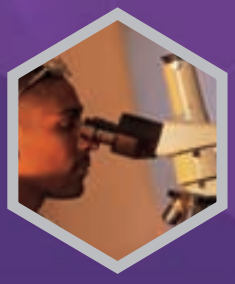
chromatography products



TRANSGENOMIC®
BIOCONSUMABLES™

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Transgenomic is a global company focused on providing you the best separations technology with the highest reproducibility possible. We understand the quality of your results depends on us. Our entire team is dedicated to supporting you in your scientific quest.

The separations products we provide are based on our many years of experience in developing and manufacturing polymer chemistries for liquid chromatography. This vast experience and knowledge base continues to help us build on our strong tradition of providing the best products for your research and quality control needs.

Collin D'Silva
Chief Executive Officer

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APPLICATION SELECTION *Guide*

Amino Acids	Protein Hydrolysates	AMINOSep AA511 AMINOSep AA911 Na^+ Column for 63/7300 Systems Na^+ Column for System Gold
	Physiological Fluids	Li^+ Column for 63/7300
Carbohydrates	Monosaccharides Disaccharides Sugar Alcohols	CARBOSep CHO-620 CARBOSep CHO-682 CARBOSep CHO-820 CARBOSep CHO-611OH CARBOSep USP L-19 CARBOSep COREGEL-87C CARBOSep COREGEL-87P CARBOSep COREGEL-87H CARBOSep COREGEL-87MM
	Oligosaccharides, Corn Syrup,, Sugar Polymers	CARBOSep COREGEL-42Ag CARBOSep CHO411 CARBOSep CHO611 CARBOSep COREGEL-87K CARBOSep COREGEL-87N
Organic Acids	Sugar Alcohols Organic Acids	ICSep Ion-300 ICSep COREGEL-87H ICSep COREGEL-107H ICSep ORH-801 ICSep WA-1 Wine Analysis Column ICSep Ion-310 ICSep ARH-601 ICSep COREGEL 64H
Proteins/Peptides	Reversed Phase	RPSep ACT-1 C18 RPSep PRX-1 RPSep PolyRP C0
DNA, RNA, Oligonucleotides	Reversed Phase	RPSep PRX-1

AMINO ACID *Analysis*

Transgenomic Columns for Amino Acid Analysis

Ion-exchange chromatography is a popular technique for the analysis of amino acids because both retention times and quantification are highly reproducible regardless of the sample matrix. This unique matrix insensitivity is important when comparing results from different patients or batches of protein hydrolysate.

Amino acids are zwitterions; at low pH, they are positively-charged and are bound to the resin by their attraction to the negatively-charged ion-exchange sites. Almost all the contaminants, i.e. matrix, are eluted at the void. The amino acids are then selectively eluted by increasing the pH and salt concentration with different buffers. With few exceptions, the order of elution follows the isoelectric point of the amino acids, i.e. acidic amino acids first, then neutral and basic. Because the separation and the ensuing post-column reaction of amino acids are devoid of contaminants, amino acid analyses via ion-exchange chromatography are highly reproducible.

Features

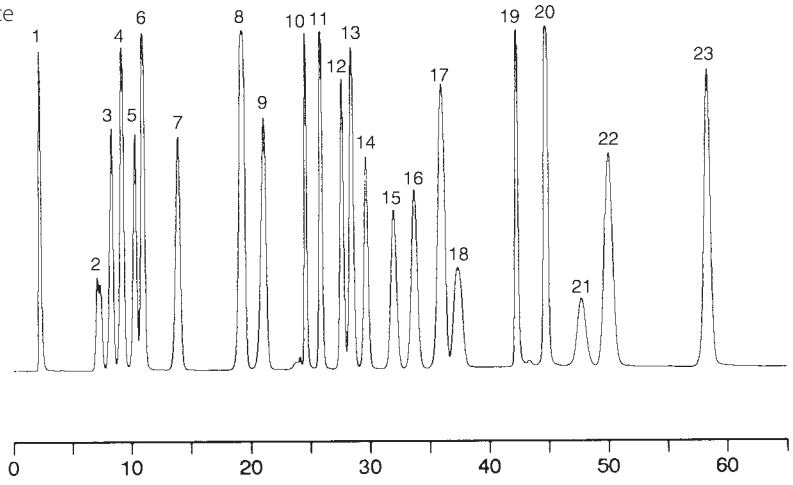
The key features of the Transgenomic cation-exchange columns are:

- **Polymeric Substrate**
- **High efficiency**
- **High resolution**
- **Reproducibility lot-to-lot and column-to-column**
- **Rugged**
- **Available for both physiological and protein hydrolysate amino acids**

Amino acid columns are subjected to many different types of samples (blood, urine, growth media, animal feed, wine, etc.) and often they are introduced with minimum sample preparation. Therefore this variety of matrix challenges all but the most rugged ion-exchange columns. Transgenomic columns use polystyrene/divinylbenzene copolymers and are stable in the pH range of 0 to 14; they are temperature stable and very rugged. The Transgenomic amino acid columns have been shown to last for thousands of runs without cleaning. Because Transgenomic manufacture the polymers and pack the columns, lot-to-lot and column-to-column reproducibility is excellent (retention times vary by less than 1%). Available for both routine hydrolysate analysis as well as complex physiological fluids, Transgenomic amino acid columns have been designed to provide the highest efficiency and highest resolution of any ion-exchange amino acid columns on the market.

Oxidized Hydrolysate Standards

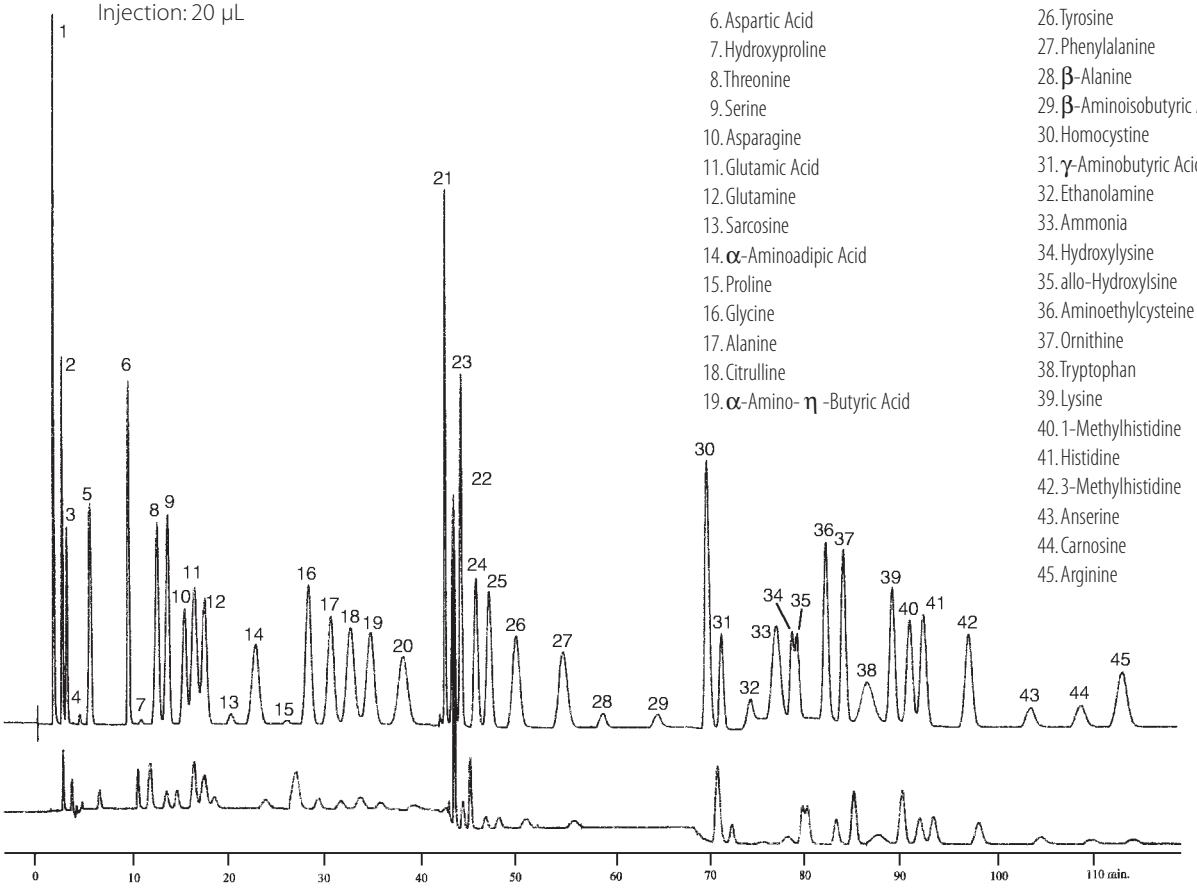
Analysis Conditions:
Column: Transgenomic Sodium Column for 6300
Flow rate: 0.233 mL/min
Temperature: 48-70-77°C
Pressure: 655 PSIG
Detection: Fluorescence
Injection: 20 µL



Sample:
1. L-Cysteic Acid
2. Methionine Sulfoxide
3. L-Aspartic Acid
4. Methionine Sulfone
5. L-Threonine
6. L-Serine
7. L-Glutamic Acid
8. Glycine
9. L-Alanine
10. L-Valine
11. L-Methionine
12. L-Isoleucine
13. L-Leucine
14. Norlfuline
15. L-Tyrosine
16. L-Phenylalanine
17. Glucosamine
18. Galactosamine
19. L-Histidine
20. L-Lysine
21. Tryptophan
22. Ammonia
23. L-Arginine

Physiological Fluid Amino Acids

Analysis Conditions:
Column: Transgenomic Lithium Column for 6300
Flow rate: 0.333 mL/min
Temperature: 32.5-63-80°C
Pressure: 1200 PSIG
Detection: UV
Injection: 20 µL

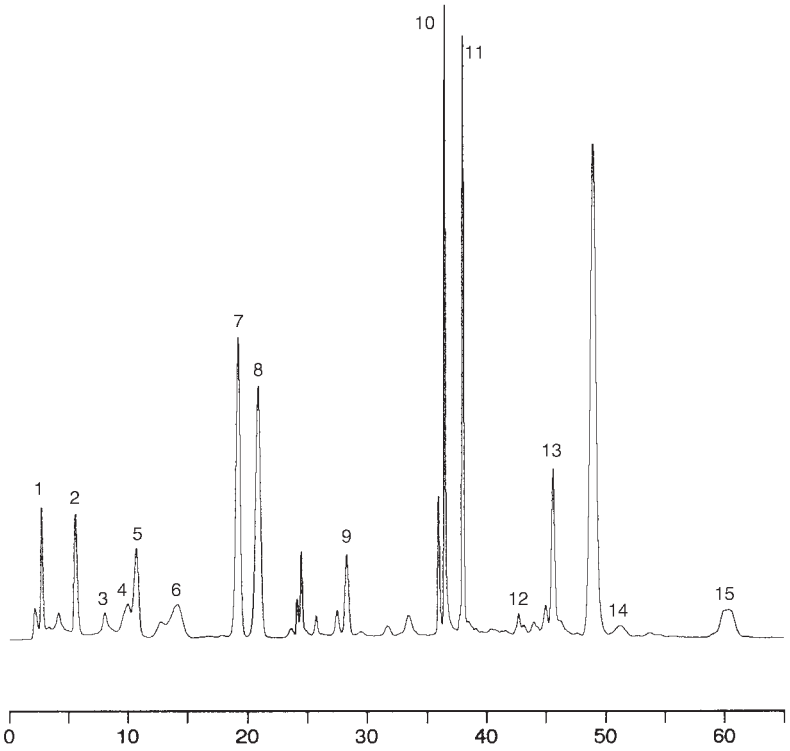


Sample:
1. Phosphoserine
2. Taurine
3. Phosphoethanolamine
4. Urea
5. Glucosaminic Acid
6. Aspartic Acid
7. Hydroxyproline
8. Threonine
9. Serine
10. Asparagine
11. Glutamic Acid
12. Glutamine
13. Sarcosine
14. α-Aminoadipic Acid
15. Proline
16. Glycine
17. Alanine
18. Citrulline
19. α-Amino- η -Butyric Acid
20. Valine
21. Cystine
22. Methionine
23. Cystathionine
24. Isoleucine
25. Leucine
26. Tyrosine
27. Phenylalanine
28. β-Alanine
29. β-Aminoisobutyric Acid
30. Homocystine
31. γ-Aminobutyric Acid
32. Ethanolamine
33. Ammonia
34. Hydroxylysine
35. allo-Hydroxylsine
36. Aminoethylcysteine
37. Ornithine
38. Tryptophan
39. Lysine
40. 1-Methylhistidine
41. Histidine
42. 3-Methylhistidine
43. Anserine
44. Carnosine
45. Arginine

Amino Acid in Red Wine

Analysis Conditions:
Column: Transgenomic Sodium Column for 6300
Flow rate: 0.233 mL/min
Temperature: 48-70-77°C
Pressure: 575 PSIG
Detection: Fluorescence
Injection: 20 µL

