interaction with the positively charged amide functional group (*see apps guide).

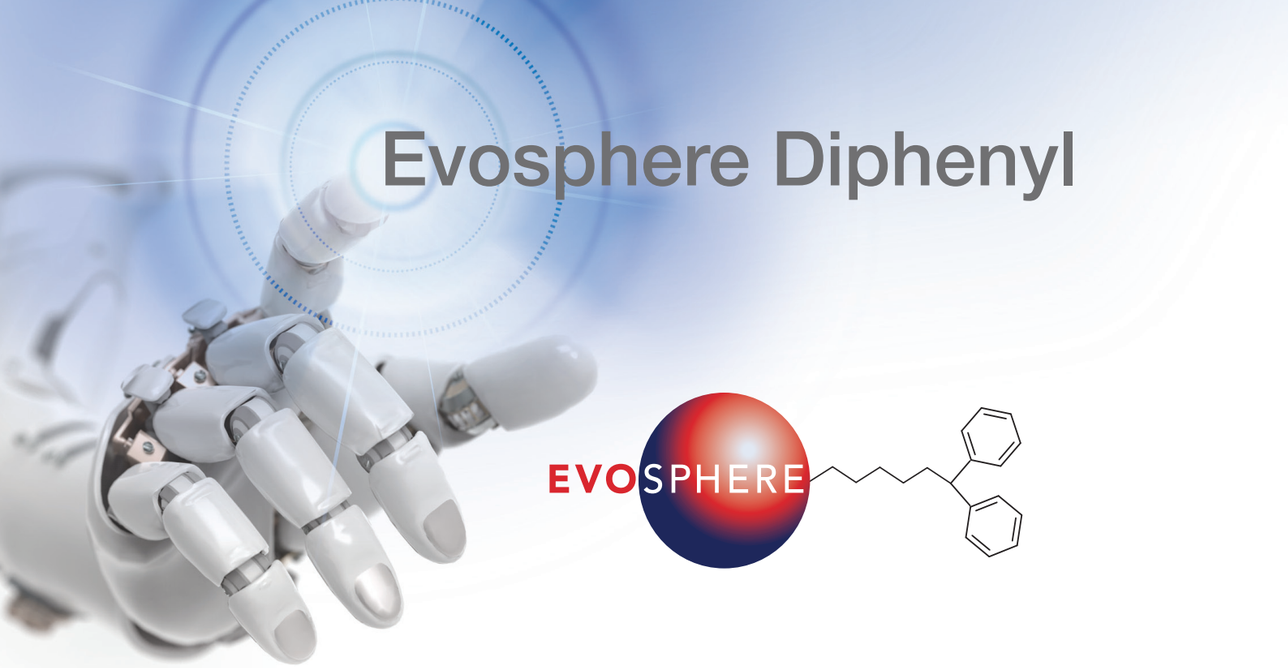


Evosphere RP18-Amide
3µ 150x4.6mm
p/n: EVORP18-050703
Mobile phase:
A: 0.1% Formic acid in water
B: 0.1% Formic acid in ACN
25-50% B in 10minutes

Flow: 1ml/min
Temp: 30°C
Wavelength: 254nm

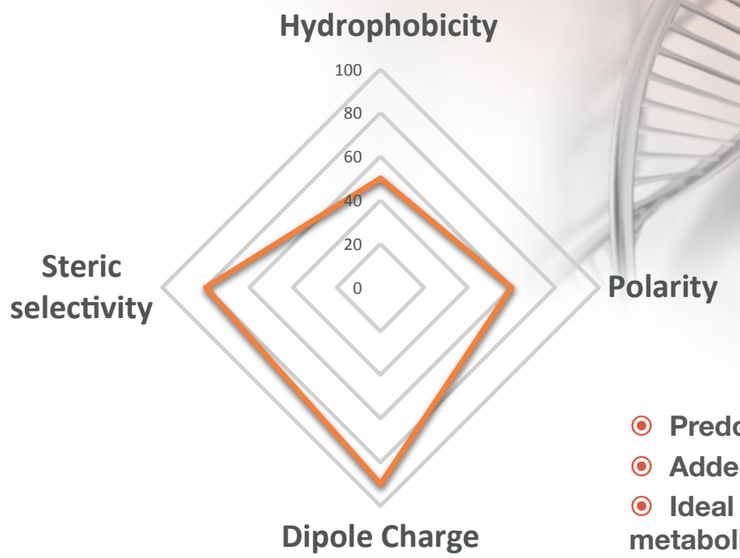
1. Doxepin
2. Imipramine
3. Nortriptyline
4. Trimipramine

Evosphere Diphenyl



- Evosphere Diphenyl
- Separate positional isomers
- Stable ligand, No “MS” bleed

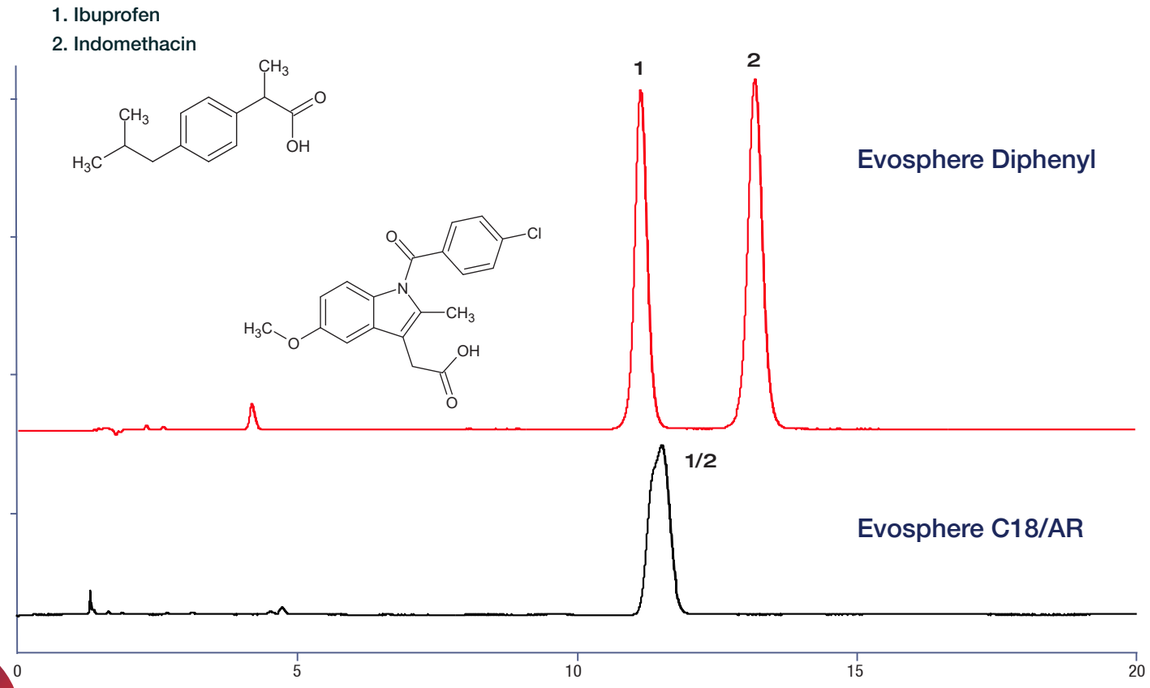
Evosphere Diphenyl is designed to provide pi-pi, steric and hydrophobic characteristics which will enhance selectivity and the ability to develop methods. Particularly suited to positional isomers and other closely related species such as metabolites.



- Predominantly Dipole selectivity
- Added polar character
- Ideal for mixtures of isomers and metabolites

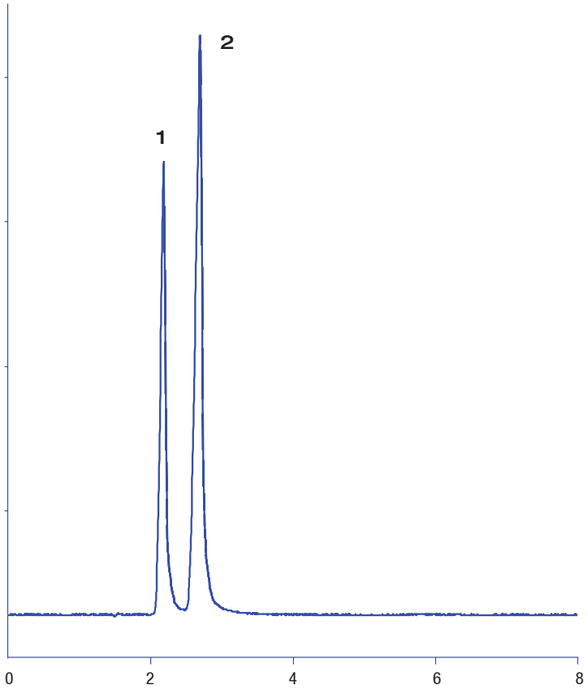
Enhanced Selectivity

When compounds are positional isomers or similar functionality then Evosphere Diphenyl brings extra selectivity over more hydrophobic stationary phases. Having pi-pi interactions as well as a steric selectivity term due to the branched structure allows the resolution of critical pairs.



Isomeric Selectivity

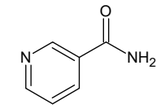
When compounds are positional isomers then Evosphere Diphenyl brings extra selectivity over more hydrophobic stationary phases. Having 3 modes of interaction, pi-pi, steric selectivity and hydrophobicity allows for extra retention and orthogonal selectivity. It is critical that isomers are separated in the LC as MS will struggle to differentiate between them. Fast analysis can still be achieved even with closely related species if sufficient resolution is achieved by the high efficiency monodisperse particles.



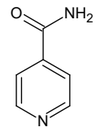
Evosphere Diphenyl
3µ 100x2.1mm
p/n: EVOPH-020503
Mobile phase:
90:10 0.1% formic acid in H_20:MeOH

