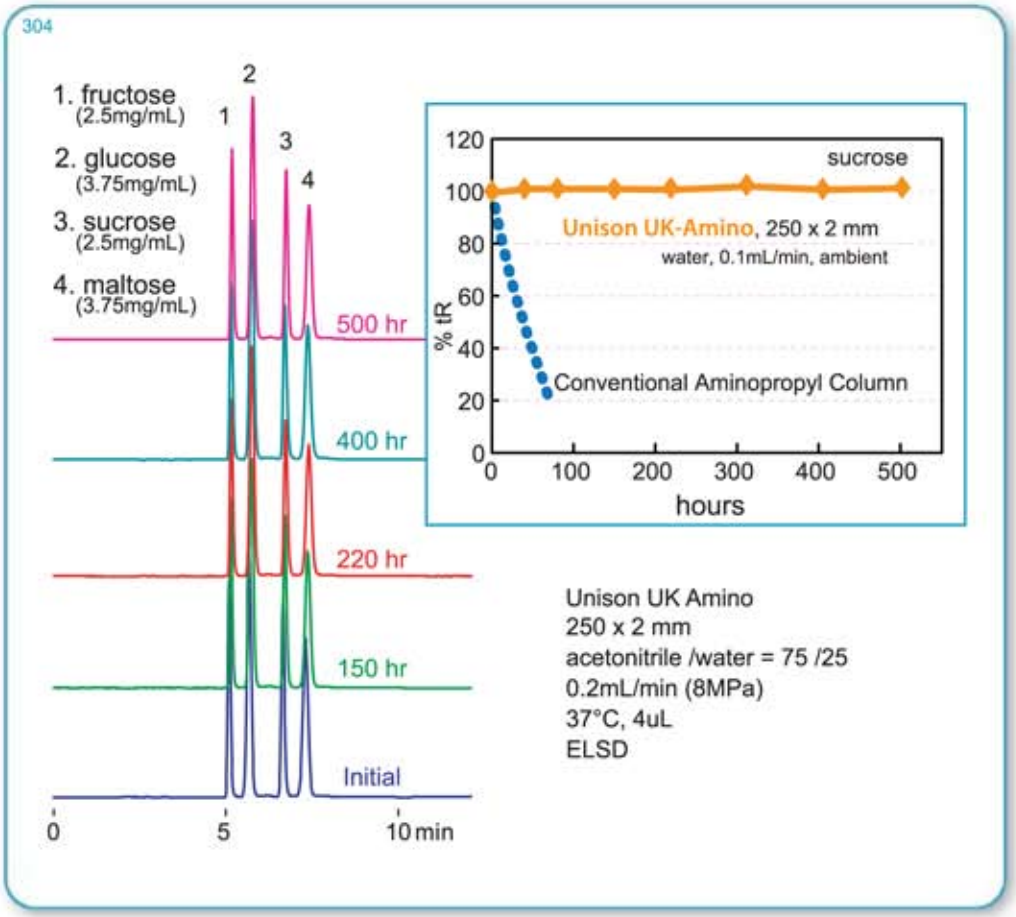
Unison UK-Amino

Revolutionary Aqueous Durability for Aminopropyl Phase

Unequalled Durability Against Water Elution

Unison UK-Amino column offers:

- Revolutionary Durability for the Aminopropyl Phase
- Aqueous to Non-aqueous Normal Phase Separation
- 3µm Particle Size
- Pure Spherical Porous Silica
- High Speed and Superior Resolution
- LC-MS Applicable