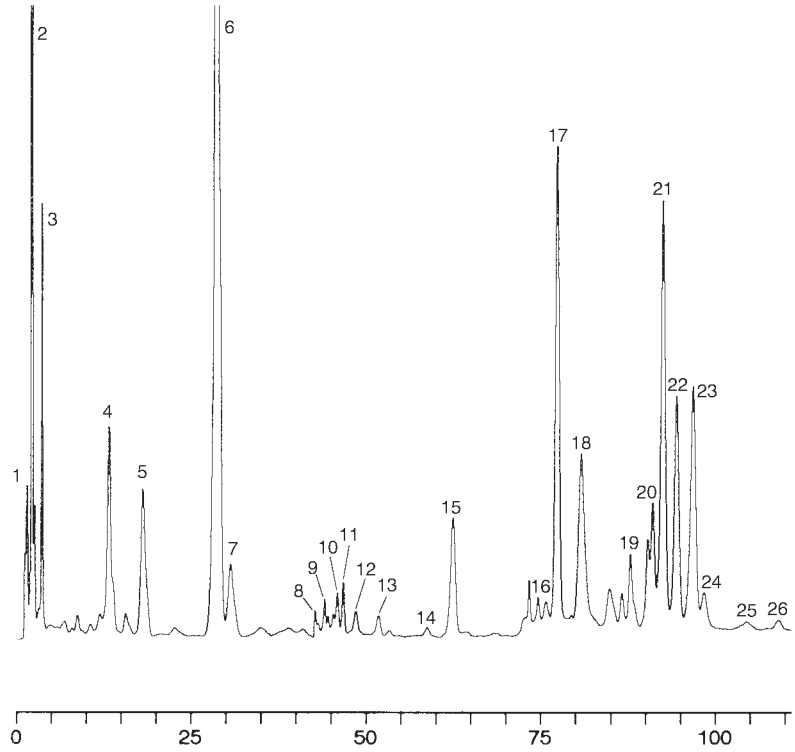
Sample:
1. Cysteic Acid
2. ASP
3. MTO2
4. THR
5. GLU
6. GLY
7. ALA
8. MET
9. Glucosamine
10. Galactosamine
11. HIS
13. LYS
14. NH3
15. ARG



Amino Acid in Urine

Analysis Conditions:
Column: Transgenomic Lithium Column for 6300
Flow rate: 0.333 mL/min
Temperature: 32.5-63-80°C
Pressure: 1200 PSIG
Detection: Fluorescence
Injection: 20 µL

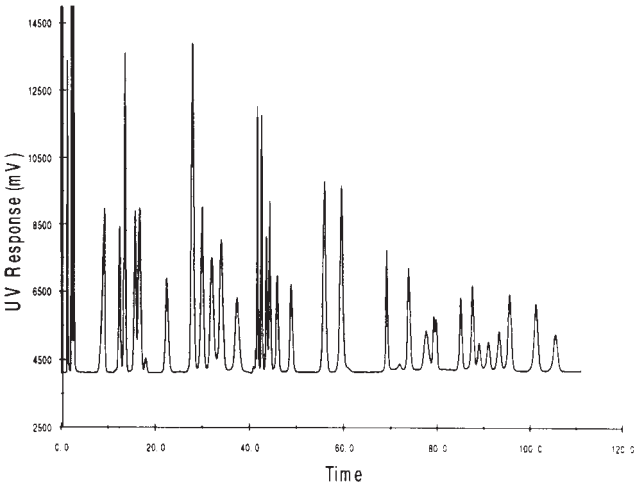
Sample:
1. PER
2. TAU
3. PETN
4. THR
5. GLU
6. GLY
7. ALA
8. Met
9. CYST
10. ILE
11. LEU
12. TYR
13. PHE
14. BALA
15. BABA
16. TRP
17. EIN
18. NH3
19. ORN
20. LYS
21. 1 ME-HIS
22. HIS
23. 3 ME-HIS
24. ANS
25. CARN
26. ARG



Transgenomic Lithium Amino Acid Column

(4 x 100 mm)
P/N AAA-99-6311

- Designed for use with the Beckman Coulter® 6300 and 7300 Amino Acid Analyzers using either the Beckman or Pickering Lithium buffer systems
- The Lithium column is ideal for Physiological amino acid analysis
- Highly efficient 6 micron particle size



AMINOSep Lithium Guard Kit

P/N AAA-99-2311

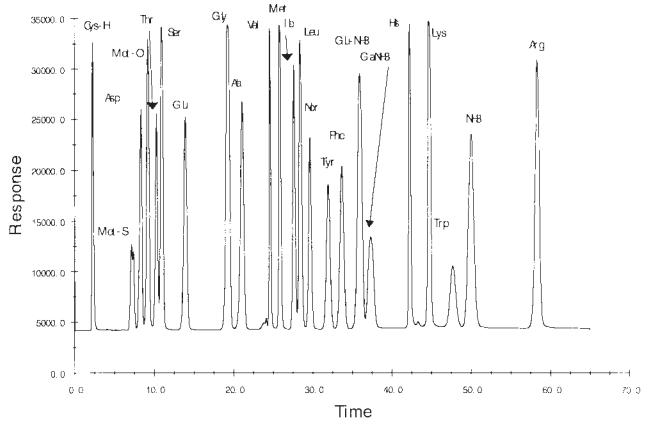
AMINOSep Lithium Guard Cartridge – 2/PK

P/N AAA-99-1311

Transgenomic Sodium Amino Acid Column

(4 x 120 mm)
P/N AAA-99-6312

- Designed for use with the Beckman Coulter 6300 and 7300 Amino Acid Analyzers using either the Beckman Coulter or Pickering Sodium buffer systems
- The Sodium column is ideally suited for routine hydrolysate analysis
- Extremely rugged polymer



AMINOSep Sodium Guard Kit

P/N AAA-99-2312

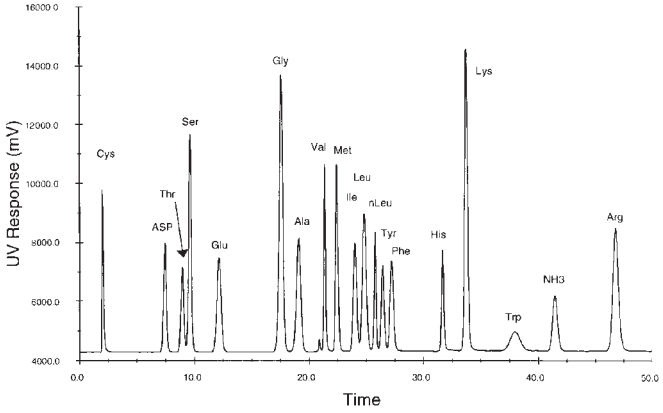
AMINOSep Sodium Guard Cartridge – 2/PK

P/N AAA-99-1312

Transgenomic Sodium Sodium Amino Acid Column for Use with System Gold

(4 x 200 mm)
P/N AAA-99-6310

- Designed for use with the Beckman Coulter System Gold Amino Acid Analyzer
- This Sodium cation exchange column is ideal for the separation of hydrolysate amino acids.



AMINOSep Sodium Guard Kit

P/N AAA-99-2312

AMINOSep Sodium Guard Cartridge – 2/PK

P/N AAA-99-1312

AMINOSep AA-911 Sodium Column

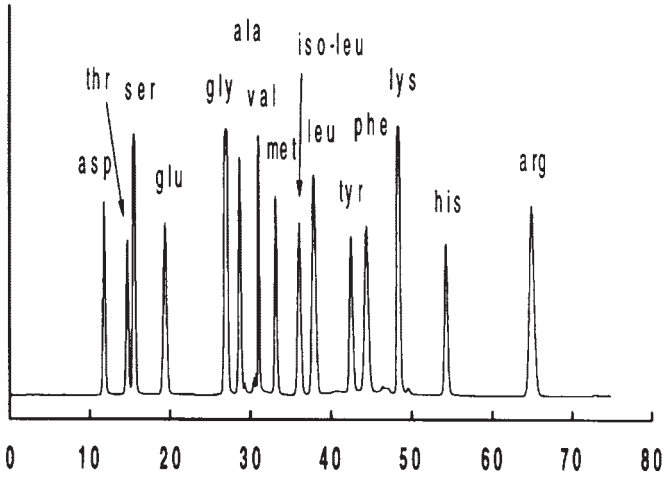
(4.6 x 250mm)
P/N AAA-99-8553

AMINOSep GC-911 Guard Kit

P/N AAA-99-2353

AMINOSep GC-911 Guard Cartridge

2 /PK P/N AAA-99-1353



AMINOSep AA-511 Sodium Column

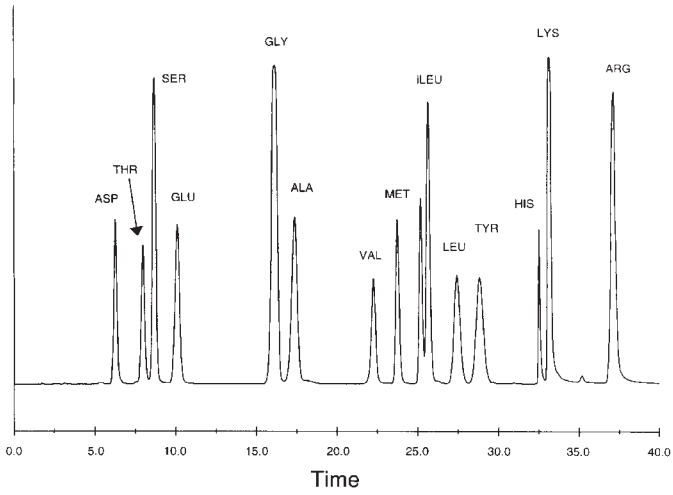
(4.6 x 150mm)
P/N AAA-99-7554

AMINOSep GC-511 Guard Kit

P/N AAA-99-2354

AMINOSep GC-511 Guard Cartridge – 2/PK

P/N AAA-99-1354



AMINOSep AA-511 High Speed Sodium Column

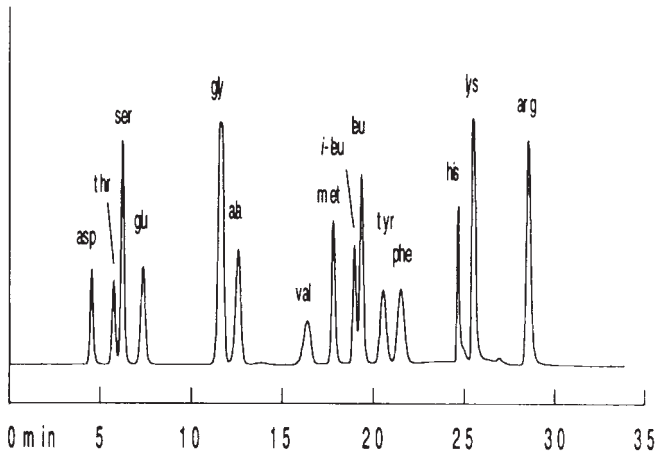
(4.6 x 120mm)
P/N AAA-99-6554

AMINOSep GC-511 Guard Kit

P/N AAA-99-2354

AMINOSep GC-511 Guard Cartridge – 2/PK

P/N AAA-99-1354



CARBOHYDRATE *Analysis*

CARBOSep Columns

Transgenomic manufactures a line of polymeric columns for carbohydrate analysis called CARBOSep columns. CARBOSep columns employ a technique called ligand-exchange chromatography for the separation of monosaccharides, disaccharides and oligosaccharides up to 15 glucose units long.

The principle behind ligand exchange is that each of the hydroxyls on a sugar molecule carry a very slight negative charge. The hydroxyl group on the anomeric carbon can be deprotonated and have a strong negative charge. It is the interaction between these negative charges on the sugar molecule and the positive charge contributed by the metal ion secured to the resin surface that causes the sugars to be retained and thus separated.

Ligand exchange resins are highly sulfonated cation exchange resins that have group 1, 2 or transition series metals loaded on. The sulfonic acid groups on the resin tightly hold the metal ions via an ionic attraction so that it is not released during analysis or through the life of the column. It is this metal ion that provides the positive charge that interacts with the negative charge on the sugar.

During analysis, the carbohydrates are introduced onto the column. The sugars are attracted to the metals via an ionic interaction thus they become weakly bound to the metal ion on the resin. Water will also have a weak ionic interaction with the metals on the column, so the water will exchange with the sugars on the metal sites. This ionic adsorption and desorption occurs for the sugars through the column. Since the ionic charge is different for every sugar, separation of the sugars occurs.

Selectivity is easily controlled by resin type, metal selected, and other factors such as temperature and mobile phase. CARBOSep columns are provided in a large variety of resin types and metals to provide selectivities that meet your separation needs.