Flow: 0.2ml/min
Temp: 25°C
Wavelength: 254nm

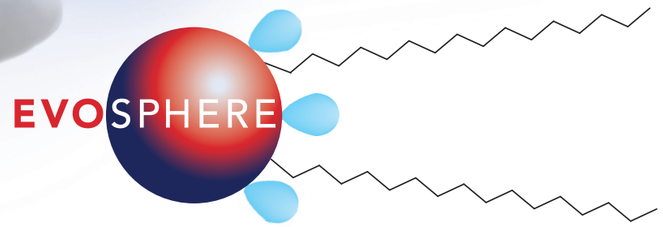
1. Nicotinamide



2. Isonicotinamide

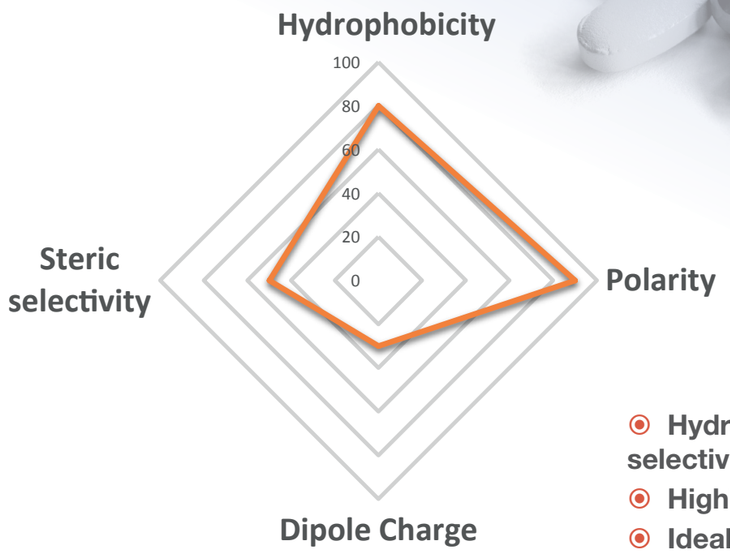


Evosphere AQUA



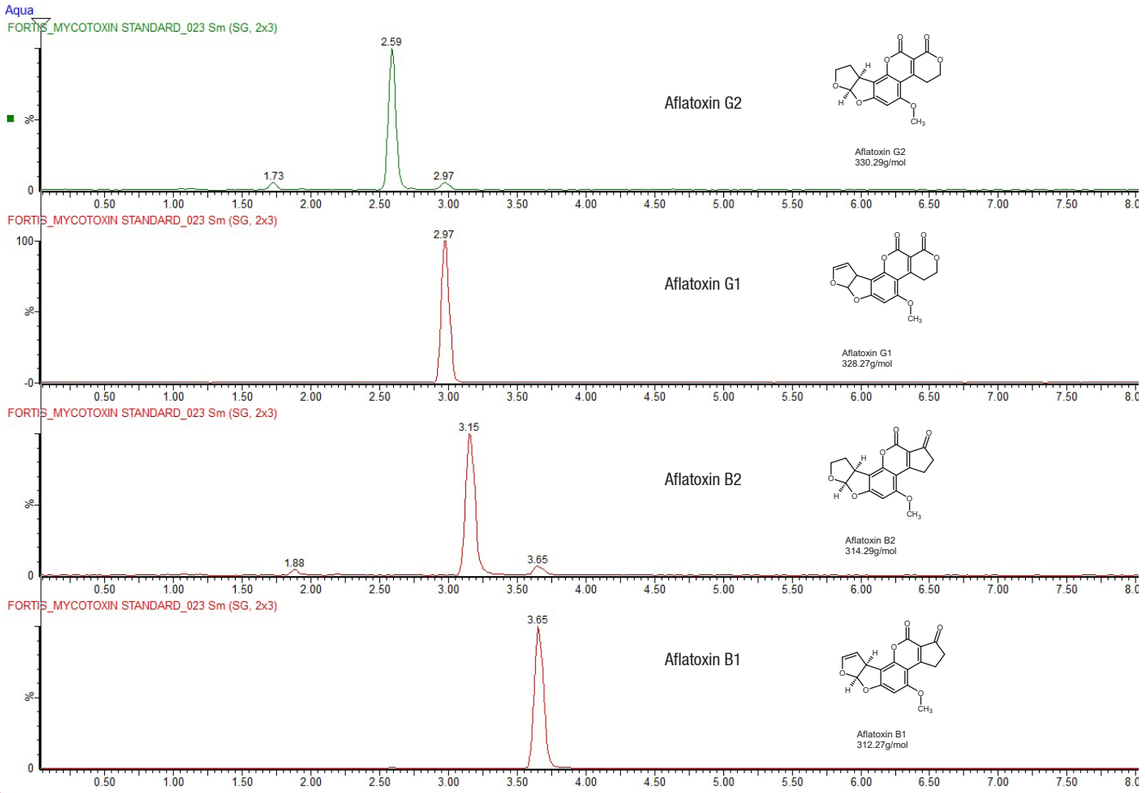
- Evosphere AQUA
- Separate polar species
- Excellent stability

Evosphere AQUA is designed to provide characteristics which will enhance retention of highly polar analytes. Reproducible surface characteristics provide robust separations. A combination of hydrophobic and hydrophilic nature.



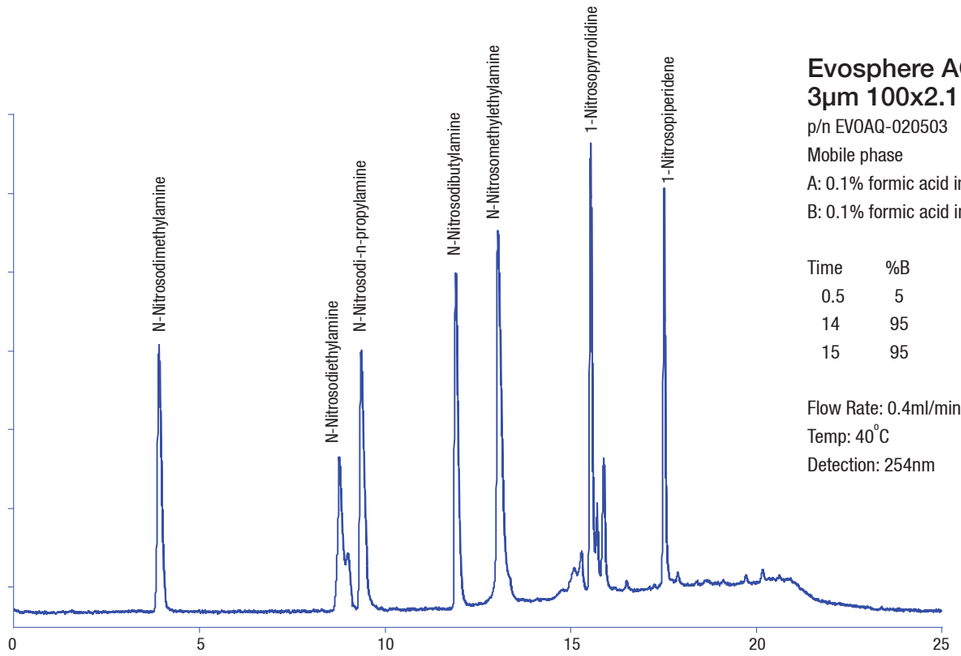
- Hydrophobic and Hydrophilic selectivity
- Highly aqueous mobile phases
- Ideal for mixtures of hydrophobic and hydrophilic compounds

Mycotoxins



Nitrosamines

Nitrosamines must be monitored for there presence as they are widely suspected of being carcinogenic. Hundreds of nitrosamines exist and they can vary widely in their chemical nature being hydrophilic or hydrophobic in nature. This presents a challenge when developing a method that can function for many of these groups. Evosphere AQUA having both polar nature and hydrophobic can retain diverse compound sets such as these.



Evosphere AQUA
3µm 100x2.1mm

p/n EVOAQ-020503

Mobile phase

A: 0.1% formic acid in water

B: 0.1% formic acid in MeOH

Time	%B
0.5	5
14	95
15	95

Flow Rate: 0.4ml/min

Temp: 40°C

Detection: 254nm

Separation of Nitrosamines - Simple chromatographic UV-Vis method

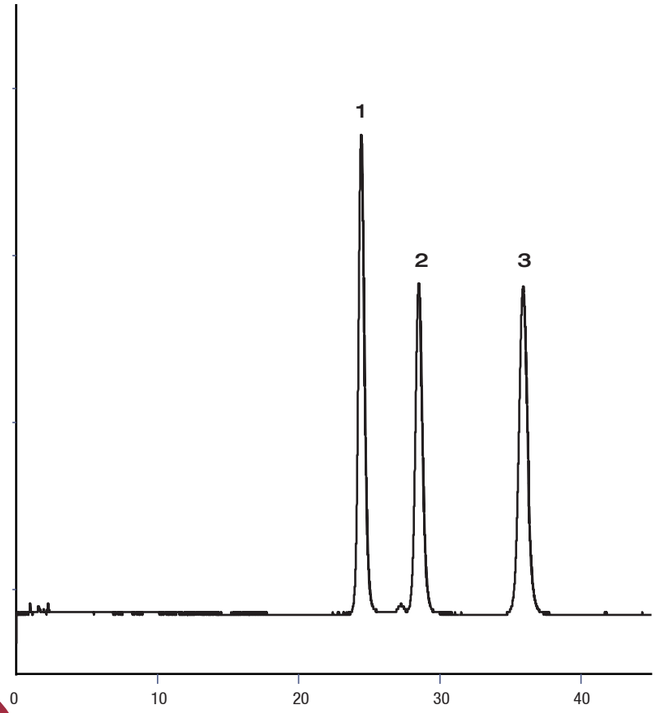
Evosphere Phenyl-Hexyl

- Evosphere Phenyl-Hexyl
- Separate metabolites
- Excellent resolution

Evosphere Phenyl-Hexyl is designed to provide characteristics which will enhance selectivity. It provides alternate selectivity to a pure hydrophobic stationary phase whilst still maintaining the key attributes of robustness and reproducibility.

Enhanced Selectivity

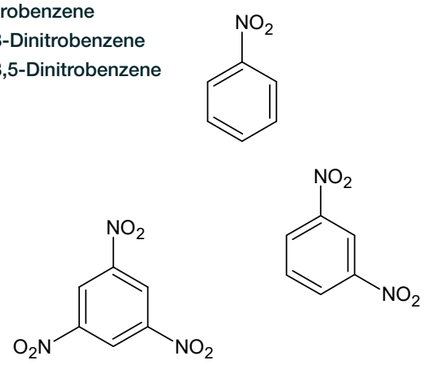
Phenyl-Hexyl offers yet another alternative selectivity in the Evosphere family, combining a short alkyl chain with a phenyl functionality. In this example the resolution of three aromatic nitro compounds is highlighted in a simple mobile phase. The stationary phase providing excellent selectivity of the 3 derivatives.



Evosphere Phenyl-Hexyl
5µ 150x4.6mm
p/n: EVOHEX-050705
Mobile phase: 70:30 MeOH:Water

Flow: 1.0ml/min
Temp: 40°C
Wavelength: 210nm

1. Nitrobenzene
2. 1,3-Dinitrobenzene
3. 1,3,5-Dinitrobenzene



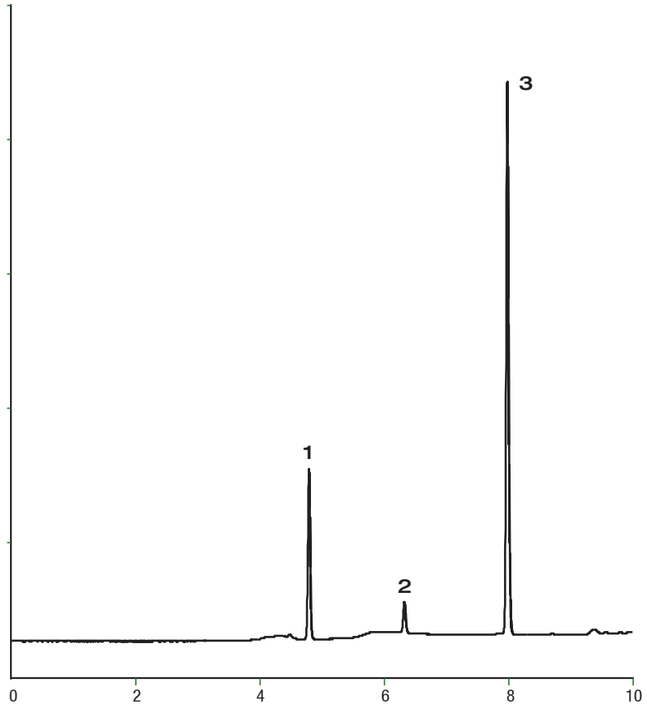
Evosphere PFP

- Evosphere PFP
- Orthogonal Selectivity
- Combined with Ultra High Efficiency particles

Evosphere PFP (PentaFluoroPhenyl) is designed to provide characteristics which will enhance selectivity. It provides alternate selectivity to a hydrophobic stationary phase whilst still maintaining the key attributes of robustness and reproducibility.

Enhanced Selectivity

Evosphere PFP is complementary to the alkyl-chain aromatic stationary phases since it provides strong electronegative flourine atoms resulting in strong retention of halogenated and polar species. Evosphere PFP can also aid in the separation of isomeric species due to ability for shape selectivity with its rigid bonded phase.