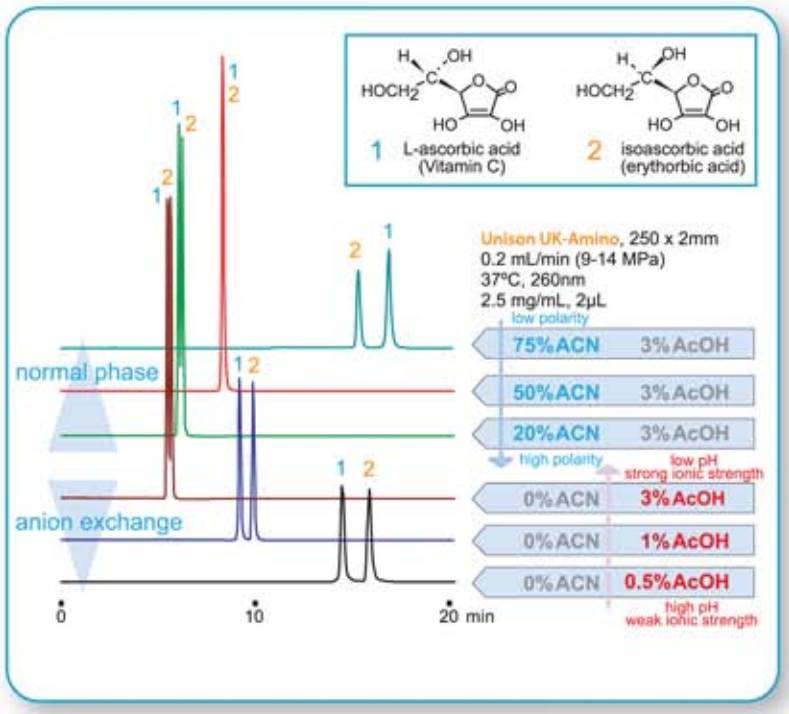
Aqueous durable silica-based aminopropyl columns have been used for a long time as a normal phase column for carbohydrate separation. However, these aminopropyl columns have a fatal flaw: "column bleeding", or the rapid deterioration in retention as a result of ligand desorption under aqueous elution.

Our newly-designed Unison UK-Amino offers a different approach from conventional columns: high durability against aqueous eluent. As the above chromatogram demonstrates, conventional columns experience a significant decline in retention when an aqueous mobile phase elutes through the column. UK-Amino, on the other hand, does not show any change in separation or retention. This is a significant development in the history of aminopropyl columns.

UK-Amino's design not only provides analytical power, but the 3µm particle, high-resolution column has other benefits, including the minimization of LC-MS and LC-ELSD noise levels. UK-Amino can be applied to aqueous normal phase conditions, and separation optimization is possible while comparing to ODS columns using reverse phase modes. One can expect significant results from this normal phase column of UK-Amino.

Normal Phase and Anion Exchange Modes

Aminopropyl stationary phases generally employ both normal phase separation mode and anion exchange mode derived from amino groups. The example of the acidic compound ascorbic acid is shown below. There are two methods using Unison UK-Amino to separate ascorbic acid and its isomer iso-ascorbate (erythorbate).



Normal phase + Anion exchange mode

In the normal phase mode, retention deteriorates as the polarity in the mobile phase increases. However, as the acetonitrile composition increases, retention increases and the two compounds completely separate at 75% acetonitrile. Moreover, the elution order is reversed from anion exchange mode due to the difference in interactions.

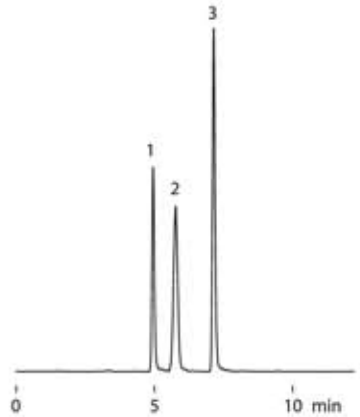
Anion Exchange Mode

In anion exchange mode, retention deteriorates as the acidic density increases and pH-driven ionic interactions grow weaker (in this case, high acidic density = low pH). In this example, two compounds are completely separated with only a 0.5% acetic acid aqueous solution.