Selectivity Chart for Carbohydrate Columns

Compound	CHO-620 (units in minutes)	CHO-611 (units in minutes)	CHO-682 (units in minutes)	COREGEL 87H (units in minutes)	COREGEL 87P (units in minutes)	COREGEL 87N (units in minutes)	COREGEL 87K (units in minutes)	COREGEL 87C (units in minutes)
Arabinose	10.64	11.08	23.95	12.08	16.32	12.64	14.72	13.92
Digitoxose	10.26	10.18	21.95	–	15.48	11.40	12.32	14.19
Fructose	10.07	10.33	25.84	11.25	16.96	11.61	13.31	13.63
Fucose	10.57	10.96	24.16	12.80	16.44	12.34	14.39	13.82
Galactose	9.58	10.22	22.32	11.12	15.16	11.44	13.36	13.82
Glucose	8.72	9.53	19.14	10.57	13.38	10.72	12.55	11.17
Mannose	9.79	10.27	25.50	11.13	16.76	11.57	13.74	12.76
Rhamnose	9.64	9.88	22.56	11.94	15.26	11.08	12.83	12.86
Sorbose	9.50	9.93	22.38	10.08	15.24	11.08	12.66	12.86
Tagatose	11.53	10.29	–	11.15	20.80	11.36	12.82	16.46
Xylose	9.56	10.34	20.64	11.32	14.42	11.77	13.69	12.32
Cellobiose	6.65	7.17	15.58	8.43	10.98	7.90	9.26	8.94
Lactose	7.01	7.51	17.37	8.77	11.84	8.18	9.63	9.44
Lactulose	7.57	7.85	20.70	9.00	13.24	8.48	10.08	10.17
Melibiose	6.99	7.46	17.63	8.56	12.02	8.19	9.72	9.36
Trehalose	6.70	7.14	15.98	8.64	11.20	7.85	9.02	9.07
Sucrose	6.76	7.27	15.70	–	11.10	7.99	9.11	9.09
Maltose	6.89	7.37	16.61	8.57	11.54	8.08	9.48	9.17
Ribitol	10.94	10.13	30.72	12.44	20.44	11.26	11.84	15.55
Arabitol	12.32	10.52	39.82	12.65	25.24	11.64	12.10	18.36
Galactitol	13.05	10.23	52.43	11.80	31.60	11.15	11.61	20.46
Myo-inositol	10.82	11.01	35.58	11.02	20.06	12.48	14.08	14.27
Lactitol	8.55	7.87	33.23	9.26	19.50	8.45	9.34	12.17
Maltitol	8.54	7.68	30.38	9.00	17.76	8.28	9.06	12.22
Mannitol	11.84	9.90	40.03	11.66	24.98	10.81	11.42	17.81
Sorbitol	13.64	10.38	56.56	11.77	33.40	11.32	11.86	21.34
Xylitol	13.93	11.01	51.15	12.82	31.10	12.16	12.64	21.30
Amiprylose	4.50	4.20	–	6.86	9.46	5.74	6.42	7.68
Melezitose	5.78	6.01	13.85	–	13.08	6.81	7.82	8.20
Maltotriose	5.91	6.22	15.17	7.72	10.54	6.98	8.16	8.28
Raffinose	5.86	6.10	14.40	–	10.22	6.88	7.92	8.24
Stachyose	5.28	5.39	13.41	–	9.58	6.33	7.28	7.77
Maltotetrose	5.37	5.54	14.07	7.30	9.84	6.42	7.46	7.80
Maltopentose	5.00	5.08	13.08	7.10	9.34	6.11	7.02	7.53
Maltohexose	4.78	4.87	12.24	7.00	8.80	5.94	6.74	7.38
Maltoheptose	4.66	4.60	11.74	6.96	8.52	5.84	6.61	7.28
Nitrate	4.50	4.20	10.30	6.85	8.40	5.70	6.40	7.30

• Mobile Phase: 100% water. • Flow rate: 0.5 mL/minute. • Temperature: 90°C

Carbohydrate Columns Specifications Chart

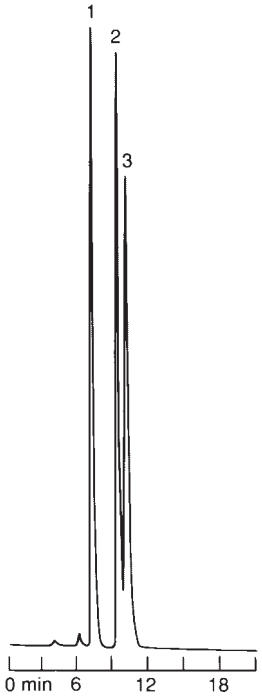
Column	Application	Form	Particle Size (µm)	Typical Mobile Phase	Recom'd Rate Flow (mL/min)	Recom'd Temp (°C)
CARBOSep CHO-411	oligosaccharides up to DP10, corn syrup, molasses	sodium	20	water	0.4	75
CARBOSep CHO-611	oligosaccharides up to DP5	sodium	10	water	0.5	90
CARBOSep CHO-611OH	mono and oligosaccharides w/ PAD detection	sodium	10	sodium hydroxide	0.5	90
CARBOSep CHO-620	high fructose corn syrup, mono-, di-, trisaccharides and sugar alcohols	calcium	10	water	0.5	90
CARBOSep CHO-682	mono and disaccharides, sucrose, maltose lactose	lead	7	water	0.4	80
CARBOSep CHO-820	simple sugars, sugar alcohols	calcium	8	water	0.5	90
CARBOSep COREGEL 87C	mono and disaccharides	calcium	9	water	0.6	85
ICSep COREGEL 87H1	fast analysis of organic acids, alcohols, sugar mixtures	hydrogen	9	sulfuric acid	0.6	85
ICSep COREGEL 87H3	organic acids, alcohols, sugar mixtures	hydrogen	9	sulfuric acid	0.6	85
CARBOSep COREGEL-42Ag	oligosaccharides up to DP11	silver	20	water	0.4	75
CARBOSep COREGEL 87K	beet sugar, cane sugar, corn syrup, molasses	potassium	8	water	0.6	85
CARBOSep COREGEL 87N	beet sugars, mono and oligosaccharides	sodium	8	water	0.6	85
CARBOSep COREGEL 87P	pentose, hexose, monosaccharides, alcohols	lead	8	water	0.8	85
CARBOSep USP L19	USP L-19 specifications for separation of sorbitol and mannitol	calcium	9	water	0.2	30
CARBOSep COREGEL-87MM	mono, di, and trisaccharides, and sugar alcohols	calcium/sodium	8	water	0.5	85
ICSep ION300	glucose and fructose in organic acid mixtures	hydrogen	8	sulfuric acid	0.4	70
ICSep ION310	grape must analysis	hydrogen	8	sulfuric acid	0.8	50

• Mobile Phase: 100% water. • Flow rate: 0.5 mL/minute. • Temperature: 90°C

Separation of Carbohydrates with PAD

Analysis Conditions:
Column: CHO-611OH
Eluent: 0.015N NaOH
Flow rate: 0.6 mL/min
Temperature: 85°C
Detection: PAD
Injection: 5 µL

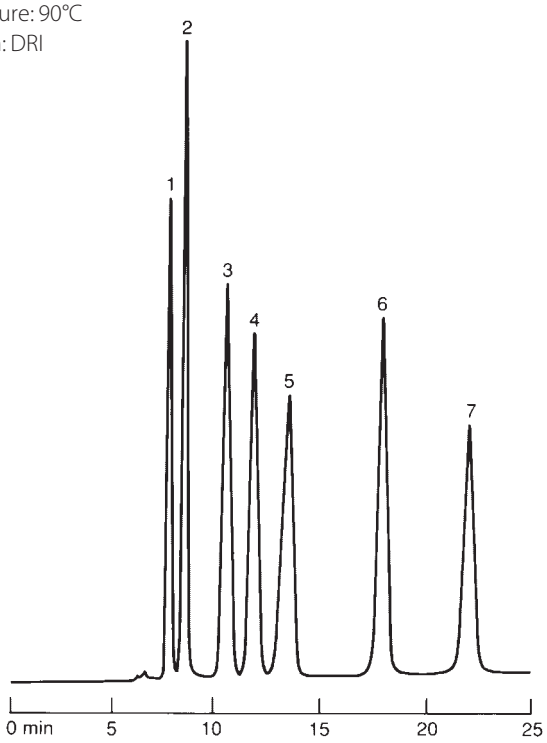
Sample:
1. Sucrose (500 ppm)
2. Glucose (250 ppm)
3. Arabinose (250 ppm)



Separation of Carbohydrate Standards

Analysis Conditions:
Column: CHO-820
Eluent: Distilled Water
Flow rate: 0.5 mL/min
Temperature: 90°C
Detection: DRI
.

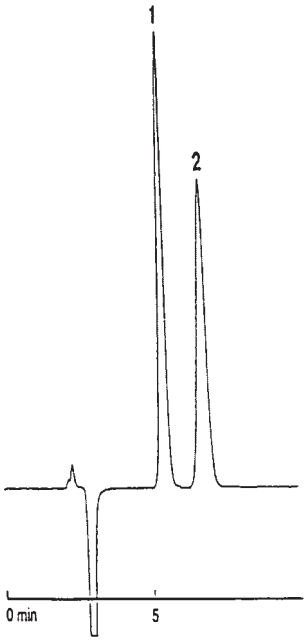
Sample:
1. Raffinose
2. Sucrose
3. Glucose
4. Galactose
5. Fructose
6. Mannitol
7. Sorbitol



Separation of Blocked Carbohydrates

Analysis Conditions:
Column: CHO-611OH
Eluent: 0.01 N NaOH
Flow rate: 0.5 mL/min
Temperature: 85°C
Detection: RI
Injection: 10 µL

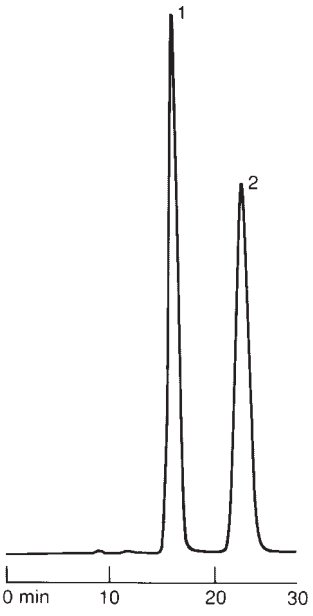
Sample: 1 mg/ml each,
1. Monoacetone xylofuranose
2. Diacetone xylofuranose



Separation of Mannitol and Sorbitol for USP-L-19

Analysis Conditions:
Column: CHO-820 L-19
Eluent: Distilled Water
Flow rate: 0.2 mL/min
Temperature: 30°C
Detection: RI

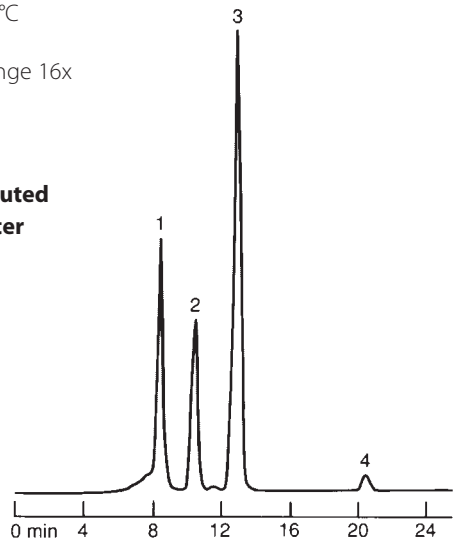
Sample:
1. Mannitol
2. Sorbitol



Separation of Sugars in Apple juice

Analysis Conditions:
Column: CHO-820
(7.8 mm x 300)
Eluent: Distilled Water
Flow rate: 0.5 mL/min
Temperature: 90°C
Pressure: 50 Bar
Detection: RI Range 16x
Injection: 20 µL

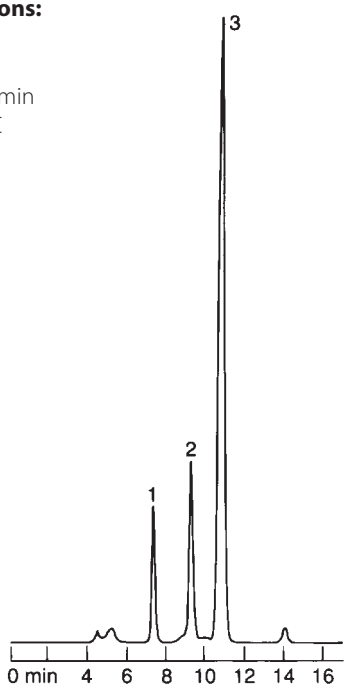
Sample:
Apple Juice Diluted 1:9 with DI Water
1. Sucrose
2. Glucose
3. Fructose
4. Sorbitol



Apple Juice

Analysis Conditions:
Column: CHO-620
Eluent: H_2O
Flow rate: 0.5 mL/min
Temperature: 90°C
Detection: DRI
Injection: 20 µL

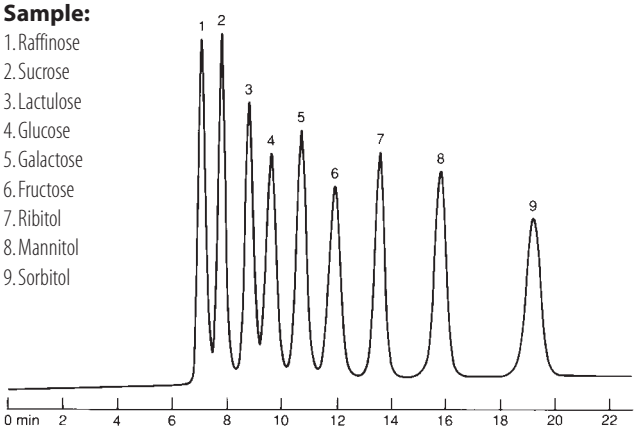
Sample:
1. Sucrose
2. Glucose
3. Fructose



Separation of Various Sugars and Sugar Alcohols on a Coregel-87C Column

Analysis Conditions:
Column: Coregel-87C
(7.8 mm x 300)
Eluent: Distilled Water
Flow rate: 0.6 mL/min
Temperature: 85°C
Pressure: 425 psig
Detection: RI Range 18x
Injection: 20 µL

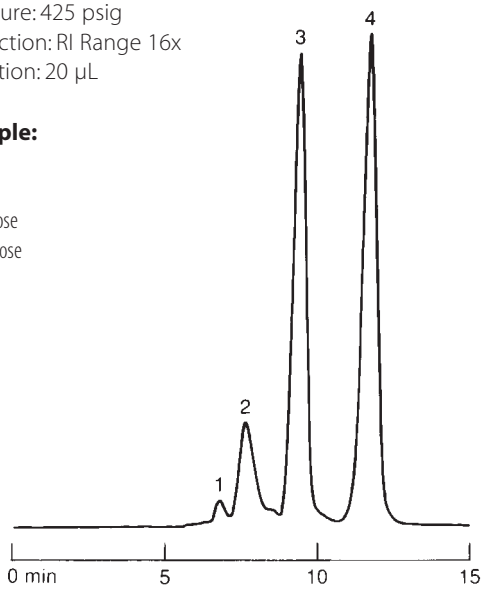
Sample:
1. Raffinose
2. Sucrose
3. Lactulose
4. Glucose
5. Galactose
6. Fructose
7. Ribitol
8. Mannitol
9. Sorbitol