Evosphere PFP
5µ 150x4.6mm
p/n: EVOPFP-050705
Mobile phase:
A: 0.1% formic acid in Water
B: 0.1% formic acid in Can
0-95% B in 10mins

Flow: 1.0ml/min
Temp: 40°C
Wavelength: 210nm

1. Acetaminophen
2. Benzyl Alcohol
3. 3-Methyl-4-Nitrobenzoic acid

Evosphere BIO

EVOSPHERE BIO

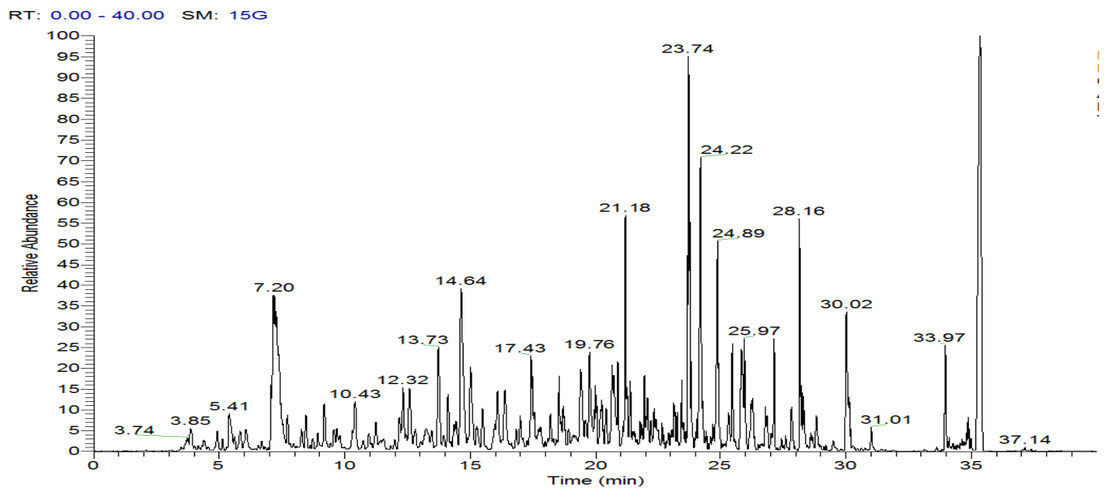
- **Evosphere BIO Monodisperse particles**
- **300Å for larger peptide and proteins**
- **High Efficiency, high sensitivity particle**

Evosphere BIO is designed for those compounds that are larger than 2000Da and require a large pore diameter in order to have access to the stationary phase for accurate adsorption/desorption mechanisms.

Evosphere BIO

When analysing complex samples Evosphere minimises band dispersion due to its monodisperse nature, this has been shown to provide peak widths half of other commercial columns, leading to better resolution, better peak height and better sensitivity of low abundance peptides and proteins.

Evosphere C18/AR adds a new dimension to selectivity for these species.



1 .7µ Evosphere 150x75µm
p/n : C075-150-01-EVO18AR

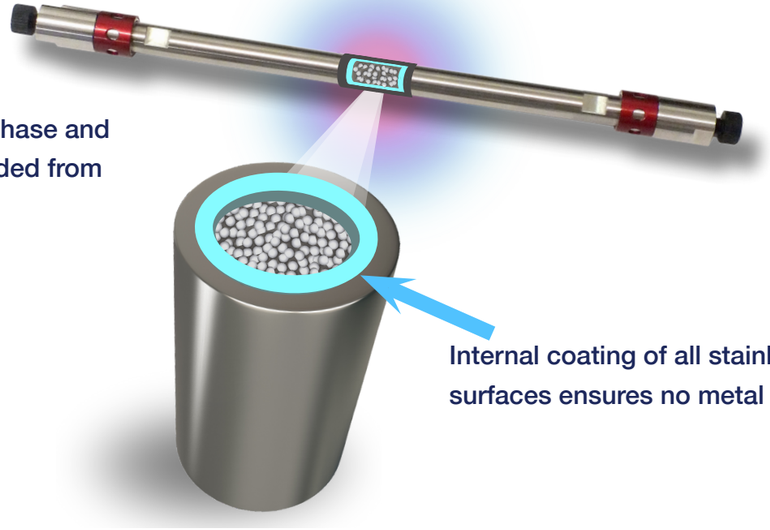
A: 0.1% formic acid
B: ACN
Gradient: 5-35% in 30minutes
Flow: 300nl
Temp: 25°C

Evosphere BIOMAX

300Å Evosphere in Inert column hardware

Many peptides and proteins do not interact well with traditional LC column hardware since it is stainless steel, generally with stainless steel frits holding the stationary phase in place.

BIOMAX columns are passivated with a new bio-inert coating in order to prevent unnecessary interactions with peptides and proteins, allowing for high sensitivity and full recovery of all analytes. Whilst PEEK can be used, PEEK can swell under pressure so is not ideal in the UHPLC methods we wish to design. BIOMAX removes this issue so that 1.7µm particles can be used for the ultimate in sensitivity and resolution.



Silica stationary phase and analytes are shielded from metals

Internal coating of all stainless steel surfaces ensures no metal interactions

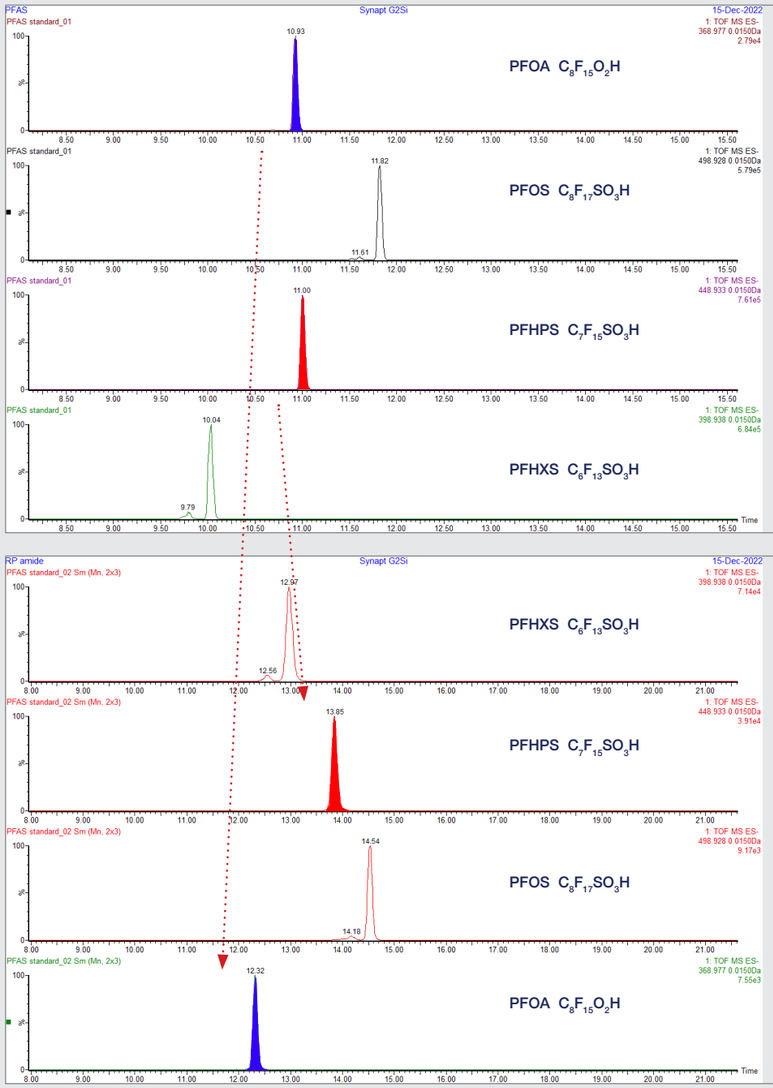
Evosphere BIO physicals

	Particle Size	Surface Area	Pore Size	% C	pH range	USP
Evosphere BIO C12	1.7µm 3µm 5µm	n/a	300Å	5%	1-9	L87
Evosphere BIO Diphenyl	1.7µm 3µm 5µm	n/a	300Å	5%	2-9	L11
Evosphere BIO C4	1.7µm 3µm 5µm	n/a	300Å	3%	2-9	L26
Evosphere BIO C18/AR	1.7µm 3µm 5µm	n/a	300Å	7%	2-9	L1

APPLICATIONS

EVOSPHERE

PFAS - PERFLUOROALKYL SUBSTANCES

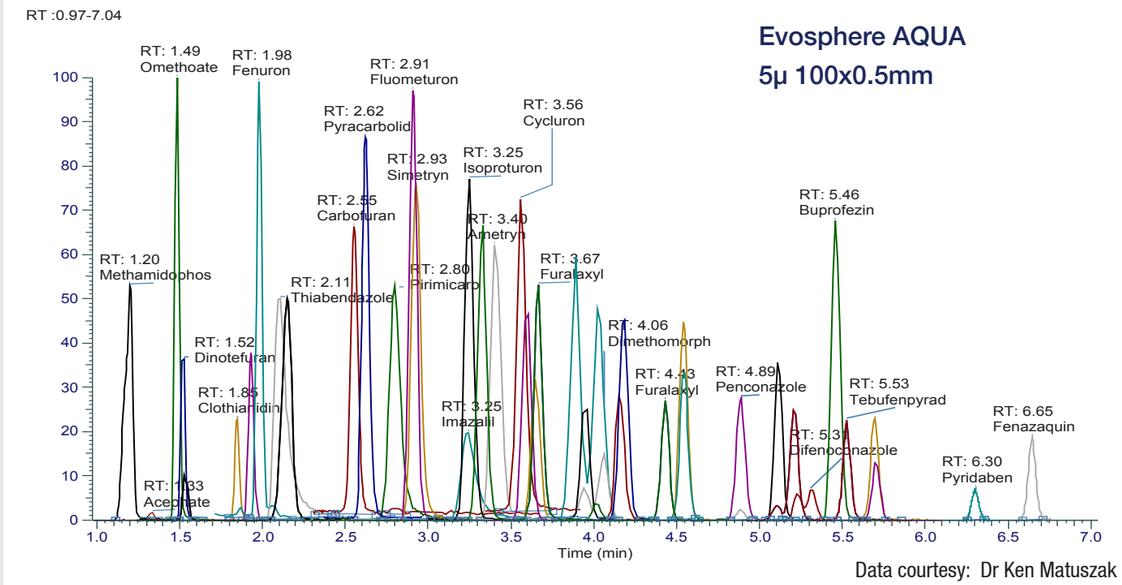


Evosphere C18/AR
1.7µm 100x2.1mm

Evosphere RP18-Amide
1.7µm 100x2.1mm

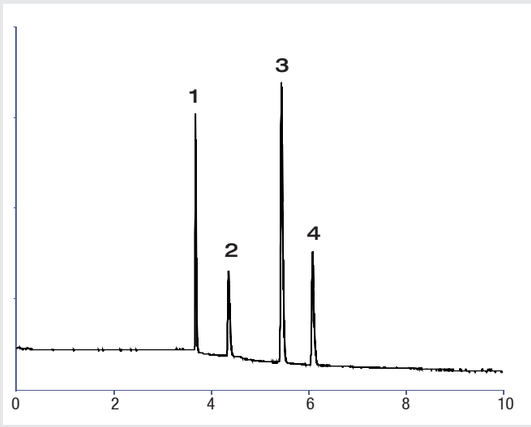
A: 95:5 Water+2mm ammonium acetate: MeOH B: MeOH+ 2mm ammonium acetate Flow 0.3ml/min Temp 35°C MS ESI-

43 PESTICIDES



Data courtesy: Dr Ken Matuszak

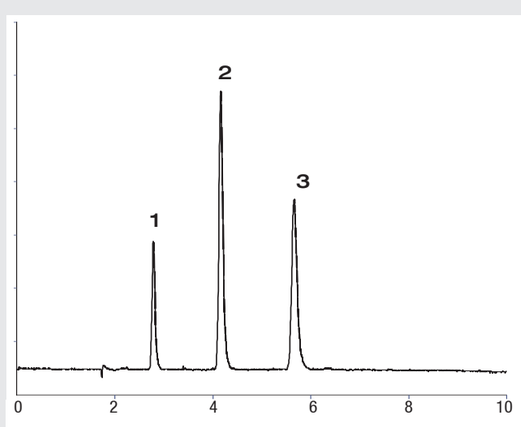
CATECHOLAMINES



Column: 3µm Evosphere AQUA 150x4.6mm
Mobile Phase: A - 0.1% formic acid
B - 0.1% formic acid in ACN
0-70% B in 10mins
Temp: 20°C
Wavelength : 270nm