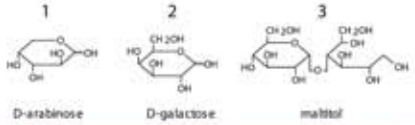
Normal Phase Separation of Saccharides

320

Arabinose, Galactose, Maltitol

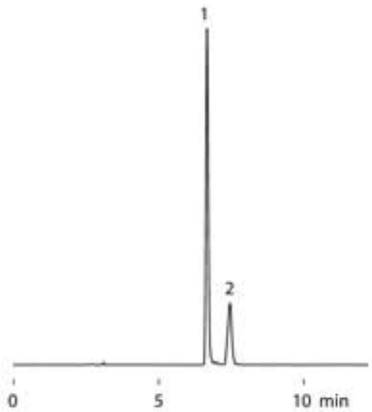


Unison UK-Amino, 250 x 4.6 mm
acetonitrile /water = 75 /25, 1 mL/min, 37°C, ELSD

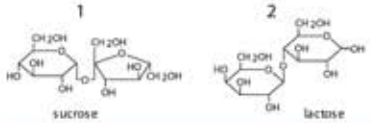


321

Sucrose and Lactose in Cafe au Lait



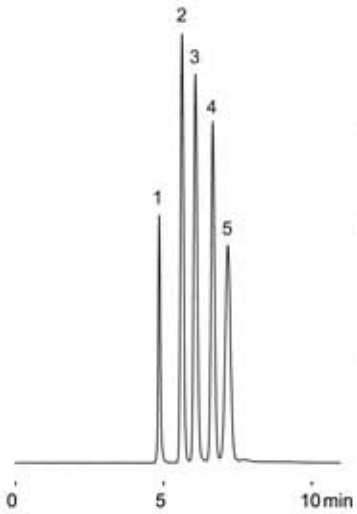
Unison UK-Amino, 250 x 4.6 mm
acetonitrile /water = 75 /25, 1 mL/min, 37°C ELSD

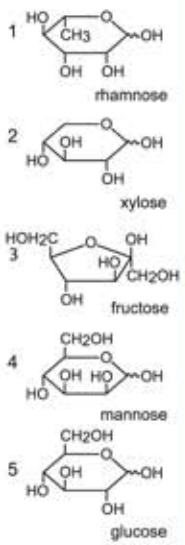


Normal Phase Separation of Saccharides

Unison UK-Amino provides excellent peak shape with 3μm particle for hydrophillic monosaccharides and sugar alcohols separation.

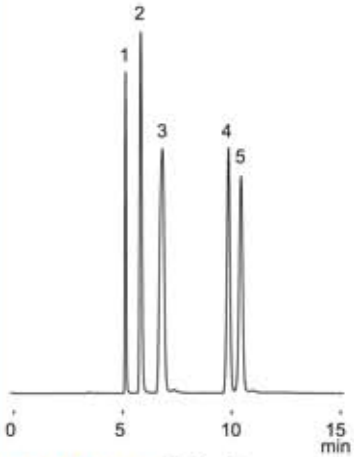
Monosaccharides

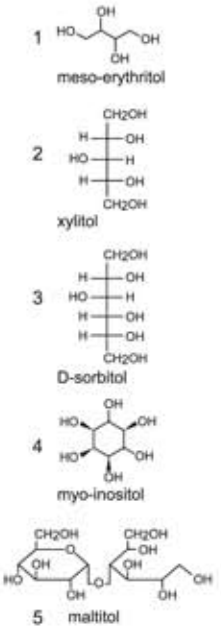




Unison UK-Amino, 250 x 2 mm
acetonitrile /water = 80 /20, 0.2 mL/min,
37°C, ELSD

Sugar Alcohols



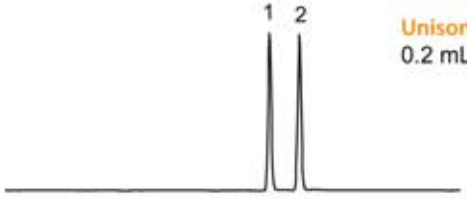


Unison UK-Amino, 250 x 2 mm
acetonitrile /water = 80 /20, 0.2 mL/min
37°C, ELSD

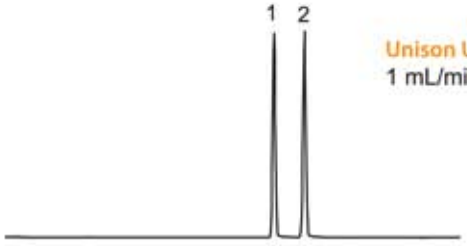
313

Sorbitol and Mannitol

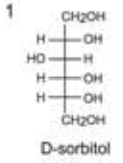
Sharp peak shape is possible with sugar alcohols by raising the analytical temperature settings