Analysis of Honey on a Coregel-87C Column

Analysis Conditions:
Column: Coregel-87C
Eluent: Distilled Water
Flow rate: 0.6 mL/min
Temperature: 85°C
Pressure: 425 psig
Detection: RI Range 16x
Injection: 20 µL

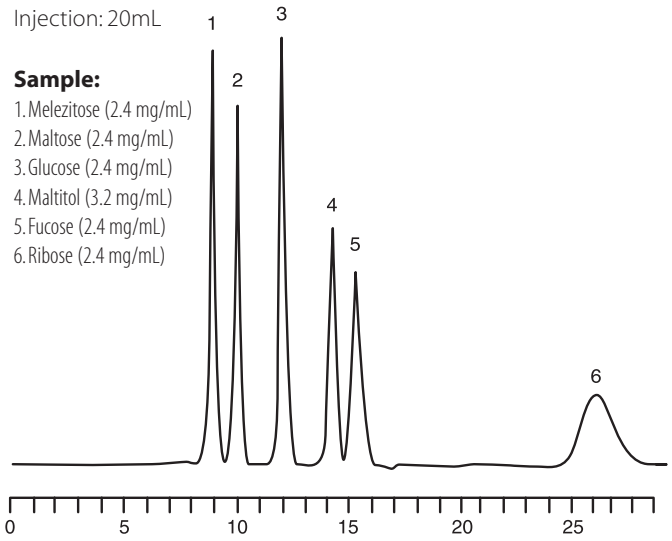
Sample:
1. DP3
2. DP2
3. Glucose
4. Fructose



Sugar Separation on CARBOSep CHO-820

Analysis Conditions:
Column: CHO-820
Eluent: Distilled Water
Flow rate: 0.5 mL/min
Temperature: 90°C
Detection: RI
Injection: 20mL

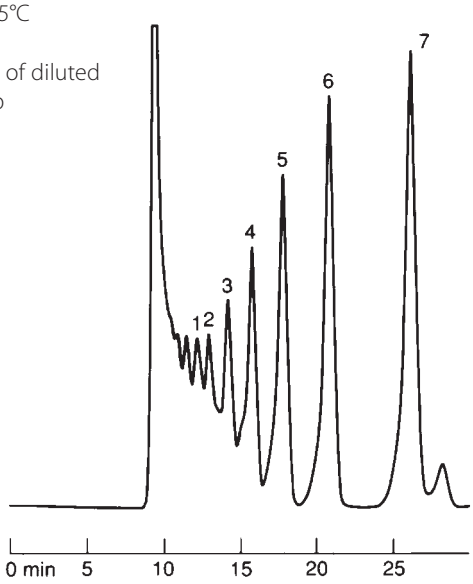
Sample:
1. Melezitose (2.4 mg/mL)
2. Maltose (2.4 mg/mL)
3. Glucose (2.4 mg/mL)
4. Maltitol (3.2 mg/mL)
5. Fucose (2.4 mg/mL)
6. Ribose (2.4 mg/mL)



Corn Syrup

Analysis Conditions:
Column: CHO-411
Eluent: H_2O
Flow rate: 0.5 mL/min
Temperature: 75°C
Detection: DRI
Injection: 20 µL of diluted dark corn syrup

Sample:
1. DP7
2. DP6
3. DP5
4. DP4
5. DP3
6. Maltose
7. Glucose



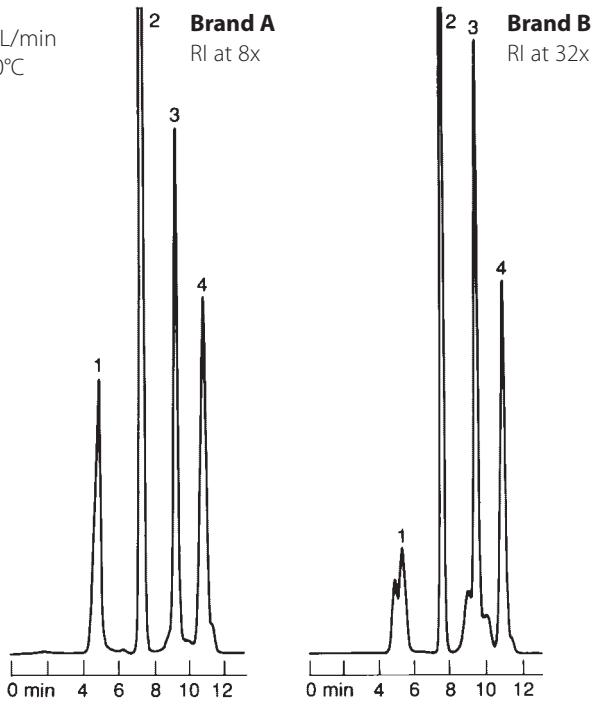
Orange Juice

Analysis Conditions:
Column: CHO-620
Eluent: H_2O
Flow rate: 0.5 mL/min
Temperature: 90°C
Detection: DRI
Injection: 20 µL

Sample:
1. Oligosaccharides
2. Sucrose
3. Glucose
4. Fructose

Brand A
RI at 8x

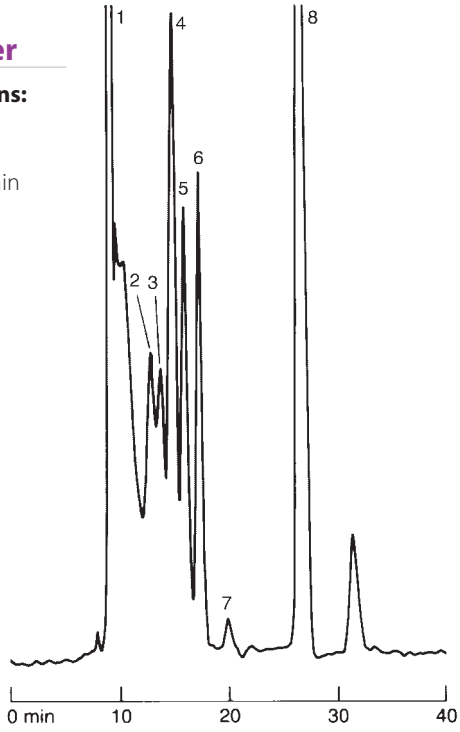
Brand B
RI at 32x



Domestic Beer

Analysis Conditions:
Column: CHO-682
Eluent: H_2O
Flow rate: 0.4 mL/min
Temperature: 80°C
Detection: DRI
Injection: 20 µL

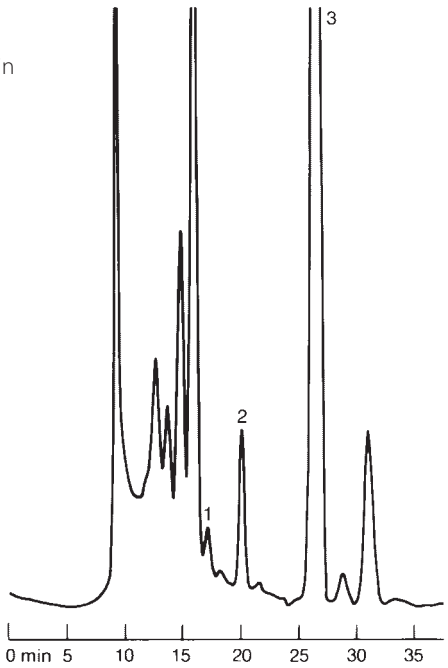
Sample:
1. Higher oligosaccharides
2. DP6
3. DP5
4. DP3
5. DP4
6. Maltose
7. Glucose
8. Ethanol



Determination of Sugars in Ale

Analysis Conditions:
Column: CHO-682
Eluent: H_2O
Flow rate: 0.4 mL/min
Temperature: 80°C
Detection: DRI
Injection: 20 µL

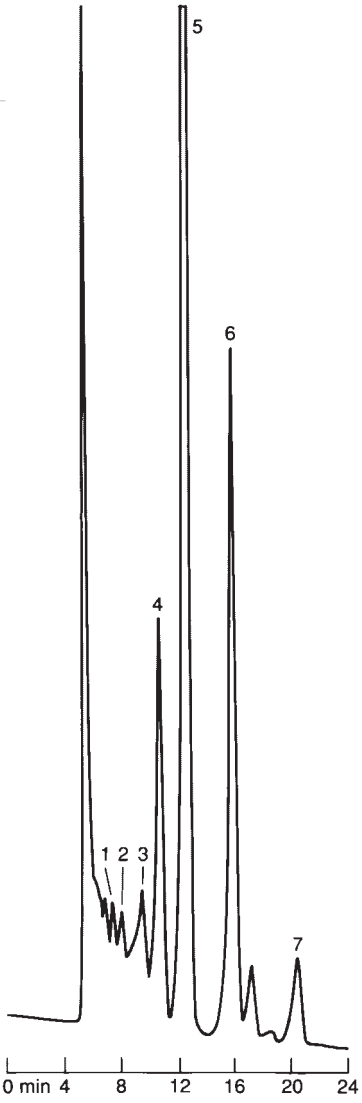
Sample:
1. Maltose
2. Glucose
3. Ethanol



Non-alcoholic Malt Liquor

Analysis Conditions:
Column: CHO-411
Eluent: H_2O
Flow rate: 0.5 mL/min
Temperature: 75°C
Detection: DRI
Injection: 20 µL

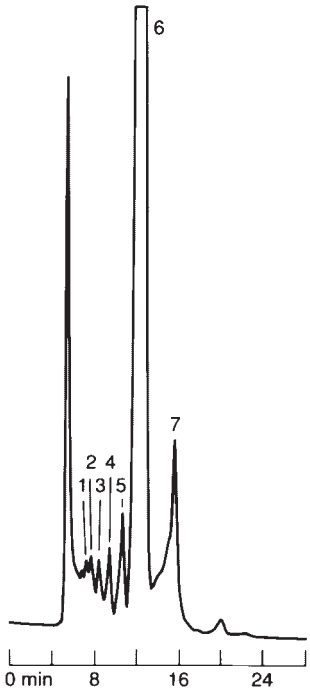
Sample:
1. DP6
2. DP5
3. DP4
4. DP3
5. Maltose
6. Glucose
7. Ethanol



Malted Milk Candy

Analysis Conditions:
Column: CHO-411
Eluent: H_2O
Flow rate: 0.5 mL/min
Temperature: 75°C
Detection: DRI
Injection: 20 µL of pretreated sample with POLYSorb™ ACT-1

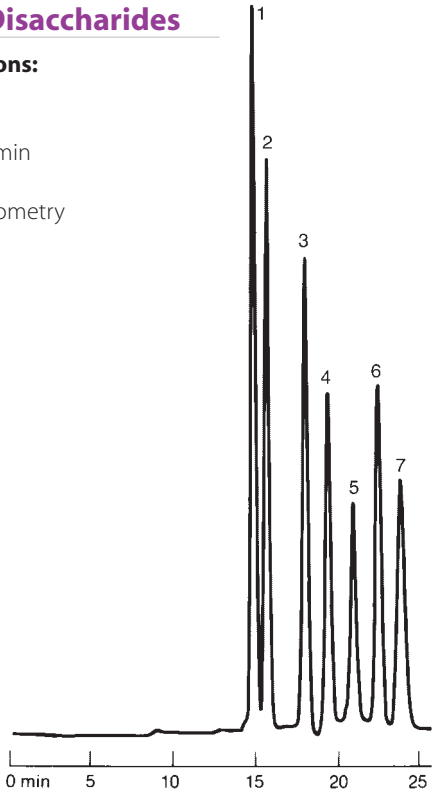
Sample:
1. DP7
2. DP6
3. DP5
4. DP4
5. DP3
6. Maltose
7. Glucose



Mono- and Disaccharides

Analysis Conditions:
Column: CHO-682
Eluent: H_2O
Flow rate: 0.4 mL/min
Temperature: 80°C
Detection: Refractometry

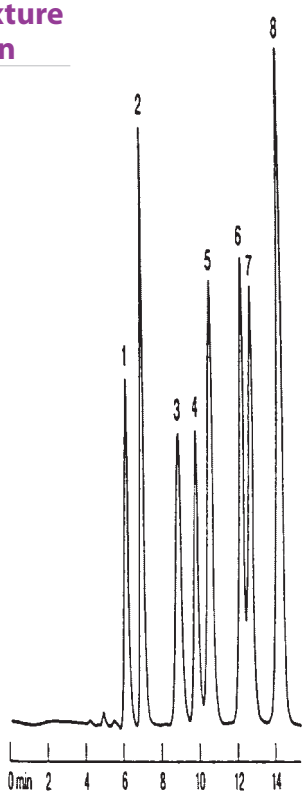
Sample:
1. Sucrose
2. Maltose
3. Glucose
4. Xylose
5. Galactose
6. Arabinose
7. Mannose



Standard Sugar Mixture On CHO-620 Column

Analysis Conditions:
Column: CHO-620
Eluent: H_2O
Flow rate: 0.5 mL/min
Temperature: 90°C
Detection: RI
Injection: 20 µL