1. Dopamine
2. Serotonin
3. DOPAC
4. 5-HIAA

XANTHINE DERIVATIVES



Column: 5µm Evosphere C12 150x4.6mm

Mobile Phase: 70:30 0.1% formic acid in Water : MeOH

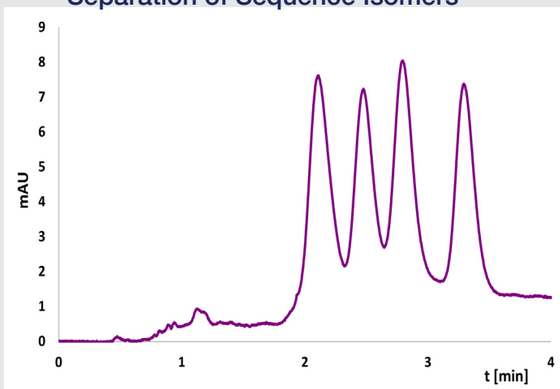
Flow: 1.0ml/min
Wavelength : 254nm
1. Theobromine
2. Theophylline
3. Caffeine

APPLICATIONS

EVOSPHERE

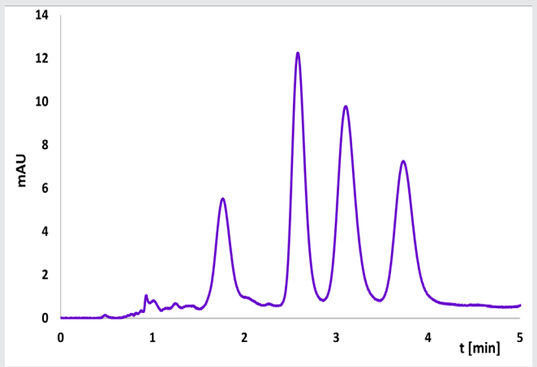
OLIGONUCLEOTIDE WITHOUT ION PAIR REAGENT

Separation of Sequence Isomers



1 - ATCGATCGATCGATCGATC**G**
2 - ATCGATCGATCGATCGATC**T**
3 - ATCGATCGATCGATCGATC**C**
4 - ATCGATCGATCGATCGATC**A**

1.7µ Evosphere C18/AR 100x2.1mm
25mM Ammonium acetate pH=6 12-20% MeOH in 10min Temp: 60°C

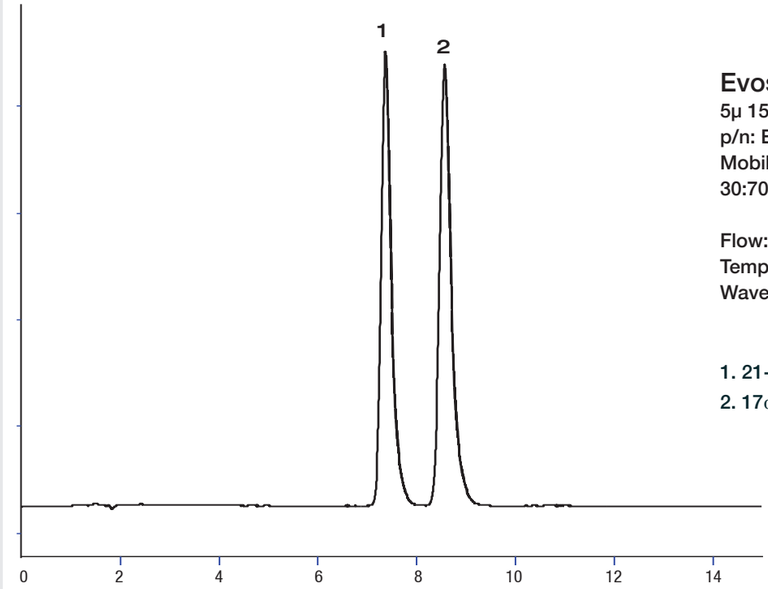


1 - ATCGATCGA**A**CGATCGATCG
2 - ATCGATCGAT**A**GATCGATCG
3 - ATCGATCGATCGATCGA**A**CG
4 - ATCGATCGATCGATCGATC**A**

1.7µ Evosphere C18/AR 100x2.1mm
25mM Ammonium acetate pH=6 12-20% MeOH in 10min Temp: 60°C

Data courtesy: Dr Sylwia Kowalska and Szymon Bocian

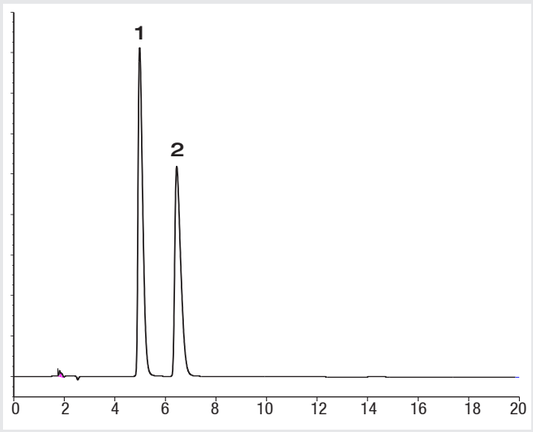
ISOMERIC PROGESTERONES



Evosphere C18/PFP
5µ 150x4.6mm
p/n: EVO18FP-050705
Mobile phase:
30:70 A: 0.1% formic acid in water
B: MeOH
Flow: 1.0ml/min
Temp: 20°C
Wavelength: 254nm

1. 21-Hydroxyprogesterone
2. 17α-Hydroxyprogesterone

ANTIARRHYTHMIC DRUGS

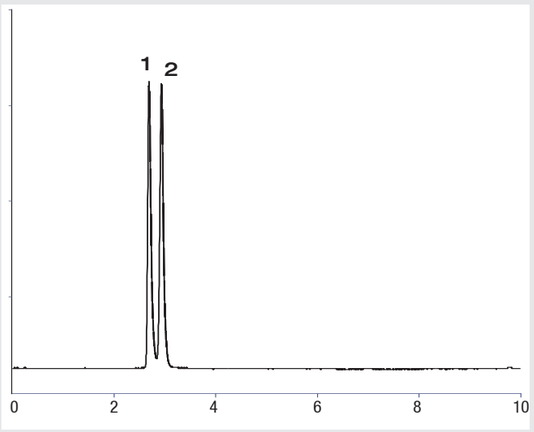


Column: 5µm Evosphere C18/AR 150x4.6mm

Mobile Phase: 70:30 0.1% formic acid in Water : MeOH
Flow: 1.0ml/min
Temp: 25°C
Wavelength : 235nm

1. Quinidine
2. Hydroquinidine

ISOMERIC ACIDS

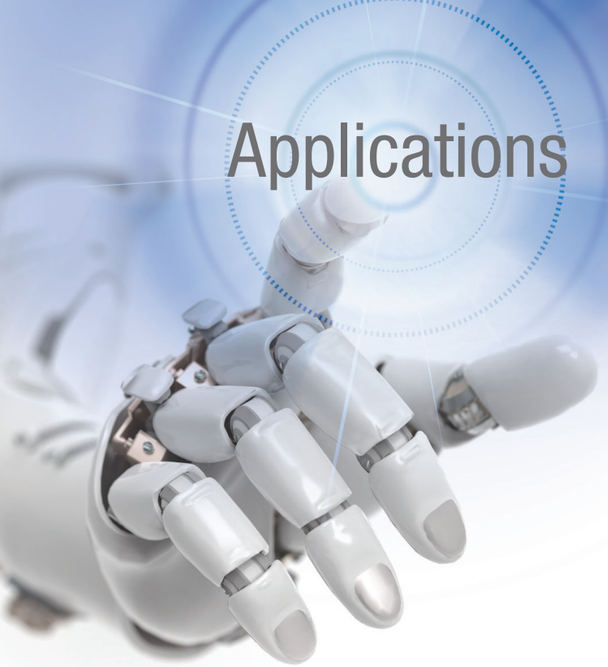


Column: 5µm Evosphere AQUA 150x4.6mm

Mobile Phase: 0.1% formic acid in Water
Flow: 1.0ml/min
Temp: 20°C
Wavelength : 254nm

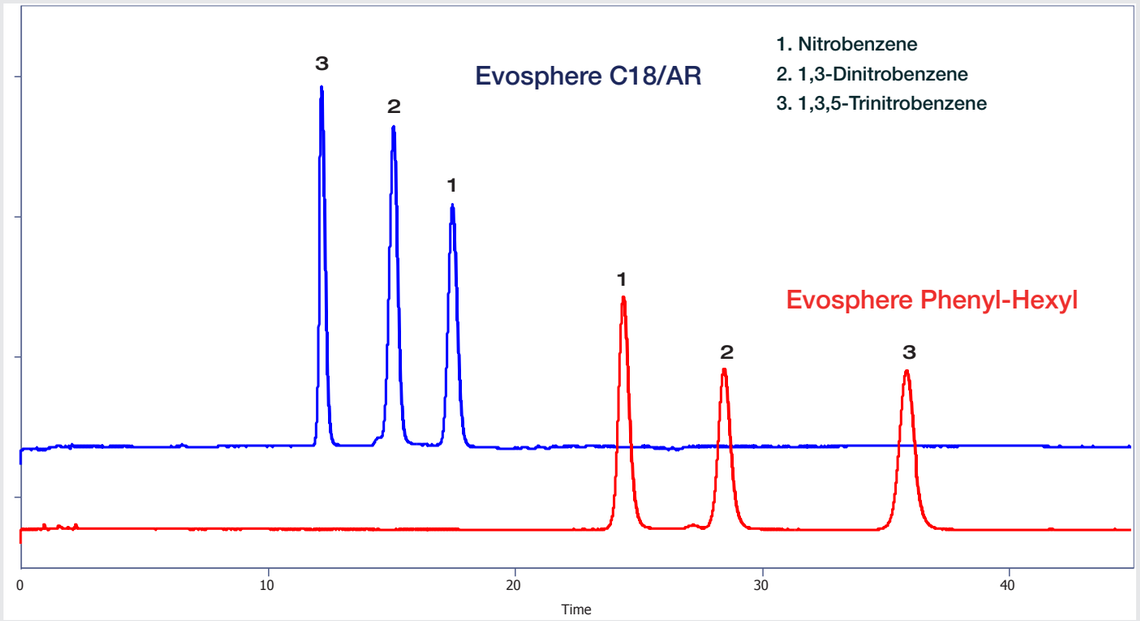
1. Isoascorbic acid
2. Ascorbic acid

Applications

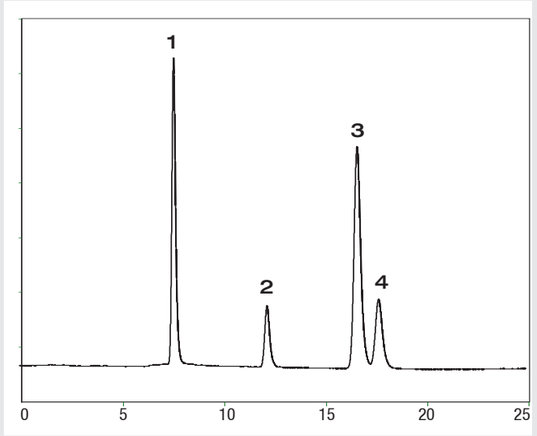


EVOSPHERE

SELECTIVITY COMPARISON - EXPLOSIVES



HALOGENATED POSITIONAL ISOMERS

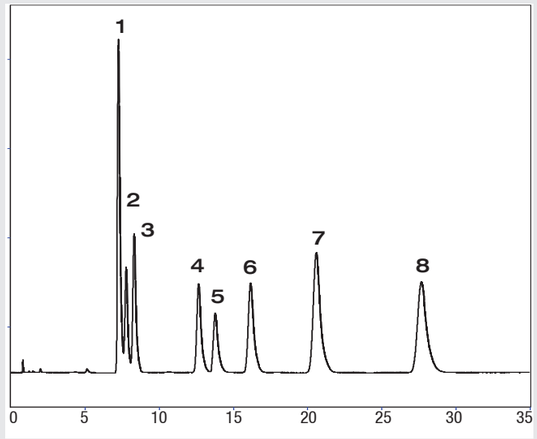


Column: 5µm Evosphere C18/PFP 150x4.6mm

Mobile Phase: 50:50 Water:MeOH
Flow: 1.0ml/min
Temp: 20°C
Wavelength: 254nm

1. Acetophenone
2. 2-Chloroacetophenone
3. 4-Chloroacetophenone
4. 3-Chloroacetophenone

SUBSTITUTED BENZENES

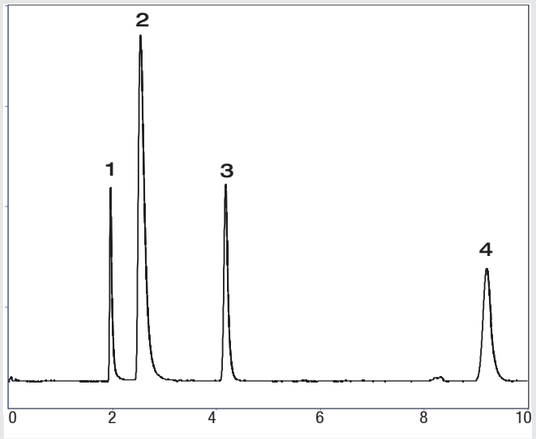


Column: 5µm Evosphere C18/PFP 150x4.6mm

Mobile Phase: 50:50 Water:MeOH
Flow: 1.0ml/min
Temp: 20°C
Wavelength: 210nm

1. 1,2,3-Trimethoxybenzene
2. 1,2-Dimethoxybenzene
3. 1,2,4-Trimethoxybenzene
4. 1,4-Dimethoxybenzene
5. Anisole
6. 1,3-Dimethoxybenzene
7. 1,3,5-Trimethoxybenzene
8. Toluene