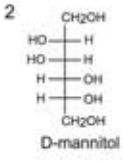


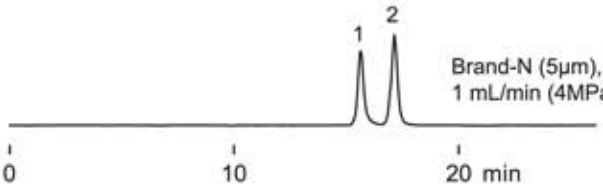
Unison UK-Amino, 250 x 2 mm
0.2 mL/min (5MPa), 0.5 μL (2.5μg)



Unison UK-Amino, 250 x 4.6 mm
1 mL/min (6MPa), 1.5 μL (7.5μg)





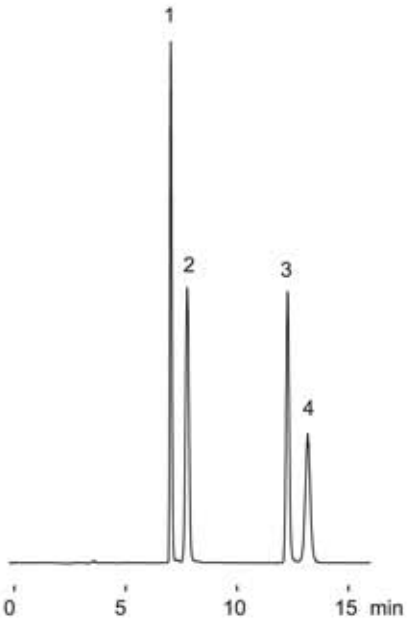


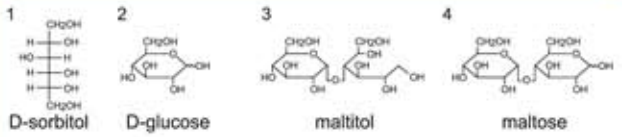
Brand-N (5μm), 250 x 4.6mm
1 mL/min (4MPa), 1.5 μL (7.5μg)