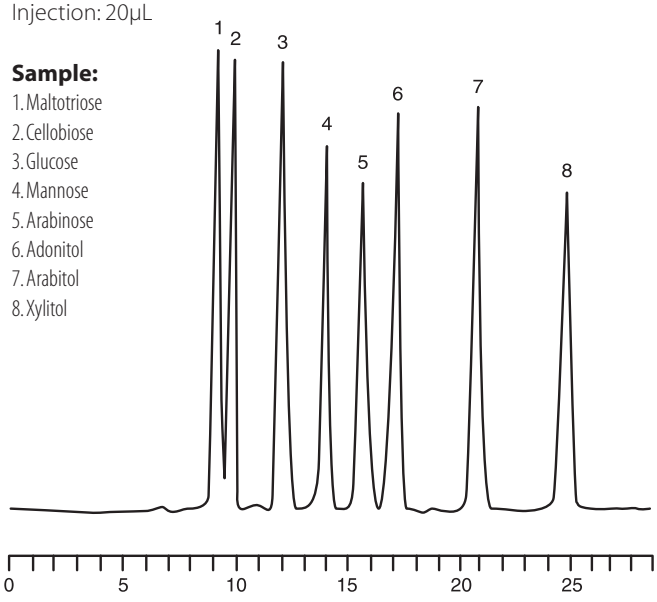
Sample:
1. Maltotriose
2. Sucrose
3. Glucose
4. Galactose
5. Fructose
6. Mannitol
7. Arabitol
8. Sorbitol



Saccharides and Sugar Alcohol Separation on CARBOSep CHO-820

Analysis Conditions:
Column: CHO-820
Eluent: Distilled Water
Flow rate: 0.5 mL/min
Temperature: 90°C
Detection: RI
Injection: 20µL

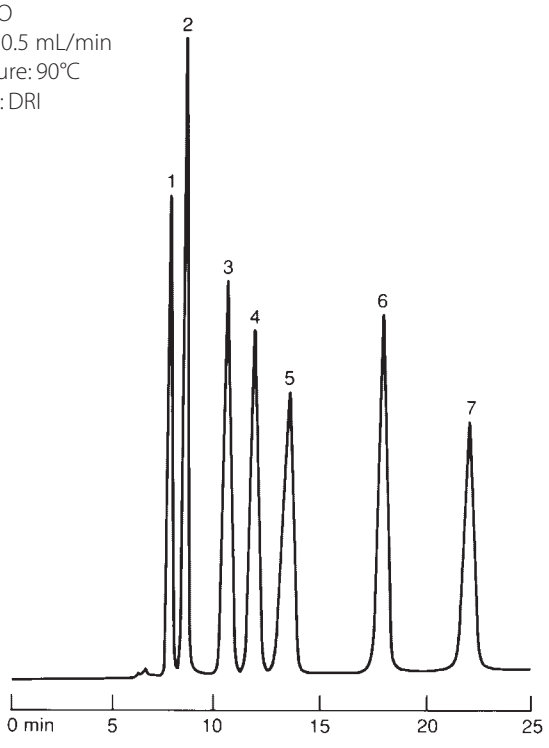
Sample:
1. Maltotriose
2. Cellobiose
3. Glucose
4. Mannose
5. Arabinose
6. Adonitol
7. Arabitol
8. Xylitol



Separation of Carbohydrate Standard

Analysis Conditions:
Column: CHO-820
Eluent: H_2O
Flow rate: 0.5 mL/min
Temperature: 90°C
Detection: DRI

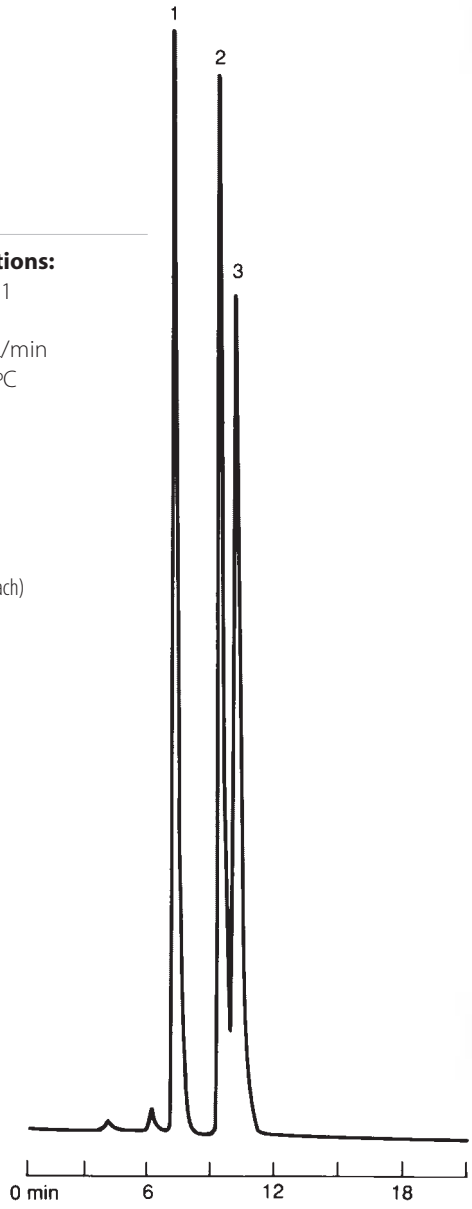
Sample:
1. Rafinose
2. Sucrose
3. Glucose
4. Galactose
5. Fructose
6. Mannitol
7. Sorbitol



Standards

Analysis Conditions:
Column: CHO-611
Eluent: H_2O
Flow rate: 0.5 mL/min
Temperature: 90ºC
Detection: DRI
Injection: 20 µL

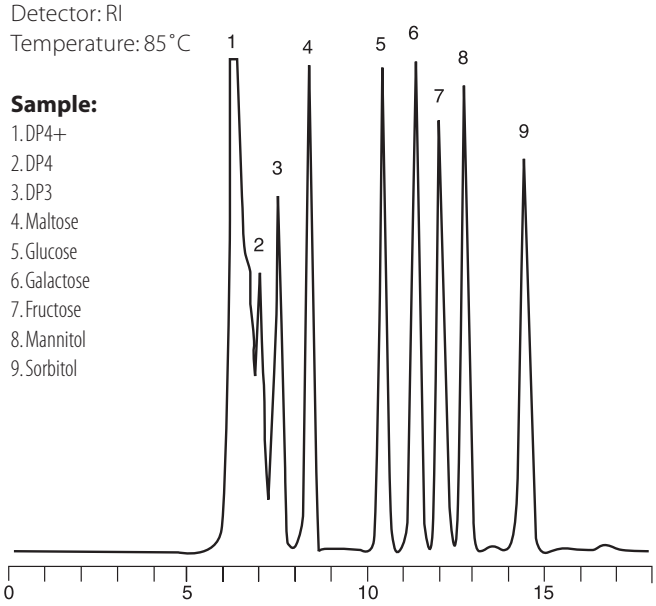
Sample:
1. Maltose
2. Glucose
3. Fructose (7 mg/mL each)



CARBOSep COREGEL-87MM Column

Analysis Conditions:
Eluent: H_2O
Flow Rate : 0.6mL/min
Detector: RI
Temperature: 85˚C

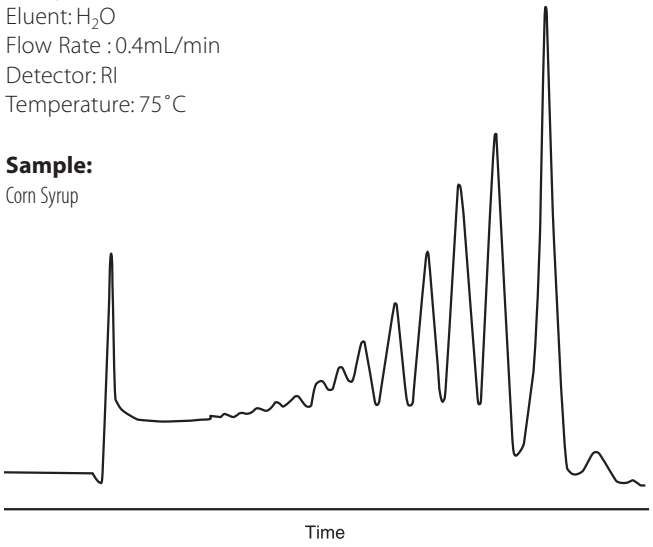
Sample:
1. DP4+
2. DP4
3. DP3
4. Maltose
5. Glucose
6. Galactose
7. Fructose
8. Mannitol
9. Sorbitol



CARBOSep COREGEL-42Ag Column

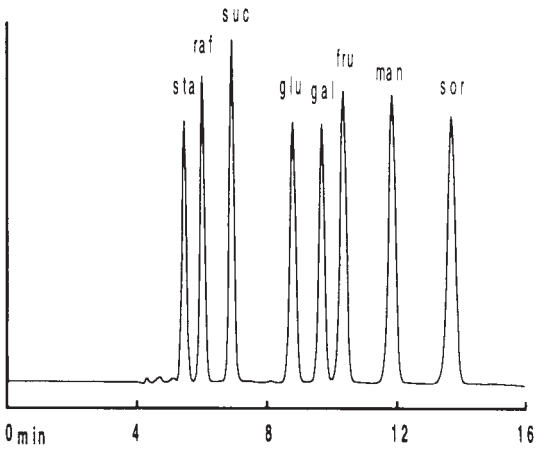
Analysis Conditions:
Eluent: H_2O
Flow Rate : 0.4mL/min
Detector: RI
Temperature: 75˚C

Sample:
Corn Syrup



CARBOSep CHO-620

(6.5 x 300mm)
P/N CHO-99-9753
- Calcium form ligand-exchange column
- Ideal for the separation of monosaccharides and sugar alcohols
- Very reproducible



CARBOSep CHO-620 Guard Kit

P/N CHO-99-2353

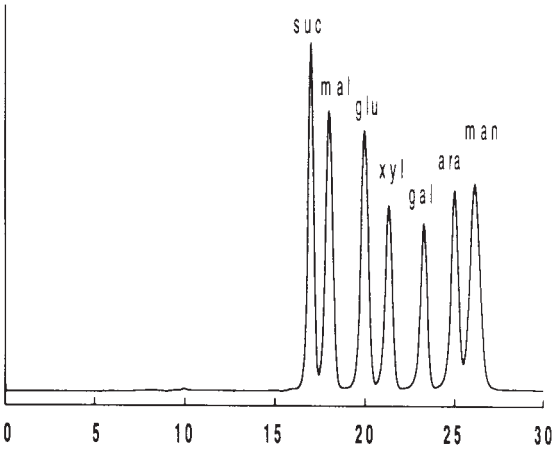
CARBOSep CHO-620 Guard Cartridge – 2/PK

P/N CH0-99-1353

CARBOSep CHO-682 Lead

(7.8 x 200mm)
P/N CHO-99-8854

(7.8 x 300mm)
P/N CHO-99-9854
- Lead form ligand-exchange column
- Ideal for the separation of mono and disaccharides as well as alcohols
- High capacity



CARBOSep CHO-682 Guard Kit

P/N CHO-99-2354

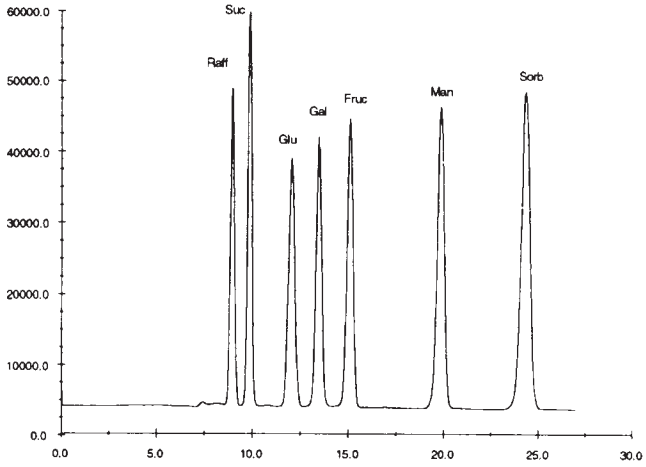
CARBOSep CHO-682 Guard Cartridge – 2/PK

P/N CH0-99-1354

CARBOSep CHO-820 Calcium

(7.8 x 200mm)
P/N CHO-99-8855

(7.8 x 300mm)
P/N CHO-99-9855
- Calcium form ligand-exchange column
- Designed with balance of resolution and ruggedness



CARBOSep CHO-820 Guard Kit

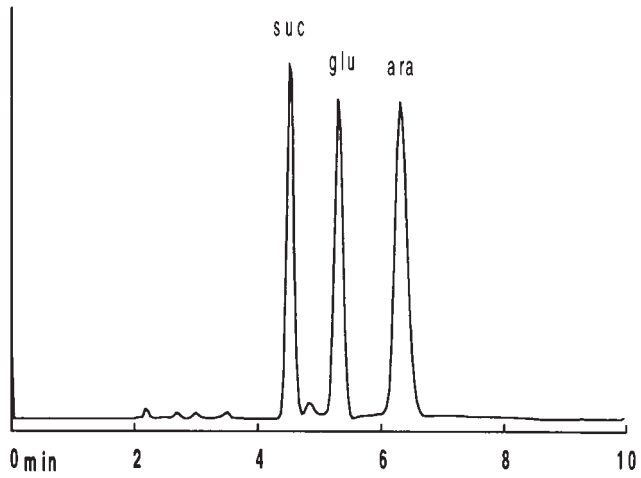
P/N CHO-99-2355

CARBOSep CHO-820 Guard Cartridge – 2/PK

P/N CHO-99-1355

CARBOSep CHO-611 OH

(6.5 x 150mm)
P/N CHO-99-7752
- Sodium form ligand-exchange column
- Designed for use with Sodium Hydroxide eluant
- Compatible with amperometric detection