NUCLEOSIDES

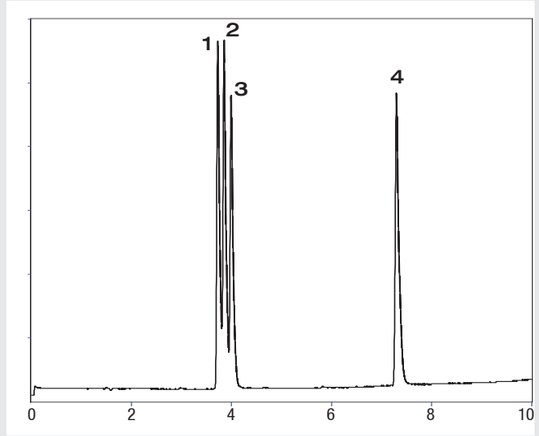


Column: 3µm Evosphere AQUA 150x4.6mm

Mobile Phase: 98:2 25mM NH4OAc : ACN
Flow:1.0ml/min
Temp: 20°C
Wavelength : 254nm

1. Uracil
2. Uridine
3. Cytosine
4. Guanosine

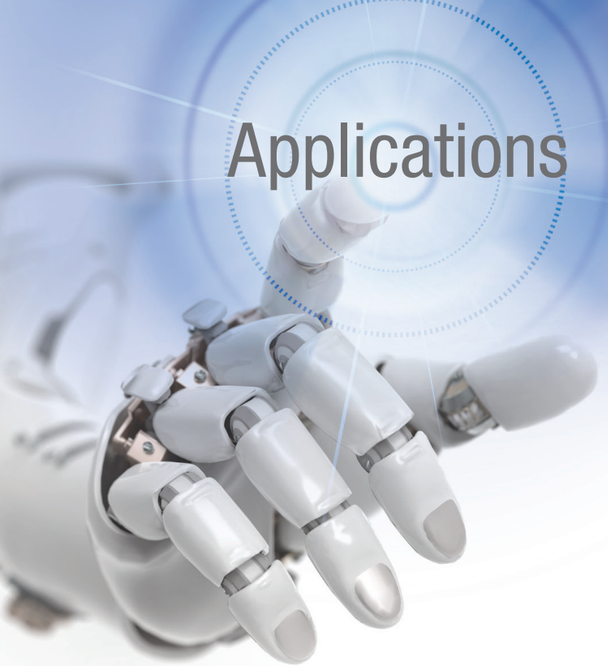
STEROIDS



Column: 3µm Evosphere AQUA 150x4.6mm

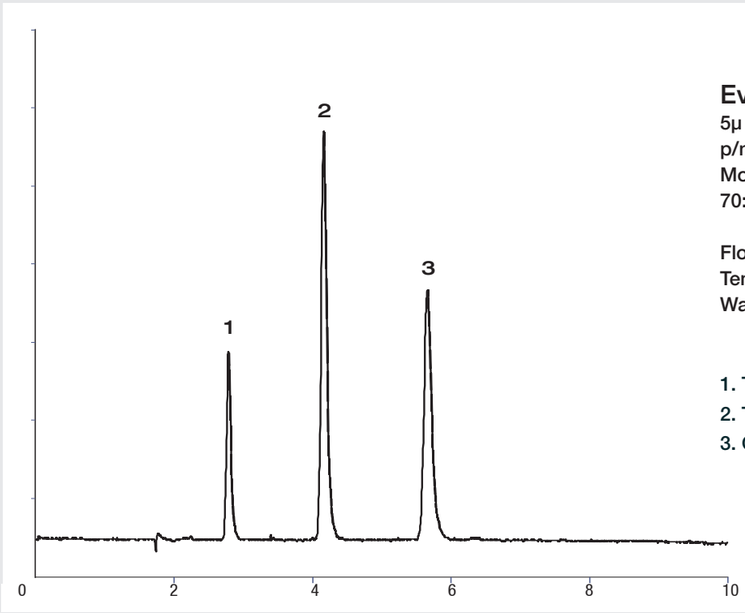
Mobile Phase: 30-100%B in 10mins
A: 0.1% Formic acid in Water
B: 0.1% Formic acid in ACN
Flow: 1.0ml/min
Wavelength : 254nm
1. Prednisolone
2. Prednisone
3. Cortisone
4. 17α Hydroxyprogesterone

Applications



EVOSPHERE

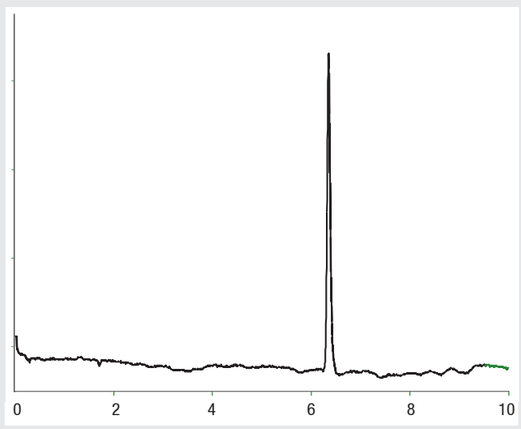
XANTHINE DERIVATIVES



Evosphere C12
5µ 150x4.6mm
p/n: EVO12-050705
Mobile phase:
70:30 A: 0.1% formic acid in water
B: MeOH
Flow: 1.0ml/min
Temp: 20°C
Wavelength: 254nm

1. Theobromine
2. Theophylline
3. Caffeine

ZEARELENONE

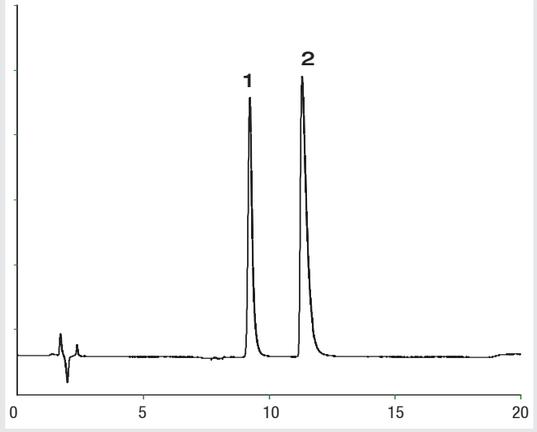


Column: 3µm Evosphere RP18-Amide 150x4.6mm

Mobile Phase: A: 0.1% formic acid
B: ACN
50-80% B in 5mins, hold for 5
Flow: 1.0ml/min
Temp: 20°C
Wavelength: 250nm

1. Zearalenone

ACIDS

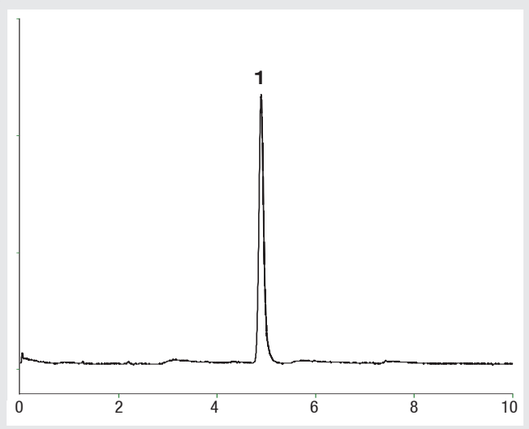


Column: 3µm Evosphere RP18-Amide 150x4.6mm

Mobile Phase: 80:20 20mM KH2PO4 (pH 2.4) : MeCN
Flow: 1.0ml/min
Temp: 20°C
Wavelength: 254nm

1. Benzoic acid
2. Sorbic acid

TRIFLURALIN

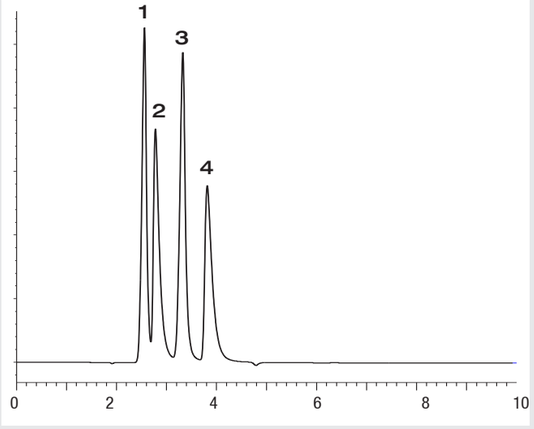


Column: 3µm Evosphere RP18-Amide 150x4.6mm

Mobile Phase: 85:15 MeOH: Water
Flow: 1.2ml/min
Temp: 20°C
Wavelength : 254nm

1. Trifluralin

NICOTINAMIDES



Column: 3µm Evosphere RP18-Amide 150x4.6mm

Mobile Phase: 98:2 0.1% formic acid in Water : MeOH
Flow: 1.0ml/min
Temp: 20°C
Wavelength : 254nm