acetonitrile / water = 90 / 10
50°C, ELSD

Normal Phase Separation of Saccharides using Unison UK-Amino

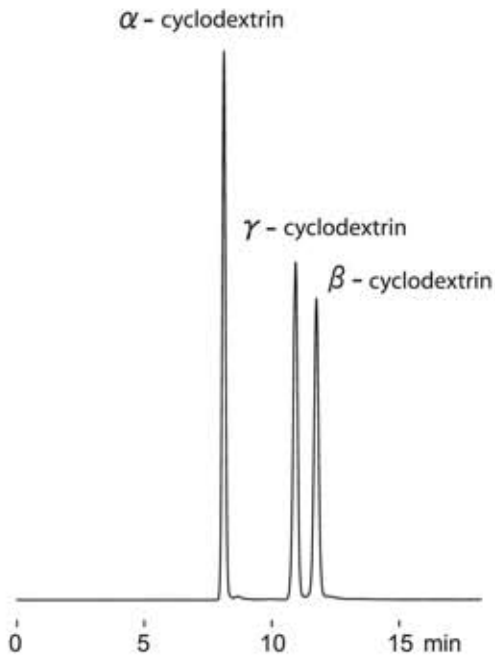
Reducing Sugar and Its Reduced Alcohol





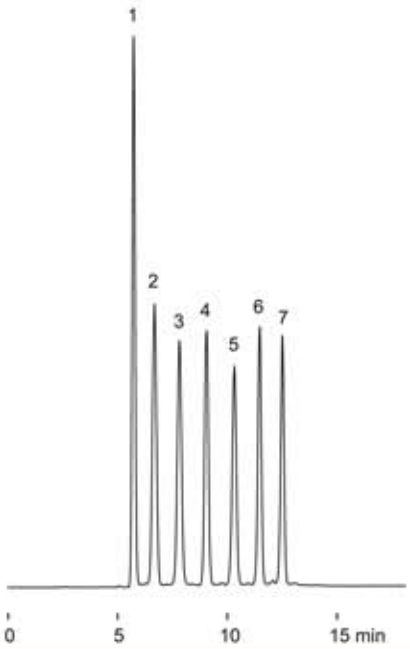
Unison UK-Amino, 250 x 4.6 mm,
acetonitrile / water = 83 / 17, 1.0 mL/min, 50°C, ELSD

Cyclodextrins

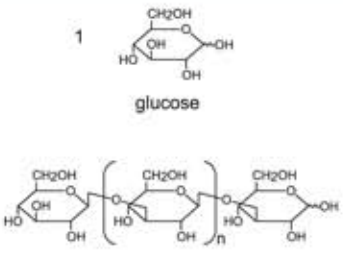


Unison UK-Amino, 250 x 2 mm
acetonitrile / water = 70 / 30
0.2 mL/min, 37°C, ELSD

Laminariorigosaccharides



Unison UK-Amino provides exceptional separation efficiency for oligosaccharides and other chemical compounds with relatively higher molecular weights.



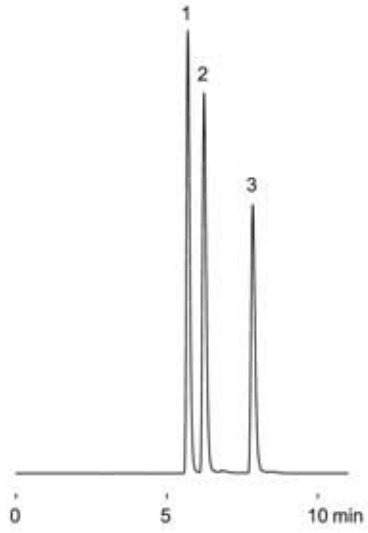
2. laminaribiose (n=0)
3. laminaritriose (n=1)
4. laminaritetraose (n=2)
5. laminaripentaose (n=3)
6. laminarihexaose (n=4)
7. laminariheptaose (n=5)

Unison UK-Amino, 250 x 2 mm
A: acetonitrile, B: water, 25-40 %B (0-15min)
0.2 mL/min, 37°C, ELSD

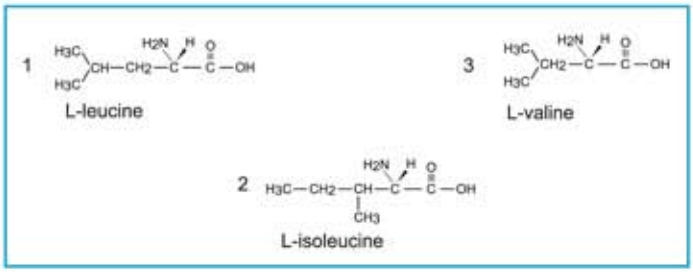
Aqueous Normal Phase Separation

Unison UK-Amino can conduct aqueous normal phase separation even with chemical compounds other than carbohydrates. The column can optimally handle various compounds with its combination of electrostatic interactions and anion exchange mode. Using LC-UV/VIS, LC-ELSD or LC-MS is possible by optimizing the organic solvent selection and type, as well as by adjusting the buffer pH and ionic strength.

Branched-Chain Amino Acids



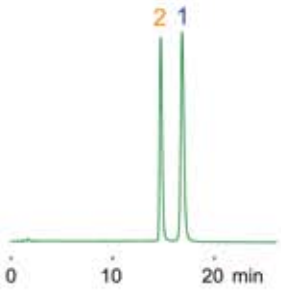
In separation of aliphatic amino acids, sharp peak shape is possible by controlling pH and ionic strength with neutral ammonium acetate.