CARBOSep CHO-611 OH Guard Kit

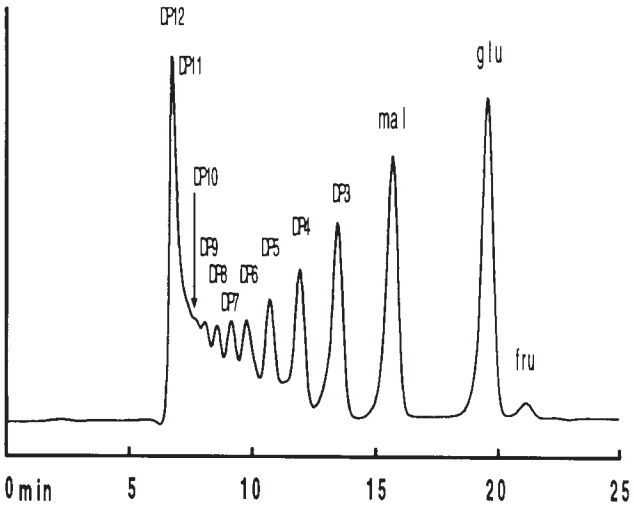
P/N CHO-99-2352

CARBOSep CHO-611 OH Guard Cartridge – 2/PK

P/N CH0-99-1352

CARBOSep CHO-411

(7.8 x 300mm)
P/N CHO-99-9850
- Sodium form mixed-mode column
- Separates by both ligand exchange and size exclusion
- Designed for the separation of oligosaccharides up to DP10
- Reproducible separation of corn syrup



CARBOSep CHO-611 Guard Kit

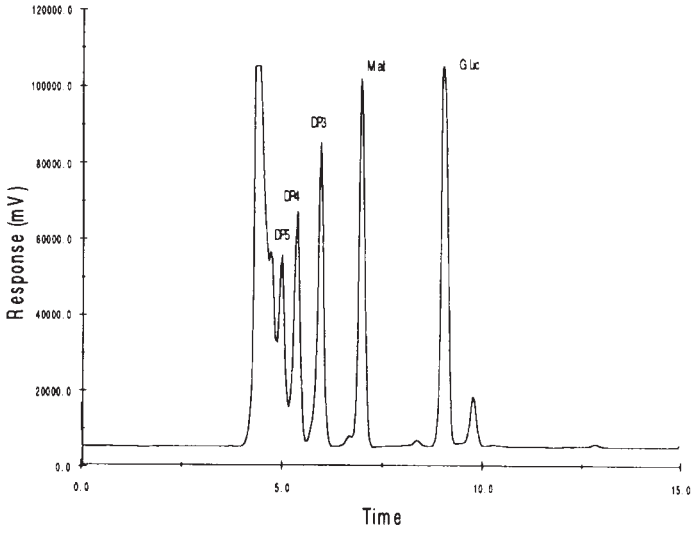
P/N CHO-99-2351

CARBOSep CHO-611 Guard Cartridge – 2/PK

P/N CH0-99-1351

CARBOSep CHO-611

(6.5 x 300mm)
P/N CHO-99-9751
- Sodium form mixed-mode column
- Separates by both ligand exchange and size exclusion
- Designed for the separation of oligosaccharides up to DP5
- Reproducible separation of corn syrup



CARBOSep CHO-611 Guard Kit

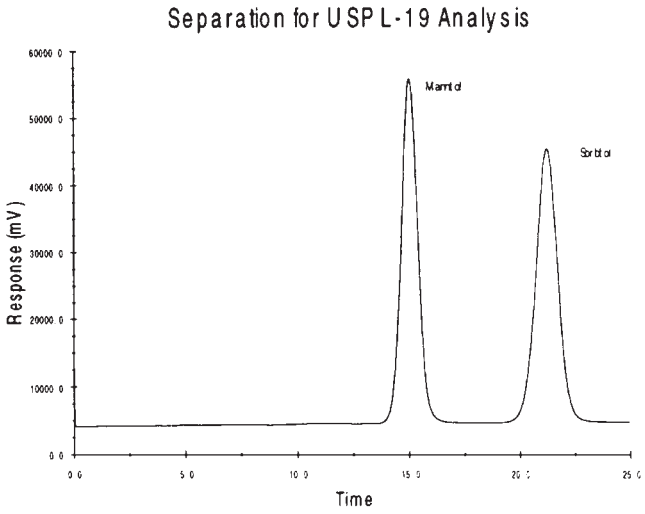
P/N CHO-99-2351

CARBOSep CHO-611 Guard Cartridge – 2/PK

P/N CH0-99-1351

CARBOSep USP L19 CA-FORM

(4.0 x 250mm)
P/N CHO-99-8453
- Calcium form ligand-exchange column
- Complies with USP L-19 specifications for the separation of sorbitol and mannitol
- Can also separate a wide number of other carbohydrates



CARBOSep CHO-820 Guard Kit

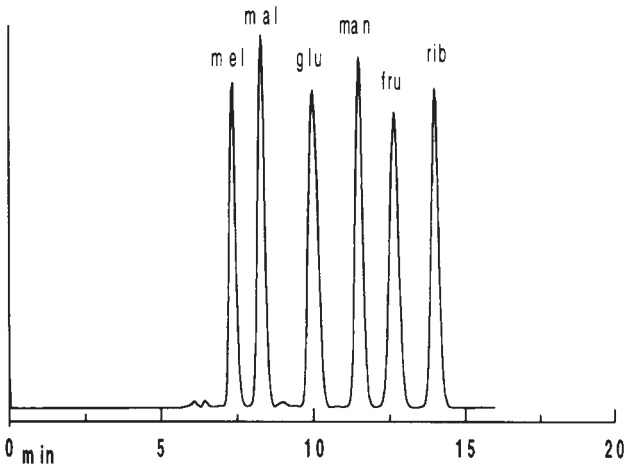
P/N CHO-99-2355

CARBOSep CHO-820 Guard Cartridge – 2/PK

P/N CHO-99-1355

CARBOSep COREGEL-87C

(7.8 x 300)
P/N CHO-99-9860
- Calcium form 9µm ligand exchange resin with 8% cross-linking
- Compatible replacement for the Bio-Rad Aminex HPX 87C
- Designed for the analysis of sugars and sugar alcohols



CARBOSep COREGEL-87C Guard Kit

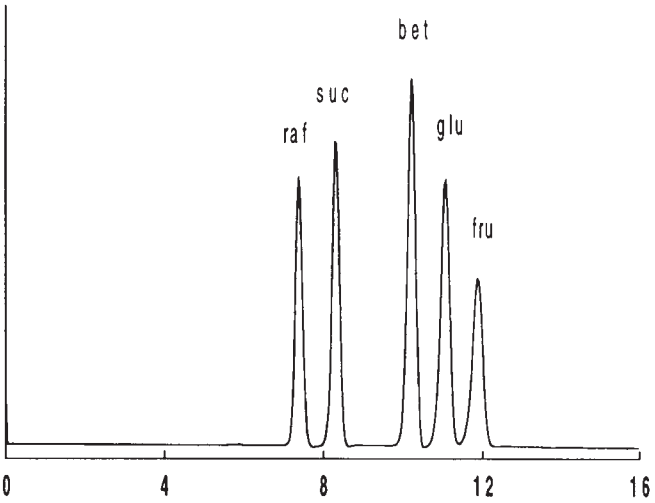
P/N CHO-99-2360

CARBOSep COREGEL-87C Guard Cartridge – 2/PK

P/N CHO-99-1360

CARBOSep COREGEL-87K

(7.8 x 300)
P/N CHO-99-9862
- Potassium form 8µm ligand exchange resin with 8% cross-linking
- Compatible replacement for the Bio-Rad Aminex HPX 87K
- Target application corn syrup and molasses



CARBOSep COREGEL-87K Guard Cartridge – 2/PK

P/N CHO-99-1362

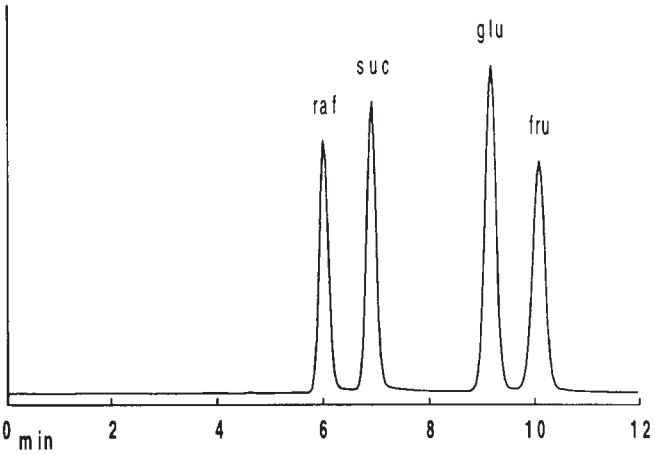
Universal Guard Cartridge Holder

P/N AXC-99-1300

CARBOSep COREGEL-87N

(7.8 x 300mm)
P/N CHO-99-9863

- Sodium form 8µm ligand exchange resin with 8% cross-linking
- Compatible replacement for the Bio-Rad Aminex HPX 87N
- Designed for the fast separation of monosaccharides and sugar alcohols



CARBOSep COREGEL-87N Guard Cartridge – 2/PK

P/N CHO-99-1363

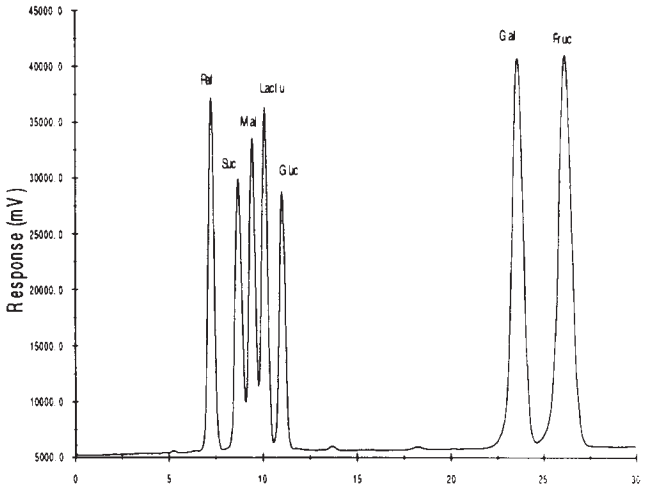
Universal Guard Cartridge Holder

P/N AXC-99-1300

CARBOSep COREGEL-87P

(7.8 x 300mm)
P/N CHO-99-9864

- Lead form 8µm ligand exchange resin with 8% cross-linking
- Compatible replacement for the Bio-Rad Aminex HPX 87P
- Optimized for the analysis of cellulose hydrolysates



CARBOSep COREGEL-87P Guard Cartridge – 2/PK

P/N CHO-99-1364

Universal Guard Cartridge Holder

P/N AXC-99-1300

CARBOSep COREGEL-87MM

(7.8 x 300mm)
P/N CHO-99-9865

- Mixed calcium/sodium form ligand-exchange column
- Increased efficiency of glucose, fructose, and sugar alcohols
- Easily cleaned with $EDTACaNa_2$

CARBOSep COREGEL-87MM Guard Cartridge 2/PK

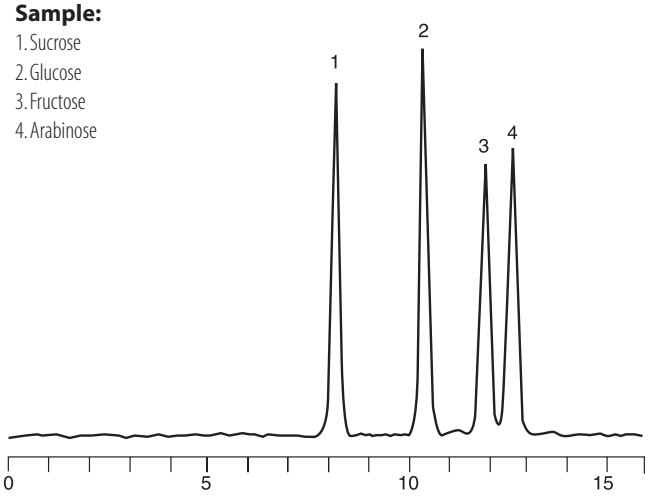
P/N CHO-99-1365

Universal Guard Cartridge Holder

P/N AXC-99-1300

Analysis Conditions:
Eluent: Water
Flow rate: 0.6 mL/min
Detector: RI

Sample:
1. Sucrose
2. Glucose
3. Fructose
4. Arabinose



CARBOSep COREGEL-42Ag

(7.8 x 300mm)
P/N CHO-99-9851

- Silver form ligand-exchange column
- Separate oligosaccharides up to DP11
- Compatible replacement for the Bio-Rad Aminex HPX-42A column

CARBOSep COREGEL-42Ag Guard Cartridge 2/PK

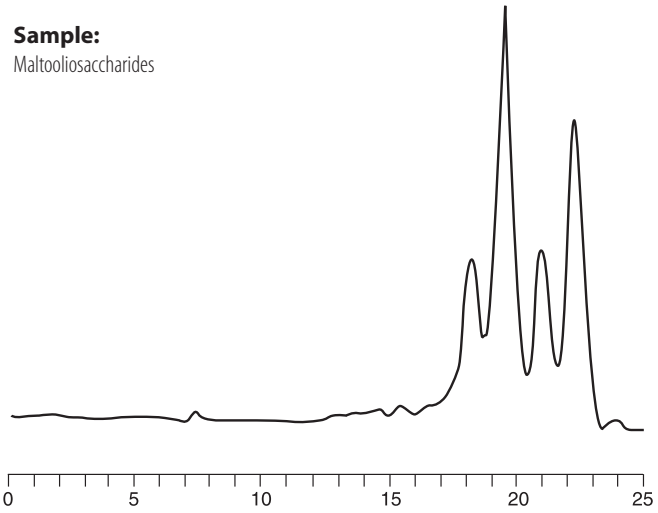
P/N CHO-99-1366

Universal Guard Cartridge Holder

P/N AXC-99-1300

Analysis Conditions:
Eluent: H_2O
Flow rate: 0.4 mL/min
Detector: RI

Sample:
Maltooliosaccharides



ORGANIC ACID *Analysis*

ICSep Columns for Organic Acid Analysis

Ion exclusion is the preferred method for the separation of weakly ionizable species such as organic acids and alcohols. Transgenomic provides a broad range of columns that provide varying efficiencies and selectivities for the separation of weak acids by ion exclusion.