1. Isonicotinamide
2. Isonicotinic acid
3. Nicotinamide
4. Nicotinic acid

Applications

Compound	Use	Column
1,2 Dimethoxybenzene		Evosphere C18/PFP
1,2,3 Trimethoxybenzene		Evosphere C18/PFP
1,2,4 Dimethoxybenzene		Evosphere C18/PFP
1,3 Dinitrobenzene	Explosives	Evosphere Phenyl-Hexyl
1,3 Dinitrobenzene	Explosives	Evosphere C18/AR
1,3 Dinitrobenzene	Explosives	Evosphere PFP
1,3,5 Dinitrobenzene	Explosives	Evosphere PFP
1,3,5 Dinitrobenzene	Explosives	Evosphere Phenyl-Hexyl
1,3,5 Dinitrobenzene	Explosives	Evosphere C18/AR
1,4 Dimethoxybenzene		Evosphere C18/PFP
17□ Hydroxyprogesterone		Evosphere AQUA
17□-Hydroxyprogesterone	Hormones	Evosphere C18/PFP
1-Nitrosopiperidene	Nitrosamines	Evosphere AQUA
1-Nitrosopyrrolidine	Nitrosamines	Evosphere AQUA
21-Hydroxyprogesterone	Hormones	Evosphere C18/PFP
2-Acetamidophenol	Method Development	Evosphere C18/PFP
2-Aminophenol	Amino Acids	Evosphere C18/AR
2-Aminophenol	Amino Acids	Evosphere C18/AR
2-Chloroacetophenone		Evosphere C18/PFP
2-Hydroxybenzoic acid	Method Development	Evosphere C18/PFP
2-Hydroxyestradiol	Steroids	Evosphere C18/AR
2-Nitrophenol	Method Development	Evosphere C18/PFP
3,4-Dihydroxyphenyl acetic acid	Amino Acids	Evosphere C18/AR
3-Chloroacetophenone		Evosphere C18/PFP
3-methoxycatecol		Evosphere AQUA
3-Methoxy-p-Tyramine	Amino Acids	Evosphere C18/AR
3-methyl-4-nitrobenzoic acid		Evosphere PFP
3-Methylindole	Amino Acids	Evosphere C18/AR
4-Chloracetanilide	Method Development	Evosphere C18/PFP
4-Chloroacetophenone		Evosphere C18/PFP
4-Hydroxybenzoic acid	Method Development	Evosphere C18/PFP
4-Hydroxyestradiol	Steroids	Evosphere C18/AR
4-methylcatechol		Evosphere AQUA
4-nitrocatechol		Evosphere AQUA
4-Nitrophenol	Method Development	Evosphere C18/PFP
5-Aminopentanoic acid	Metabolomics	Evosphere C18/PFP
5-HIAA	Catecholamines	Evosphere AQUA
5-Hydroxy Tryptophan	Amino Acids	Evosphere C18/AR
5-Methoxytryptaphol	Amino Acids	Evosphere C18/AR
Acetaminophen		Evosphere PFP
Acetaminophen	Flu Relief	Evosphere AQUA
Acetaminophen	Pain relief	Evosphere AQUA
Acetophenone	Phenones	Evosphere AQUA
Acetophenone		Evosphere C18/PFP
Acetyl choline	Amino Acids	Evosphere C18/AR
Acetyl-Carnitine	Metabolomics	Evosphere C18/PFP
Aflatoxin B1	Mycotoxins	Evosphere AQUA
Aflatoxin B2	Mycotoxins	Evosphere AQUA
Aflatoxin G1	Mycotoxins	Evosphere AQUA
Aflatoxin G2	Mycotoxins	Evosphere AQUA
Amitriptyline Hydrochloride	Antidepressants	Evosphere Phenyl-Hexyl
Amitriptyline Hydrochloride	Antidepressants	Evosphere C18/AR
Ascorbic acid	Vitamins	Evosphere AQUA
Aspirin	Method Development	Evosphere C18/PFP
Atorvastatin	High Blood Pressure	Evosphere AQUA
Bendroflumethiazide	Diuretic	Evosphere AQUA
Benfluralin	Herbicide	Evosphere AQUA
Benzene sulphonic acid		Evosphere C18/PFP
Benzoic acid	Preservatives in food	Evosphere RP18-Amide
Benzophenone	Phenones	Evosphere AQUA
Benzyl alcohol		Evosphere C18/PFP
Benzyl alcohol		Evosphere PFP
Benzyl butyl phthalate	Plasticizers	Evosphere AQUA
Bis(2-ethylhexyl) adipate	Plasticizers	Evosphere AQUA
Bis(2-ethylhexyl) phthalate	Plasticizers	Evosphere AQUA
Butyrophenone	Phenones	Evosphere AQUA
Caffeine	Flu Relief	Evosphere AQUA
Caffeine	Stimulants	Evosphere C12
Caffeine	Stimulants	Evosphere C18/AR
Caffeine	Method Development	Evosphere C18/PFP
Cefaclor		Evosphere Diphenyl
Cefadroxil		Evosphere Diphenyl
Cefradine		Evosphere Diphenyl
Cephalexin		Evosphere Diphenyl
Chloramphenicol	Eye antibiotic	Evosphere AQUA
Cholesterol Esters	Lipidomics	Evosphere C12
Clomipramine Hydrochloride	Antidepressants	Evosphere Phenyl-Hexyl
Clomipramine Hydrochloride	Antidepressants	Evosphere C18/AR
Co-codamol	Pain relief	Evosphere AQUA
Cortisone	Steroid	Evosphere AQUA
Cortisone	Steroid	Evosphere AQUA
Cytosine	Nucleosides	Evosphere AQUA
Diazepam	Anti anxiety	Evosphere C12
Diazepam	Anti anxiety	Evosphere C18/AR
Dibutyl phthalate	Plasticizers	Evosphere AQUA
DOPAC	Catecholamines	Evosphere AQUA
Dopamine	Catecholamines	Evosphere AQUA
Dopamine	Amino Acids	Evosphere C18/AR
Doxepin	Antidepressants	Evosphere RP18-Amide
Folic Acid	Vitamin	Evosphere AQUA
Furazolidone	Antibacterials	Evosphere RP18-Amide
GABA	Amino Acids	Evosphere C18/AR
Guanosine	Nucleosides	Evosphere AQUA
Hydroquinidine	Irregular heartbeat treatment	Evosphere Phenyl-Hexyl
Hydroquinidine	Irregular heartbeat treatment	Evosphere C18/AR
Hydroquinidine	Method Development	Evosphere C18/PFP
Ibuprofen	Anti-inflammitory painkillers	Evosphere Phenyl-Hexyl
Ibuprofen	Anti-inflammitory painkillers	Evosphere PFP
Ibuprofen	Anti-inflammitory painkillers	Evosphere Diphenyl
Imipramine	Antidepressants	Evosphere RP18-Amide
Imipramine Hydrochloride	Antidepressants	Evosphere Phenyl-Hexyl
Imipramine Hydrochloride	Antidepressants	Evosphere C18/AR
Indole-3-Carboxylic Acid	Amino Acids	Evosphere C18/AR

Applications

Indomethacin	Anti-inflammitory painkillers	Evosphere Phenyl-Hexyl
Indomethacin	Anti-inflammitory painkillers	Evosphere PFP
Indomethacin	Anti-inflammitory painkillers	Evosphere Diphenyl
Inole-3-Acetamide	Amino Acids	Evosphere C18/AR
Iso-ascorbic acid	Vitamins	Evosphere AQUA
Isoleucine	Metabolomics	Evosphere C18/PFP
Iso-leucine	Amino Acids	Evosphere C18/AR
Isonicotinamide	Vitamins	Evosphere RP18-Amide
Isonicotinic acid	Vitamins	Evosphere RP18-Amide
Kynurenic Acid	Amino Acids	Evosphere C18/AR
Leucine	Metabolomics	Evosphere C18/PFP
Lorazepam	Anti anxiety	Evosphere C12
Lorazepam	Anti anxiety	Evosphere C18/AR
L-Phenylalanine	Amino Acids	Evosphere C18/AR
Lyso-PC	Lipidomics	Evosphere C12
Melatonin	Amino Acids	Evosphere C18/AR
Methionine	Amino Acids	Evosphere C18/AR
Mianserin Hydrochloride	Antidepressants	Evosphere Phenyl-Hexyl
Mianserin Hydrochloride	Antidepressants	Evosphere C18/AR
N-acetyl Tyrosine EE	Amino Acids	Evosphere C18/AR
N-Acetyl-4-Hydroxytryptamine	Amino Acids	Evosphere C18/AR
N-actyl Tryptophan EE	Amino Acids	Evosphere C18/AR
Nalidixic acid	Antibacterials	Evosphere RP18-Amide
Nicotinamide	Vitamins	Evosphere RP18-Amide
Nicotinic acid	Vitamins	Evosphere RP18-Amide
Nicotinic Acid	Amino Acids	Evosphere C18/AR
Nitrobenzene	Explosives	Evosphere Phenyl-Hexyl
Nitrobenzene	Explosives	Evosphere C18/AR
Nitrobenzene	Explosives	Evosphere PFP
N-Nitrosodibutylamine	Nitrosamines	Evosphere AQUA
N-Nitrosodiethylamine	Nitrosamines	Evosphere AQUA
N-Nitrosodimethylamine	Nitrosamines	Evosphere AQUA
N-Nitrosodi-n-propylamine	Nitrosamines	Evosphere AQUA
N-Nitrosomethylethylamine	Nitrosamines	Evosphere AQUA
Norepinephrine	Amino Acids	Evosphere C18/AR
Nortriptyline	Antidepressants	Evosphere RP18-Amide
Oligonucleotide	Oligonucleotide	Evosphere C18/AR
Paracetamol	Method Development	Evosphere C18/PFP
Patulin	Mycotoxin in molds	Evosphere AQUA
PFHPS	PFAS	Evosphere C18/AR
PFHPS	PFAS	Evosphere RP18-Amide
PFHXS	PFAS	Evosphere C18/AR
PFHXS	PFAS	Evosphere RP18-Amide
PFOA	PFAS	Evosphere C18/AR
PFOA	PFAS	Evosphere RP18-Amide
PFOS	PFAS	Evosphere C18/AR
PFOS	PFAS	Evosphere RP18-Amide
Phenol		Evosphere C18/PFP
Phenol	Method Development	Evosphere C18/PFP
Phenylalanine	Metabolomics	Evosphere C18/PFP
Phenylephrine	Flu Relief	Evosphere AQUA
Phospholipids	Lipidomics	Evosphere C12
Prednisolone		Evosphere AQUA
Prednisolone		Evosphere AQUA
Prednisone		Evosphere AQUA
Prednisone		Evosphere AQUA
Propiophenone	Phenones	Evosphere AQUA
Quinidine	Irregular heartbeat treatment	Evosphere Phenyl-Hexyl
Quinidine	Irregular heartbeat treatment	Evosphere C18/AR
Quinolinic Acid	Amino Acids	Evosphere C18/AR
Quinolinic Acid	Amino Acids	Evosphere C18/AR
Resorcinol		Evosphere AQUA
Serotonin	Catecholamines	Evosphere AQUA
Serotonin	Amino Acids	Evosphere C18/AR
Sorbic acid	Preservatives in food	Evosphere RP18-Amide
Sulfamerazine		Evosphere RP18-Amide
Sulfamerazine		Evosphere C12
Sulfamethoxazole		Evosphere RP18-Amide
Sulfamethoxazole		Evosphere C12
Sulfathiazole		Evosphere RP18-Amide
Sulfathiazole		Evosphere C12
Temazepam	Anti anxiety	Evosphere C12
Temazepam	Anti anxiety	Evosphere C18/AR
Theobromine	Stimulants	Evosphere C12
Theobromine	Stimulants	Evosphere C18/AR
Theobromine	Method Development	Evosphere C18/PFP
Theophylline	Stimulants	Evosphere C12
Theophylline	Stimulants	Evosphere C18/AR
Theophylline	Method Development	Evosphere C18/PFP
Trifluralin	Herbicide	Evosphere C18/PFP
Trifluralin	Herbicide	Evosphere RP18-Amide
Triglycerides	Lipidomics	Evosphere C12
Trimipramine	Antidepressants	Evosphere RP18-Amide
Tryptanthrin	Amino Acids	Evosphere C18/AR
Tryptophan	Amino Acids	Evosphere C18/AR
Tryptophan Ethyl Ester	Amino Acids	Evosphere C18/AR
Tryptophan ME	Amino Acids	Evosphere C18/AR
Tryptophan Methyl Ester	Amino Acids	Evosphere C18/AR
Tyramine	Amino Acids	Evosphere C18/AR
Tyrosine	Metabolomics	Evosphere C18/PFP
Uracil	Nucleosides	Evosphere AQUA
Uridine	Nucleosides	Evosphere AQUA
Valine	Metabolomics	Evosphere C18/PFP
Zearalenone	Mycotoxin in molds	Evosphere RP18-Amide
Zearalenone	Mycotoxin in molds	Evosphere C18/PFP

Capillaries & Scaling to Prep

Evosphere capillaries are available in 75µm, 150µm, 0.5mm, 1mm i.d. with any phase chemistry and any particle size from the Evosphere range. Request a quote from your local distributor.