Unison UK-Amino, 150 x 2 mm
acetonitrile /10mM ammonium acetate = 85 /15
0.2 mL/min, 37°C, ELSD

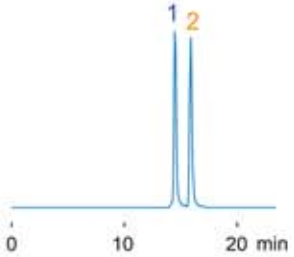
Ascorbic Acid and Erythorbic Acid

Ascorbic acid and its isomer erthyorbic acid can be separated in either normal phase or ion exchange modes. Unison UK-Amino can be used with acetic acid, a mild pH adjusting agent. Moreover, separation mode differences allow column users to select different elution orders and separation modes to suit their needs.



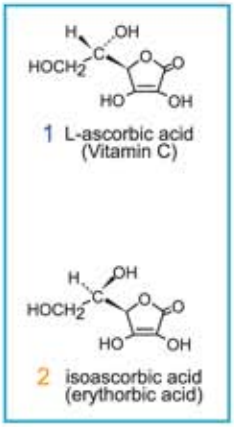
normal phase

Unison UK-Amino, 150 x 2 mm
acetonitrile /water /acetic acid = 80 /20 /2
0.2mL/min (5MPa),
37 °C, 260nm,
1μL(1.3μg)



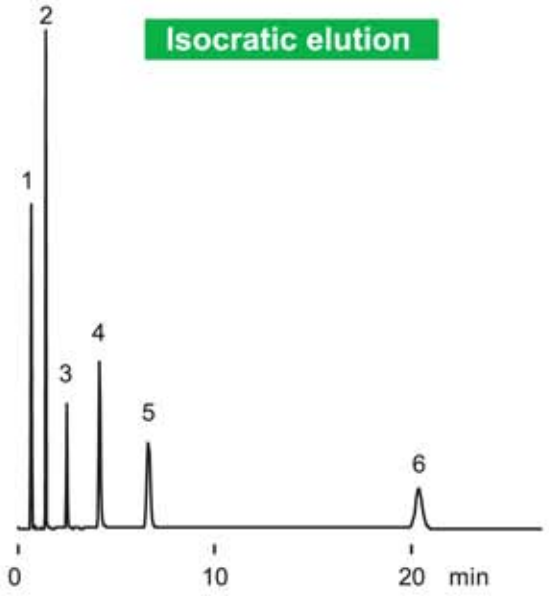
anion exchange

Unison UK-Amino, 250 x 2 mm
water / acetic acid = 100 / 0.5
0.2mL/min (14MPa),
37deg.C, 260nm,
0.2μL(0.5μg)



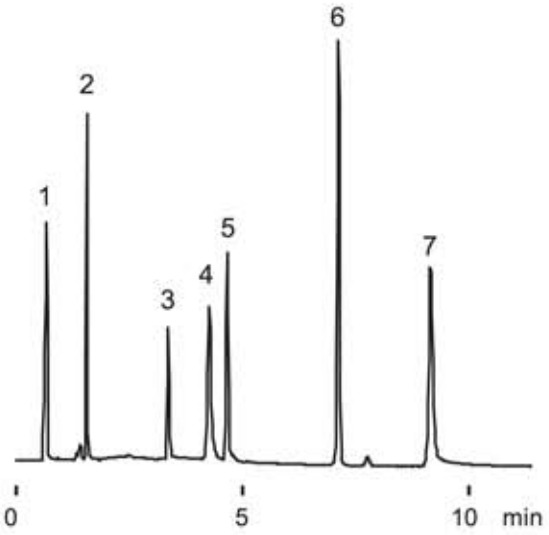
Water Soluble Vitamins

Isocratic elution



Unison UK-Amino, 100 x 4.6 mm
ACN / water / acetic acid = 90 / 10 / 5
1mL/min, 37°C, 260 nm

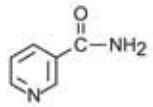
Gradient elution



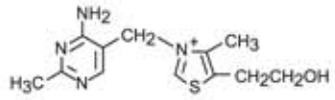
Unison UK-Amino, 100 x 4.6 mm
A: ACN / acetic acid = 100 / 5
B: water / acetic acid = 100 / 5
2-70 %B (0-10min)
1mL/min, 37°C, 260 nm

Simple analysis is obtaintable using acetic acid with water soluble vitamins. There is no need for ion pair mode via reverse phase separation. Moreover, gradient elution enables high speed analysis for a wide range of vitamins.