The packings employed with ion exclusion are totally sulfonated polystyrene divinylbenze (PS/DVB) copolymers. By totally sulfonating the polymer, the bead behaves as though it were a negatively charged sphere. This charged sphere is referred to as a Donnan membrane. Species that have a negative charge are repelled from the negatively charged membrane, while uncharged species are allowed to enter the sphere and adsorb onto the beads. The mobile phases employed with ion exclusion are low concentration acids, such as 5mM sulfuric acid.

$$R\text{-}COO^- + H^+ \longleftrightarrow R\text{-}COOH$$

(repelled) (retained)

This equilibrium is regulated by the acidic dissociation constant (pKa) of the organic acid or alcohol. Therefore, species are analyzed by ion exclusion and elute according to their pKa.

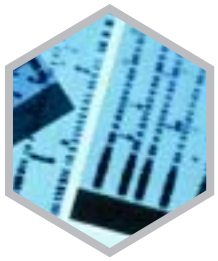
Features

The key features of the ICSep ion exclusion columns are:

- **Polymeric Substrate**
- **High efficiency**
- **High resolution**
- **Separates organic acids, carbohydrates, and alcohols on the same column**
- **Very Rugged Design which provides long life**

Since ICSep columns are based on a polymeric substrate consisting of polystyrene/divinylbenzene copolymers they are stable in the pH range of 0 to 14, temperature stable, and very rugged. The ICSep organic acid columns have been shown to last for thousands of runs without cleaning. They show very good lot-to-lot and column-to-column reproducibility with retention times varying by less than 1%.

Transgenomic offers ICSep organic acid columns to meet your analytical needs. ICSep columns are available that focus on speed or efficiency and there are ICSep ion exclusion columns that focus on ruggedness and the ability to handle dirty samples. There are even ICSep columns for aromatic organic acids. Transgenomic is sure to have an ion exclusion column to meet your needs.



Selectivity Chart for Ion Exclusion Columns

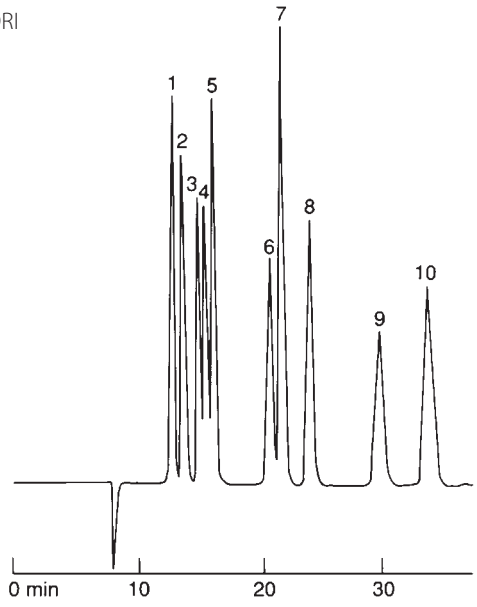
Compound	Coregel 87H @ 85°C (units in minutes)	Coregel 64H @ 65°C (units in minutes)	ION-300 @ 65°C (units in minutes)	ORH-801 @ 45°C (units in minutes)
Acetic acid	13.8	15.0	14.9	10.4
Acetoacetic acid	nd	nd	nd	10.2
Aconitic acid	8.6	9.8	10.7	7.2
Acrylic acid	15.9	17.7	17.9	13.1
Adipic acid	12.5	15.1	15.8	11.6
Butanol	32.9	35.1	25.2	18.4
Butyric acid	18.4	21.0	20.8	15.2
Citraconic acid	10.1	11.0	11.5	nd
Citric acid	7.5	8.0	8.6	5.5
Ethanol	21.4	21.7	20.6	14.6
Formic acid	12.9	13.8	13.9	9.6
Fumaric acid	11.5	13.4	14.7	10.0
2-Furoic acid	22.1	26.9	29.0	22.0
Glucoronic acid	nd	nd	nd	5.3
Glycolic acid	11.4	13.0	12.9	8.5
Glycoxylic acid	9.2	9.7	10.3	6.5
Hydroxybutyric acid	12.8	14.0	14.1	9.5
Iso-butyric acid	17.3	19.6	19.5	14.0
Itaconic acid	11.1	12.8	13.4	9.1
Keto-butyric acid	nd	nd	11.4	7.4
Keto-glutaric acid	7.8	8.2	nd	5.6
Keto-valeric acid	11.7	12.6	13.1	8.6
Lactic acid	11.9	12.9	11.6	8.7
Maleic acid	8.2	8.6	9.0	5.9
Malic acid	8.8	9.6	10.3	6.6
Malonic acid	9.3	10.0	10.7	6.9
Methanol	18.7	19.0	18.7	12.9
Methylglutaric acid	11.8	13.9	14.5	10.0
Methylsuccinic acid	10.9	12.5	13.0	8.8
Oxalic acid	6.7	6.6	nd	4.5
Propanol	25.9	26.7	22.2	16.1
Propionic acid	15.8	17.4	17.4	12.3
Pyruvic acid	9.2	9.5	9.9	6.3
Quinic acid	9.4	10.3	11.4	6.9
Shikimic acid	10.5	11.8	12.9	8.2
Succinic acid	10.4	11.7	12.2	8.2
Tartaric acid	8.0	8.6	9.5	5.9

Flow rate: 0.6 mL/minute. nd = not determined

Standard Mixture of Sugars and Acids

Analysis Conditions:
Column: ION-300
Eluent: 0.0085 *N* H_2SO_4
Flow rate: 0.4 mL/min
Temperature: 70°C
Detection: DRI

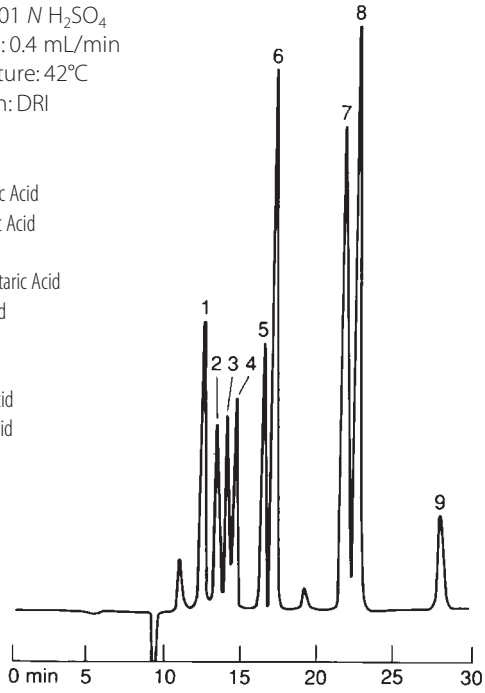
Sample:
1. Citric Acid
2. Tartaric Acid
3. Glucose
4. Malic Acid
5. Fructose
6. Lactic Acid
7. Glycerol
8. Acetic Acid
9. Methanol
10. Ethanol



Krebs Tricarboxylic Acid Cycle Intermediates

Analysis Conditions:
Column: ION-300
Eluent: 0.01 *N* H_2SO_4
Flow rate: 0.4 mL/min
Temperature: 42°C
Detection: DRI

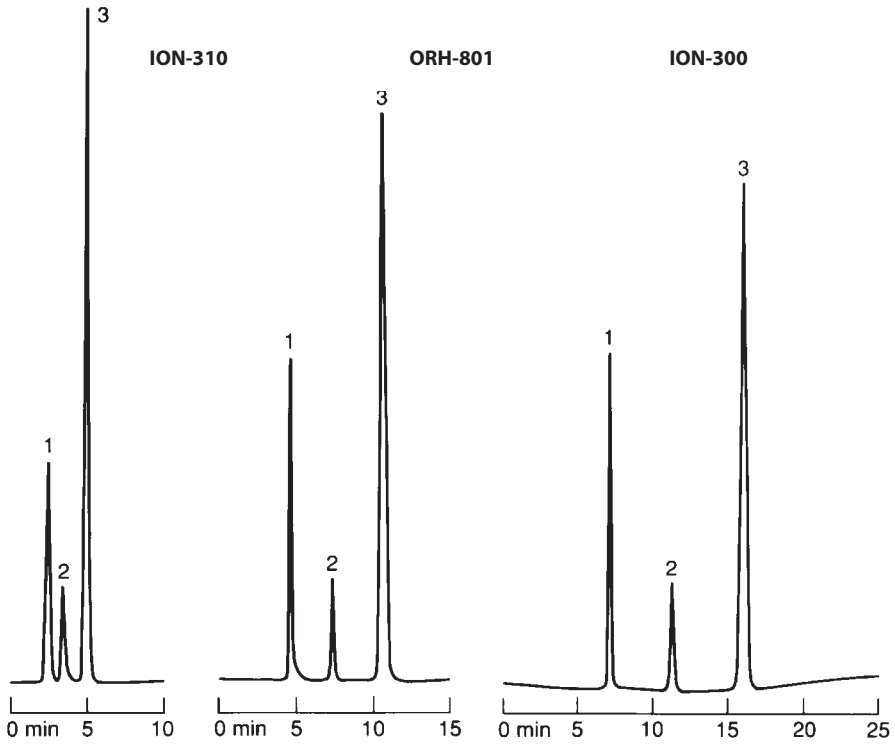
Sample:
1. Cis-Aconitic Acid
2. Oxaloacetic Acid
3. Citric Acid
4. α-ketoglutaric Acid
5. Pyruvic Acid
6. Malic Acid
7. Lactic Acid
8. Succinic Acid
9. Fumaric Acid



Comparison of Organic Acids Retention on Ion-exclusion Columns

Analysis Conditions:
Column: ION-310 (6.5 x 150 mm),
ORH-801 (6.5 x 300 mm),
ION-300 (7.8 x 300 mm)
Eluent: 0.002 *N* H_2SO_4
Flow rate: 0.5 mL/min
Temperature: 35°C
Detection: UV at 210 nm
Injection: 20 µL

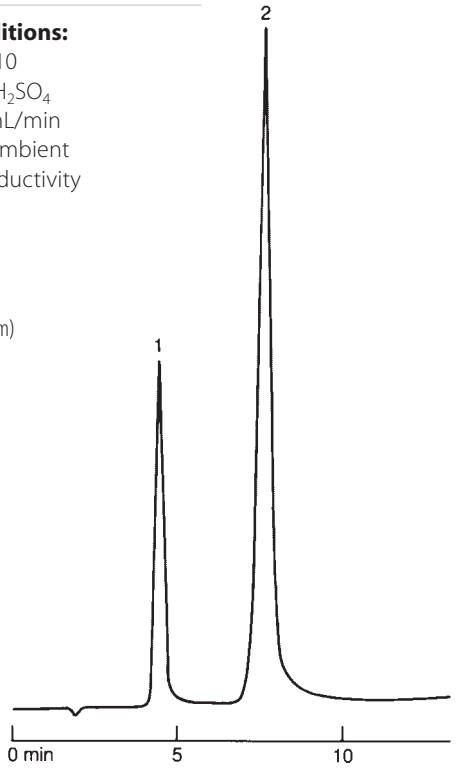
Sample:
1. Maleic Acid (2 ppm)
2. Malic Acid (100 ppm)
3. Fumaric Acid (5 ppm)



Borate and Bicarbonate

Analysis Conditions:
Column: ION-310
Eluent: 0.05 *M* H_2SO_4
Flow rate: 0.5 mL/min
Temperature: Ambient
Detection: Conductivity
Injection: 20 µL

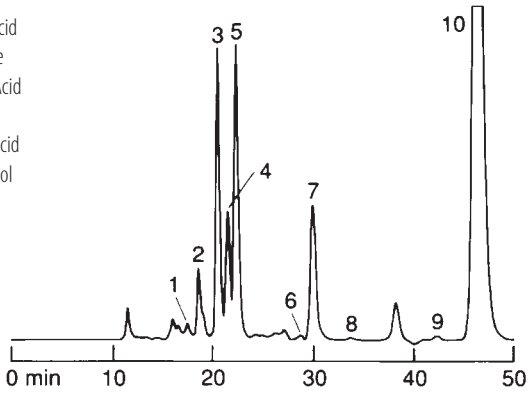
Sample:
1. Borate (11 ppm)
2. Bicarbonate (60 ppm)



Wine Analysis by High Resolution Ion Exclusion

Analysis Conditions:
Column: ION-300
Eluent: 0.005 *N* H_2SO_4
Flow rate: 0.3 mL/min
Temperature: 60°C
Detection: DRI