Evosphere Prep

- **10mm, 21.2mm and 30mm**
- **High Loadability**
- **Optimised Packing Efficiency**
- **Narrow peak profile, High Efficiency and Resolution**

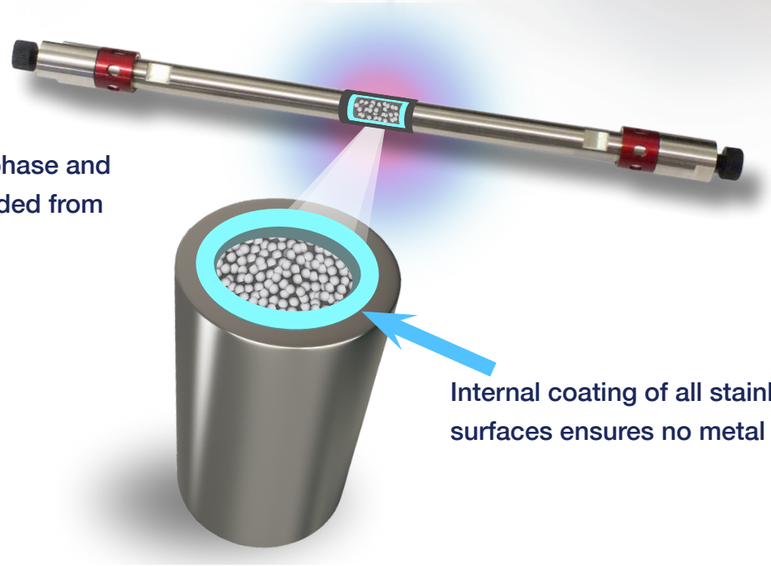
Evosphere Prep columns are designed for high sample loading, high throughput applications. The optimised packed bed (OPB) process ensures excellent peak shapes and efficiency, whilst the lifetime of the column is increased.

MAX Hardware

Inert Column Hardware Design

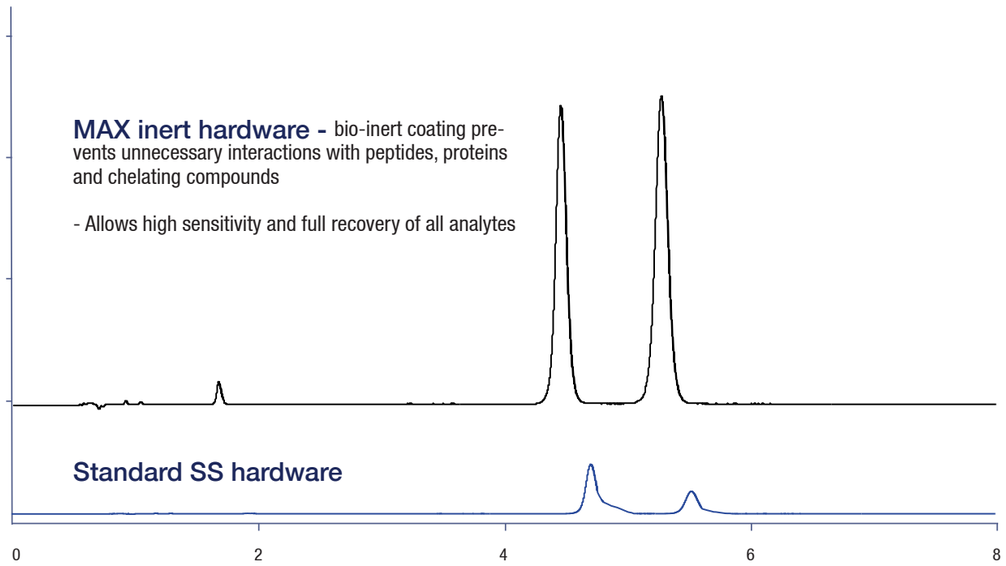
Many peptides and proteins do not interact well with traditional LC column hardware since it is stainless steel,generally with stainless steel frits holding the stationary phase in place.

MAX columns are passivated with a new bio-inert coating in order to prevent unnecessary interactions with peptides and proteins, allowing for high sensitivity and full recovery of all analytes. Whilst PEEK can be used, PEEK can also swell under pressure so is not ideal in the UHPLC methods we wish to design. MAX removes this issue so that small 1.7um particles can be used for the ultimate in sensitivity and resolution.



Silica stationary phase and analytes are shielded from metals

Internal coating of all stainless steel surfaces ensures no metal interactions



1.7µm EVOSPHERE® part numbers

1.7µm EVOSPHERE C12		Column Length			
		30	50	100	150
Column Diameter	2.1	EV012-020201	EV012-020301	EV012-020501	EV012-020701
	3.0	EV012-030201	EV012-030301	EV012-030501	EV012-030701
	4.6	EV012-050201	EV012-050301	EV012-050501	EV012-050701

1.7µm EVOSPHERE C18/AR		Column Length			
		30	50	100	150
Column Diameter	2.1	EV018AR-020201	EV018AR-020301	EV018AR-020501	EV018AR-020701
	3.0	EV018AR-030201	EV018AR-030301	EV018AR-030501	EV018AR-030701
	4.6	EV018AR-050201	EV018AR-050301	EV018AR-050501	EV018AR-050701

1.7µm EVOSPHERE C18/PFP		Column Length			
		30	50	100	150
Column Diameter	2.1	EV018FP-020201	EV018FP-020301	EV018FP-020501	EV018FP-020701
	3.0	EV018FP-030201	EV018FP-030301	EV018FP-030501	EV018FP-030701
	4.6	EV018FP-050201	EV018FP-050301	EV018FP-050501	EV018FP-050701

1.7µm EVOSPHERE RP18-AMIDE		Column Length			
		30	50	100	150
Column Diameter	2.1	EVORP18-020201	EVORP18-020301	EVORP18-020501	EVORP18-020701
	3.0	EVORP18-030201	EVORP18-030301	EVORP18-030501	EVORP18-030701
	4.6	EVORP18-050201	EVORP18-050301	EVORP18-050501	EVORP18-050701

1.7µm EVOSPHERE PHENYL-HEXYL		Column Length			
		30	50	100	150
Column Diameter	2.1	EVOHEX-020201	EVOHEX-020301	EVOHEX-020501	EVOHEX-020701
	3.0	EVOHEX-030201	EVOHEX-030301	EVOHEX-030501	EVOHEX-030701
	4.6	EVOHEX-050201	EVOHEX-050301	EVOHEX-050501	EVOHEX-050701

1.7µm EVOSPHERE DIPHENYL		Column Length			
		30	50	100	150
Column Diameter	2.1	EVOPH-020201	EVOPH-020301	EVOPH-020501	EVOPH-020701
	3.0	EVOPH-030201	EVOPH-030301	EVOPH-030501	EVOPH-030701
	4.6	EVOPH-050201	EVOPH-050301	EVOPH-050501	EVOPH-050701

1.7µm EVOSPHERE PFP		Column Length			
		30	50	100	150
Column Diameter	2.1	EVOPFP-020201	EVOPFP-020301	EVOPFP-020501	EVOPFP-020701
	3.0	EVOPFP-030201	EVOPFP-030301	EVOPFP-030501	EVOPFP-030701
	4.6	EVOPFP-050201	EVOPFP-050301	EVOPFP-050501	EVOPFP-050701

1.7µm EVOSPHERE AQUA		Column Length			
		30	50	100	150
Column Diameter	2.1	EVOAQ-020201	EVOAQ-020301	EVOAQ-020501	EVOAQ-020701
	3.0	EVOAQ-030201	EVOAQ-030301	EVOAQ-030501	EVOAQ-030701
	4.6	EVOAQ-050201	EVOAQ-050301	EVOAQ-050501	EVOAQ-050701

Evosphere Sample Filters

- **Low volume in-line filter for all core-shell/UHPLC columns**
- **Increase lifetime of columns**
- **Change over time seconds not minutes**
- **Pressure rated to 1000bar**

High pressure In-line Filters	
UHPSAV2	UHPLC In-line filter pk 2
UHPSAV4	UHPLC In-line filter pk 4
UHPSAV2-w	UHPLC In-line filter pk 2 Acquity® Compatible
UHPSAV4-w	UHPLC In-line filter pk 4 Acquity® Compatible

3µm EVOSPHERE® part numbers

3µm EVOSPHERE C12		Column Length			
		30	50	100	150
Column Diameter	2.1	EV012-020203	EV012-020303	EV012-020503	EV012-020703
	3.0	EV012-030203	EV012-030303	EV012-030503	EV012-030703
	4.6	EV012-050203	EV012-050303	EV012-050503	EV012-050703

3µm EVOSPHERE C18/AR		Column Length			
		30	50	100	150
Column Diameter	2.1	EV018AR-020203	EV018AR-020303	EV018AR-020503	EV018AR-020703
	3.0	EV018AR-030203	EV018AR-030303	EV018AR-030503	EV018AR-030703
	4.6	EV018AR-050203	EV018AR-050303	EV018AR-050503	EV018AR-050703

3µm EVOSPHERE C18/PFP		Column Length			
		30	50	100	150
Column Diameter	2.1	EV018FP-020203	EV018FP-020303	EV018FP-020503	EV018FP-020703
	3.0	EV018FP-030203	EV018FP-030303	EV018FP-030503	EV018FP-030703
	4.6	EV018FP-050203	EV018FP-050303	EV018FP-050503	EV018FP-050703

3µm EVOSPHERE RP18-AMIDE		Column Length			
		30	50	100	150
Column Diameter	2.1	EVORP18-020203	EVORP18-020303	EVORP18-020503	EVORP18-020703
	3.0	EVORP18-030203	EVORP18-030303	EVORP18-030503	EVORP18-030703
	4.6	EVORP18-050203	EVORP18-050303	EVORP18-050503	EVORP18-050703

3µm EVOSPHERE PHENYL-HEXYL		Column Length			
		30	50	100	150
Column Diameter	2.1	EVOHEX-020203	EVOHEX-020303	EVOHEX-020503	EVOHEX-020703
	3.0	EVOHEX-030203	EVOHEX-030303	EVOHEX-030503	EVOHEX-030703
	4.6	EVOHEX-050203	EVOHEX-050303	EVOHEX-050503	EVOHEX-050703

3µm EVOSPHERE DIPHENYL		Column Length			
		30	50	100	150
Column Diameter	2.1	EVOPH-020203	EVOPH-020303	EVOPH-020503	EVOPH-020703
	3.0	EVOPH-030203	EVOPH-030303	EVOPH-030503	EVOPH-030703
	4.6	EVOPH-050203	EVOPH-050303	EVOPH-050503	EVOPH-050703

3µm EVOSPHERE PFP		Column Length			
		30	50	100	150
Column Diameter	2.1	EVOPFP-020203	EVOPFP-020303	EVOPFP-020503	EVOPFP-020703
	3.0	EVOPFP-030203	EVOPFP-030303	EVOPFP-030503	EVOPFP-030703
	4.6	EVOPFP-050203	EVOPFP-050303	EVOPFP-050503	EVOPFP-050703

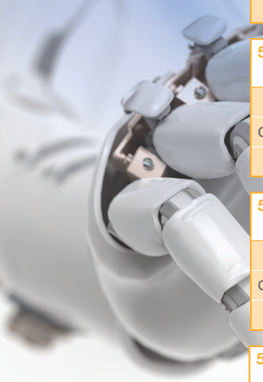
3µm EVOSPHERE AQUA		Column Length			
		30	50	100	150
Column Diameter	2.1	EVOAQ-020203	EVOAQ-020303	EVOAQ-020503	EVOAQ-020703
	3.0	EVOAQ-030203	EVOAQ-030303	EVOAQ-030503	EVOAQ-030703
	4.6	EVOAQ-050203	EVOAQ-050303	EVOAQ-050503	EVOAQ-050703

- **Direct connect guard system for all 3µm and 5µm phases**
- **Quick replacement cartridges**
- **Highly Cost Effective**