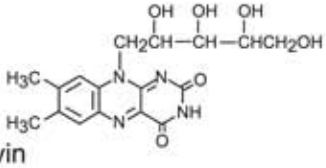
1 nicotinamide



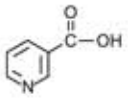
2 thiamine



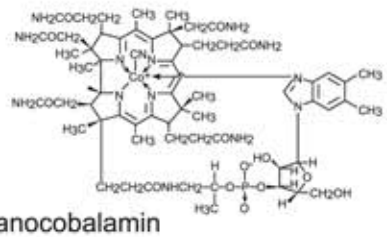
3 riboflavin



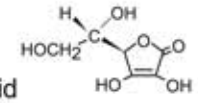
4 nicotinic acid



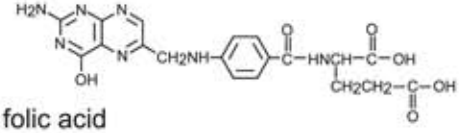
5 cyanocobalamin



6 L-ascorbic acid



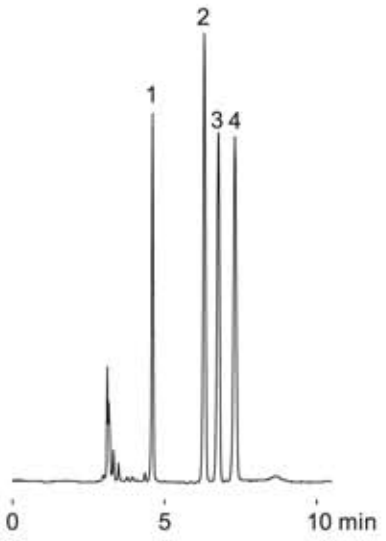
7 folic acid



Non-Aqueous Normal Phase Separation

Unison UK-Amino has a highly polar stationary phase enabling non-aqueous normal phase separation similar to other silica columns. However, the presence of a dissociative group (amino group) and bound water in the stationary phase side means that highly reproducible analysis is possible by adding acetic acid and other pH adjusting agents.

Tocopherols



Unison UK-Amino, 250 x 4.6 mm
hexane / ethyl acetate / acetic acid = 80 / 20 / 0.1
1 mL/min, 37°C, 295 nm

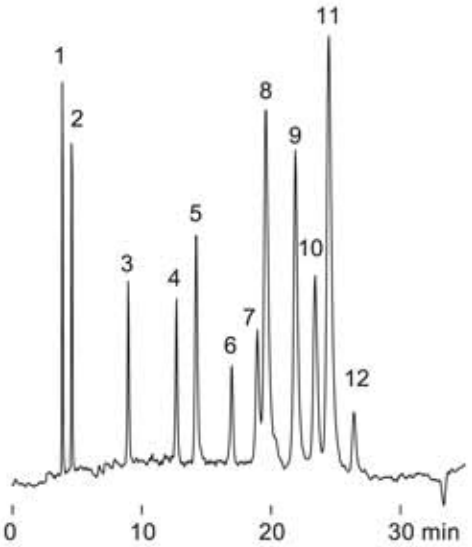
1 α-tocopherol

2 β-tocopherol

3 γ-tocopherol

4 δ-tocopherol

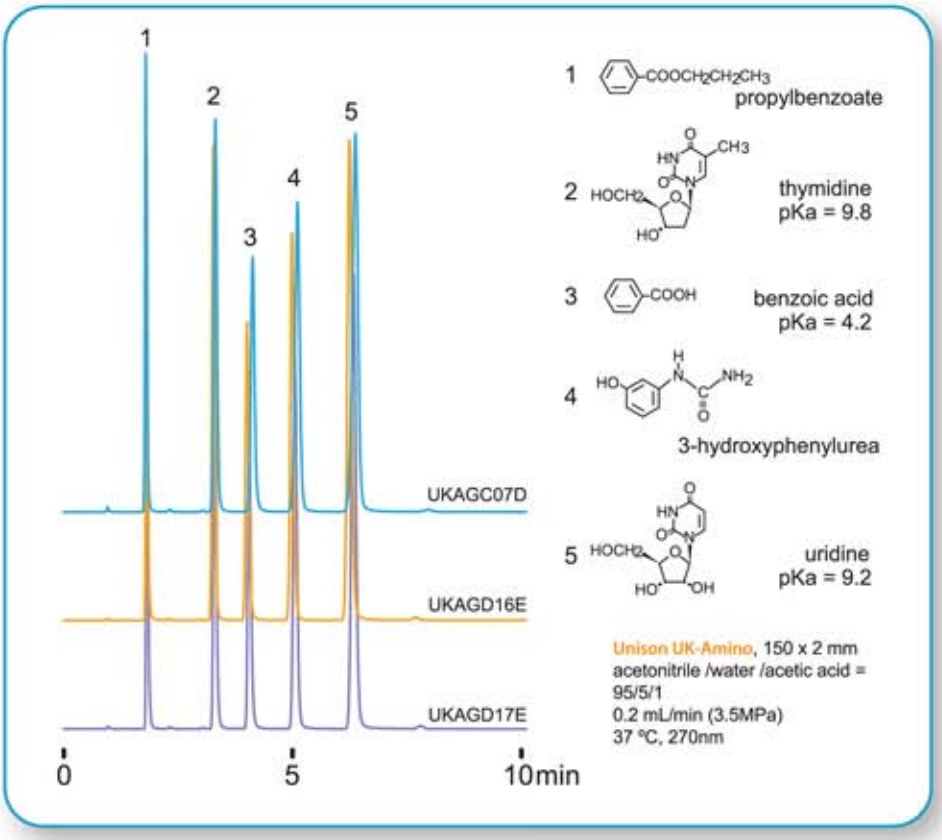
Steroids



Unison UK-Amino, 250 x 4.6 mm
A: hexane /acetic acid = 100 /0.1
B: ethanol /acetic acid = 100 /1
10-30%B (0-30 min), 1 mL/min, 37°C, 260 nm

1 progesterone
2 deoxycorticosterone acetate
3 estrone
4 estradiol
5 corticosterone
6 ethynylestradiol
7 cortisone
8 prednisone
9 6alpha-methylprednisolone
10 hydrocortisone
11 prednisolone
12 estriol

UK-Amino Batch-to-Batch Reproducibility



Conventional aminopropyl stationary phases struggle to achieve solute retention and repeatable separations because the interactions are complicated due to the presence of both normal phase and anion exchange modes. Unison UK-Amino addresses this problem with a novel stationary phase design that provides excellent reproducibility.

Unison UK-Amino
3 µm Particle Size Stationary Phase

	Analytical Columns					Prep Columns
Length	Internal Diameter					
mm	1	2	3	4.6	6	10
10		UKA20	UKA30	UKA00		
20		UKA29	UKA39	UKA09		
30	UKA11	UKA21	UKA31	UKA01	UKA61	UKAP1
50	UKA12	UKA22	UKA32	UKA02	UKA62	UKAP2
75	UKA13	UKA23	UKA33	UKA03	UKA63	UKAP3
100	UKA14	UKA24	UKA34	UKA04	UKA64	UKAP4
150	UKA15	UKA25	UKA35	UKA05	UKA65	UKAP5
250	UKA16	UKA26	UKA36	UKA06	UKA66	UKAP6
500				UKA07		

Guard Cartridges		
Size	Code	Pieces
1mm	GCUKAC	3
2-6mm	GCUKAS	3
10mm	GCUKAM	2

Guard Holders		
Column Coupler Included		
1-6mm	GCH01S	
10mm	GCH02M	