3µm Evosphere Guard Cartridges	
DCGUA-1	Guard Cartridge Holder
DCxx-040003G/2	10x4mm Evosphere 3µm Guard pk 2
DCxx-040003G/4	10x4mm Evosphere 3µm Guard pk 4
DCxx-020003G/2	10x2mm Evosphere 3µm Guard pk 2
DCxx-020003G/4	10x2mm Evosphere 3µm Guard pk 4

Replace xx 12 for Evosphere C12 EPH for Evosphere Diphenyl AQ for Evosphere AQUA HEX for Evosphere Phenyl-Hexyl
PFP for Evosphere PFP RP18 for Evosphere RP18-Amide 18AR for Evosphere C18/AR 18FP for Evosphere C18/PFP

5µm EVOSPHERE® part numbers



5µm EVOSPHERE C12		Column Length			
		30	50	100	150
Column Diameter	2.1	EV012-020205	EV012-020305	EV012-020505	EV012-020705
	3.0	EV012-030205	EV012-030305	EV012-030505	EV012-030705
	4.6	EV012-050205	EV012-050305	EV012-050505	EV012-050705

5µm EVOSPHERE C18/AR		Column Length			
		30	50	100	150
Column Diameter	2.1	EV018AR-020205	EV018AR-020305	EV018AR-020505	EV018AR-020705
	3.0	EV018AR-030205	EV018AR-030305	EV018AR-030505	EV018AR-030705
	4.6	EV018AR-050205	EV018AR-050305	EV018AR-050505	EV018AR-050705

5µm EVOSPHERE C18/PFP		Column Length			
		30	50	100	150
Column Diameter	2.1	EV018FP-020205	EV018FP-020305	EV018FP-020505	EV018FP-020705
	3.0	EV018FP-030205	EV018FP-030305	EV018FP-030505	EV018FP-030705
	4.6	EV018FP-050205	EV018FP-050305	EV018FP-050505	EV018FP-050705

5µm EVOSPHERE RP18-AMIDE		Column Length			
		30	50	100	150
Column Diameter	2.1	EVORP18-020205	EVORP18-020305	EVORP18-020505	EVORP18-020705
	3.0	EVORP18-030205	EVORP18-030305	EVORP18-030505	EVORP18-030705
	4.6	EVORP18-050205	EVORP18-050305	EVORP18-050505	EVORP18-050705

5µm EVOSPHERE PHENYL-HEXYL		Column Length			
		30	50	100	150
Column Diameter	2.1	EVOHEX-020205	EVOHEX-020305	EVOHEX-020505	EVOHEX-020705
	3.0	EVOHEX-030205	EVOHEX-030305	EVOHEX-030505	EVOHEX-030705
	4.6	EVOHEX-050205	EVOHEX-050305	EVOHEX-050505	EVOHEX-050705

5µm EVOSPHERE DIPHENYL		Column Length			
		30	50	100	150
Column Diameter	2.1	EVOPH-020205	EVOPH-020305	EVOPH-020505	EVOPH-020705
	3.0	EVOPH-030205	EVOPH-030305	EVOPH-030505	EVOPH-030705
	4.6	EVOPH-050205	EVOPH-050305	EVOPH-050505	EVOPH-050705

5µm EVOSPHERE PFP		Column Length			
		30	50	100	150
Column Diameter	2.1	EVOPFP-020205	EVOPFP-020305	EVOPFP-020505	EVOPFP-020705
	3.0	EVOPFP-030205	EVOPFP-030305	EVOPFP-030505	EVOPFP-030705
	4.6	EVOPFP-050205	EVOPFP-050305	EVOPFP-050505	EVOPFP-050705

5µm EVOSPHERE AQUA		Column Length			
		30	50	100	150
Column Diameter	2.1	EVOAQ-020205	EVOAQ-020305	EVOAQ-020505	EVOAQ-020705
	3.0	EVOAQ-030205	EVOAQ-030305	EVOAQ-030505	EVOAQ-030705
	4.6	EVOAQ-050205	EVOAQ-050305	EVOAQ-050505	EVOAQ-050705

- **Direct connect guard system for all 3µm and 5µm phases**
- **Quick replacement cartridges**
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5µm Evosphere Guard Cartridges	
DCGUA-1	Guard Cartridge Holder
DCxx-040005G/2	10x4mm Evosphere 5µm Guard pk 2
DCxx-040005G/4	10x4mm Evosphere 5µm Guard pk 4
DCxx-020005G/2	10x2mm Evosphere 5µm Guard pk 2
DCxx-020005G/4	10x2mm Evosphere 5µm Guard pk 4

Replace xx 12 for Evosphere C12 EPH for Evosphere Diphenyl AQ for Evosphere AQUA HEX for Evosphere Phenyl-Hexyl
PFP for Evosphere PFP RP18 for Evosphere RP18-Amide 18AR for Evosphere C18/AR 18FP for Evosphere C18/PFP

EVOSPHERE® BIO part numbers

EVOSPHERE BIO C12		Column Length			
		30	50	100	150
Column Diameter	2.1	EV0312-0202xx	EV0312-0203xx	EV0312-0205xx	EV0312-0207xx
	3.0	EV0312-0302xx	EV0312-0303xx	EV0312-0305xx	EV0312-0307xx
	4.6	EV0312-0502xx	EV0312-0503xx	EV0312-0505xx	EV0312-0507xx

EVOSPHERE BIO DIPHENYL		Column Length			
		30	50	100	150
Column Diameter	2.1	EV03PH-0202xx	EV03PH-0203xx	EV03PH-0205xx	EV03PH-0207xx
	3.0	EV03PH-0302xx	EV03PH-0303xx	EV03PH-0305xx	EV03PH-0307xx
	4.6	EV03PH-0502xx	EV03PH-0503xx	EV03PH-0505xx	EV03PH-0507xx

EVOSPHERE BIO C4		Column Length			
		30	50	100	150
Column Diameter	2.1	EV0304-0202xx	EV0304-0203xx	EV0304-0205xx	EV0304-0207xx
	3.0	EV0304-0302xx	EV0304-0303xx	EV0304-0305xx	EV0304-0307xx
	4.6	EV0304-0502xx	EV0304-0503xx	EV0304-0505xx	EV0304-0507xx

EVOSPHERE BIO C18/AR		Column Length			
		30	50	100	150
Column Diameter	2.1	EV0318AR-0202xx	EV0318AR-0203xx	EV0318AR-0205xx	EV0318AR-0207xx
	3.0	EV0318AR-0302xx	EV0318AR-0303xx	EV0318AR-0305xx	EV0318AR-0307xx
	4.6	EV0318AR-0502xx	EV0318AR-0503xx	EV0318AR-0505xx	EV0318AR-0507xx

Replace xx 05 for 5µm 03 for 3µm 01 for 1.7µm

Evosphere BIOMAX (Inert surface)

EVOSPHERE BIOMAX C12		Column Length			
		30	50	100	150
Column Diameter	2.1	EV0312-0202xx-m	EV0312-0203xx-m	EV0312-0205xx-m	EV0312-0207xx-m
	3.0	EV0312-0302xx-m	EV0312-0303xx-m	EV0312-0305xx-m	EV0312-0307xx-m
	4.6	EV0312-0502xx-m	EV0312-0503xx-m	EV0312-0505xx-m	EV0312-0507xx-m

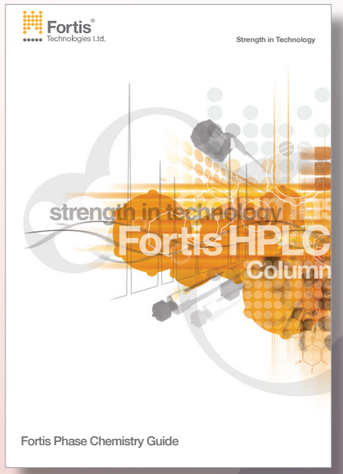
EVOSPHERE BIOMAX DIPHENYL		Column Length			
		30	50	100	150
Column Diameter	2.1	EV03PH-0202xx-m	EV03PH-0203xx-m	EV03PH-0205xx-m	EV03PH-0207xx-m
	3.0	EV03PH-0302xx-m	EV03PH-0303xx-m	EV03PH-0305xx-m	EV03PH-0307xx-m
	4.6	EV03PH-0502xx-m	EV03PH-0503xx-m	EV03PH-0505xx-m	EV03PH-0507xx-m

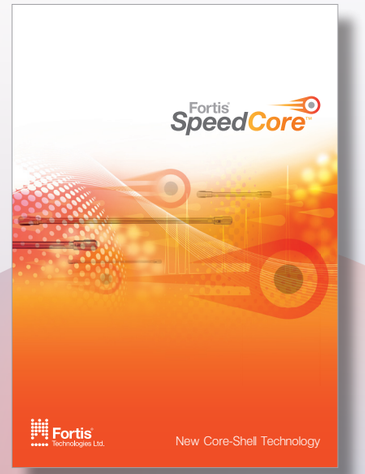
EVOSPHERE BIOMAX C4		Column Length			
		30	50	100	150
Column Diameter	2.1	EV0304-0202xx-m	EV0304-0203xx-m	EV0304-0205xx-m	EV0304-0207xx-m
	3.0	EV0304-0302xx-m	EV0304-0303xx-m	EV0304-0305xx-m	EV0304-0307xx-m
	4.6	EV0304-0502xx-m	EV0304-0503xx-m	EV0304-0505xx-m	EV0304-0507xx-m

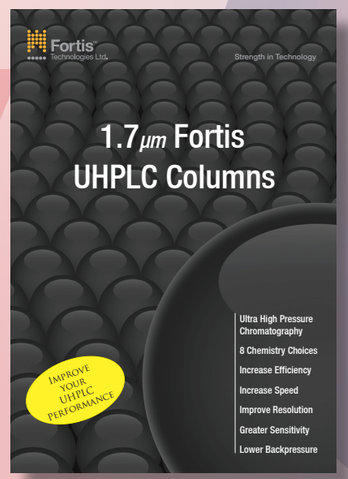
EVOSPHERE BIOMAX C18/AR		Column Length			
		30	50	100	150
Column Diameter	2.1	EV0318AR-0202xx-m	EV0318AR-0203xx-m	EV0318AR-0205xx-m	EV0318AR-0207xx-m
	3.0	EV0318AR-0302xx-m	EV0318AR-0303xx-m	EV0318AR-0305xx-m	EV0318AR-0307xx-m
	4.6	EV0318AR-0502xx-m	EV0318AR-0503xx-m	EV0318AR-0505xx-m	EV0318AR-0507xx-m

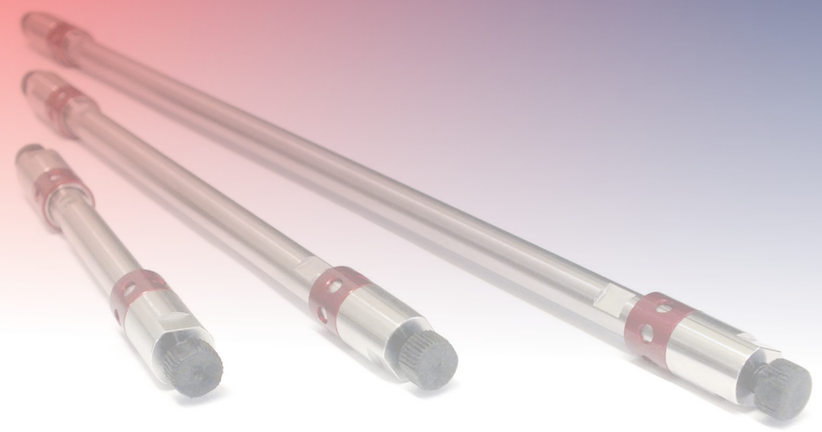
Replace xx 05 for 5µm 03 for 3µm 01 for 1.7µm

Other Product Guides Available



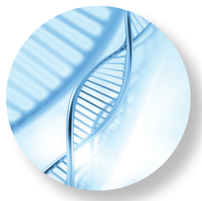
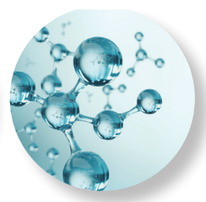






EVOSPHERE

Monodisperse HPLC Columns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