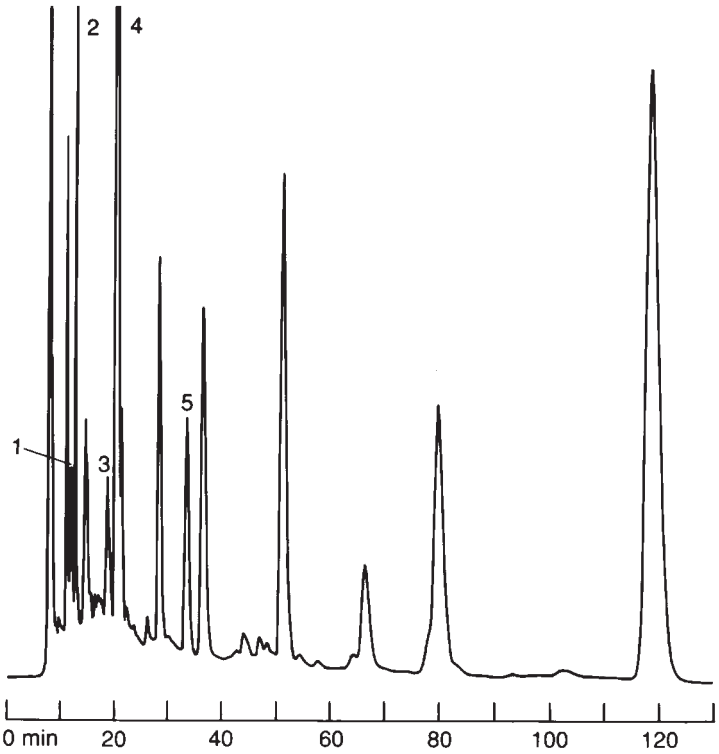
Sample:
1. Citric Acid
2. Tartaric Acid
3. Glucose
4. Malic Acid
5. Fructose
6. Acetic Acid
7. Glycerol
8. Lactic Acid
9. Methanol
10. Ethanol



Analysis of Corn Mash Fermentation Sample

Analysis Conditions:
Column: ION-300
Eluent: 0.005 *N* H_2SO_4
Flow rate: 0.4 mL/min
Temperature: 60°C
Detection: UV at 210
Injection: 20 µL filtered
corn mash fermentation broth

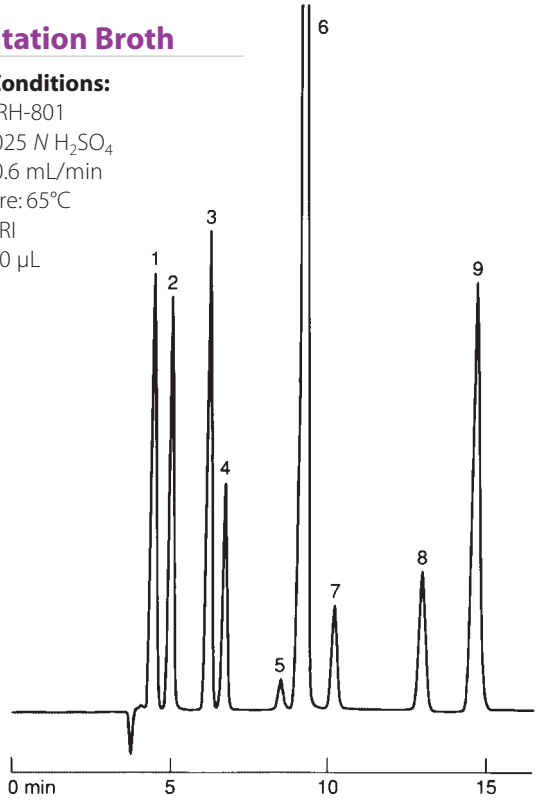
Sample:
1. Citric, Isocitric
2. Pyruvic
3. Succinic
4. Fumaric
5. Ethanol



Fermentation Broth

Analysis Conditions:
Column: ORH-801
Eluent: 0.0025 *N* H_2SO_4
Flow rate: 0.6 mL/min
Temperature: 65°C
Detection: RI
Injection: 20 µL

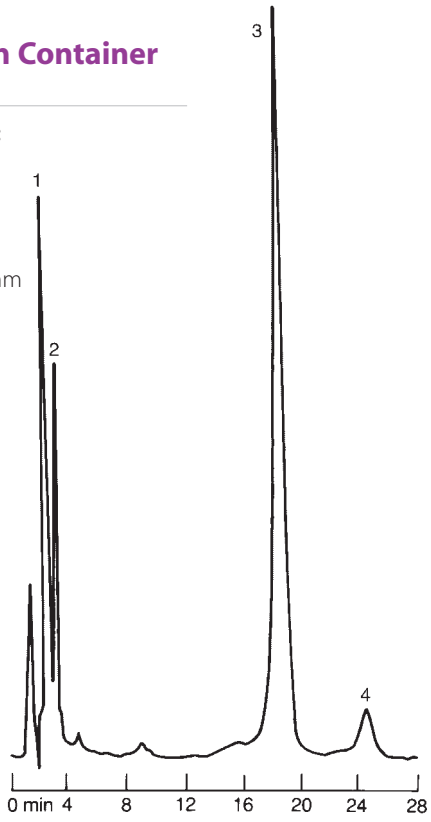
Sample:
1. Maltotriose
2. Maltose
3. Glucose
4. Fructose
5. Lactic Acid
6. Glycerol
7. Acetic Acid
8. Methanol
9. Ethanol



Preservatives in Container Citrus Juice

Analysis Conditions:
Column: ARH-601
Eluent: 0.01 *N* H_2SO_4
Flow rate: 0.6 mL/min
Temperature: 45°C
Detection: UV at 228 nm

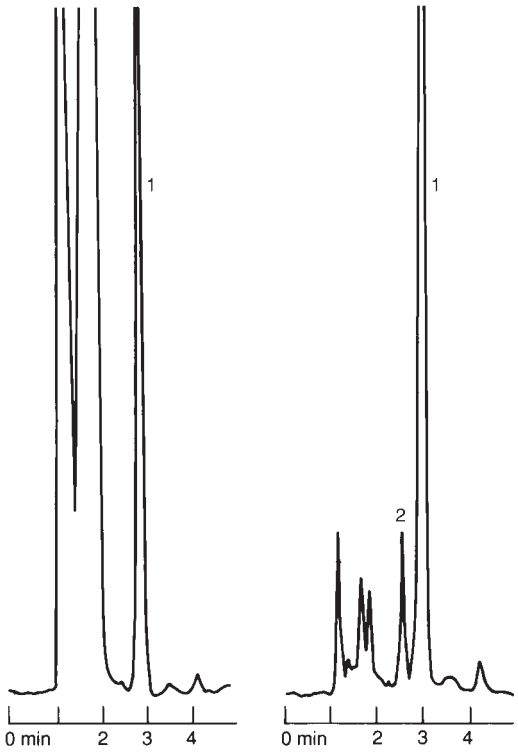
Sample:
1. Citric Acid
2. Ascorbic Acid
3. Sorbic Acid
4. Benzoic Acid



Fast Acid Analysis

Analysis Conditions:
Column: ORH-801
Eluent: 0.01 *N* H_2SO_4
Flow rate: 0.5 mL/min
Detection: Conductivity

Sample:
1. Acetic Acid
2. Glycerol

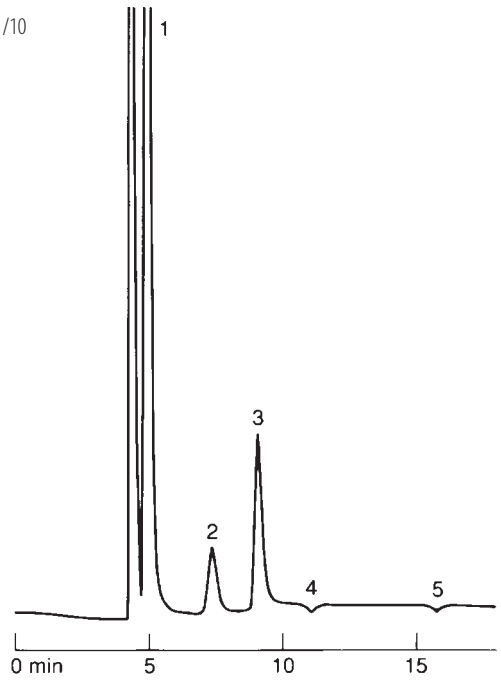


Fluoride in Dental Rinse

Analysis Conditions:
Column: ION-310
Eluent: 0.01 *N* H_2SO_4
Flow rate: 1.0 mL/min
Temperature: 50°C
Detection: DRI

Sample:
Dental rinse diluted 1/10 with eluent, 20 µL

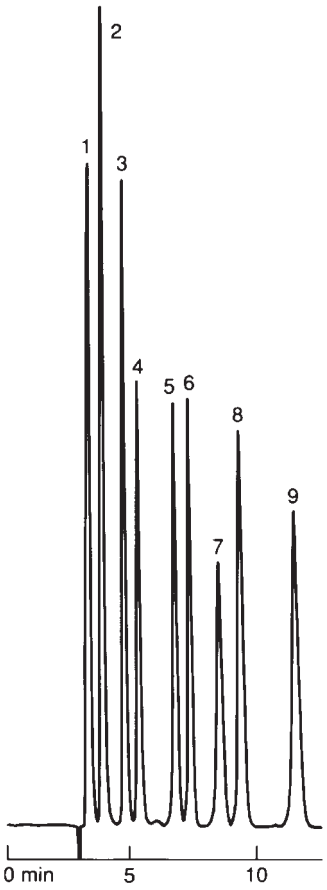
1. Phosphate
2. Saccharin
3. Glycerol
5. Ethanol



Separation of Organic Acids

Analysis Conditions:
Column: ORH-801
Eluent: 0.01 *N* H_2SO_4
Flow rate: 0.8 mL/min
Temperature: 35°C
Detection: DRI
Injection: 20 µL

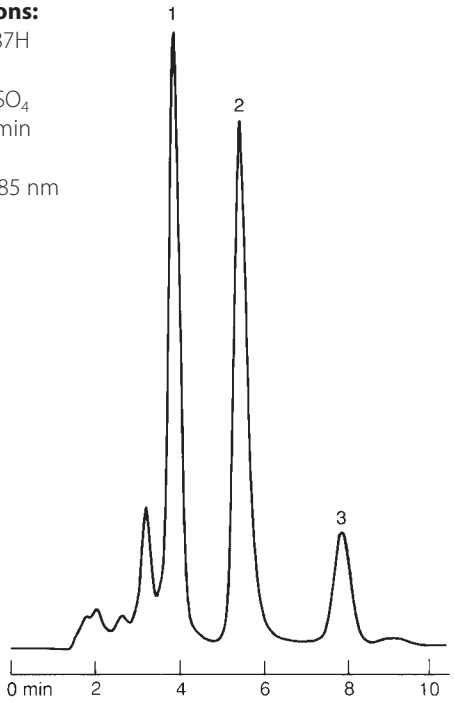
Sample:
1. Oxalic
2. cis-aconitic
3. Tartaric
4. Malic
5. Lactic
6. Formic
7. Fumaric
8. Propionic
9. Butyric



Determination of Chemical Markers for Thermal Processing of Ground Meat

Analysis Conditions:
Column: Coregel-87H
(100 x 7.8 mm)
Eluent: 0.005 *N* H_2SO_4
Flow rate: 1.0 mL/min
Temperature: 35°C
Detection: UV at 285 nm
Injection: 20 µL

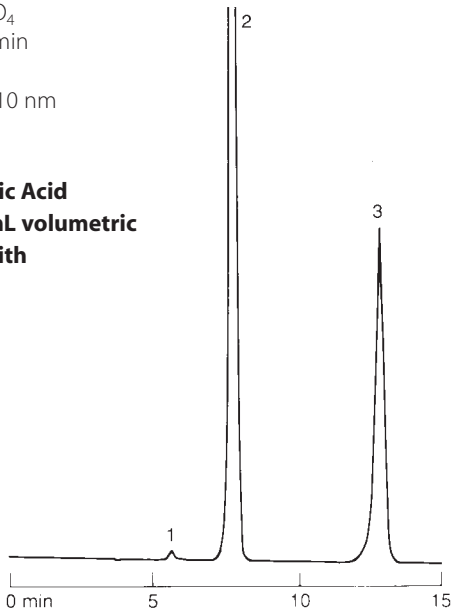
Sample:
1. M1
2. M2
3. M3



USP-NF Malic Acid Method, Fumaric and Maleic Acids

Analysis Conditions:
Column: ORH-801
packing L17 specification
Eluent: 0.01 *N* H_2SO_4
Flow rate: 0.6 mL/min
Temperature: 37°C
Detection: UV at 210 nm
Injection: 20 µL

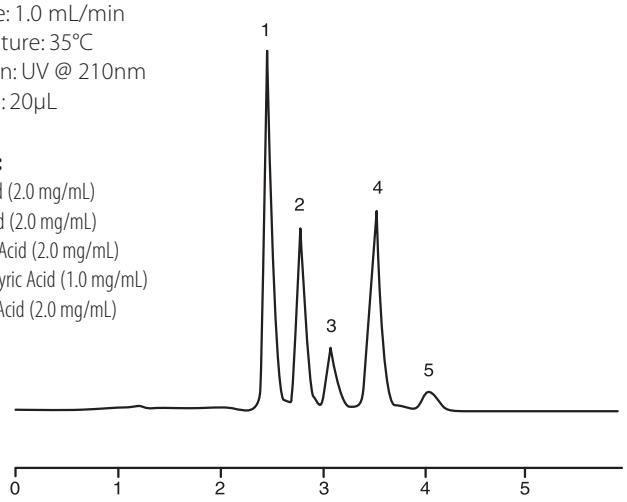
Sample: USP Malic Acid (100 mg in 100 mL volumetric flask, made up with 0.01 N H_2SO_4)
1. Maleic Acid
2. Malic Acid
3. Fumaric Acid



Organic Acid Separation on COREGEL-87H1

Analysis Conditions:
Column: COREGEL-87H1
Eluent: 5mM Sulfuric Acid
Flow rate: 1.0 mL/min
Temperature: 35°C
Detection: UV @ 210nm
Injection: 20µL

Sample:
1. Lactic Acid (2.0 mg/mL)
2. Acetic Acid (2.0 mg/mL)
3. Propionic Acid (2.0 mg/mL)
4. alpha-Butyric Acid (1.0 mg/mL)
5. Glutamic Acid (2.0 mg/mL)



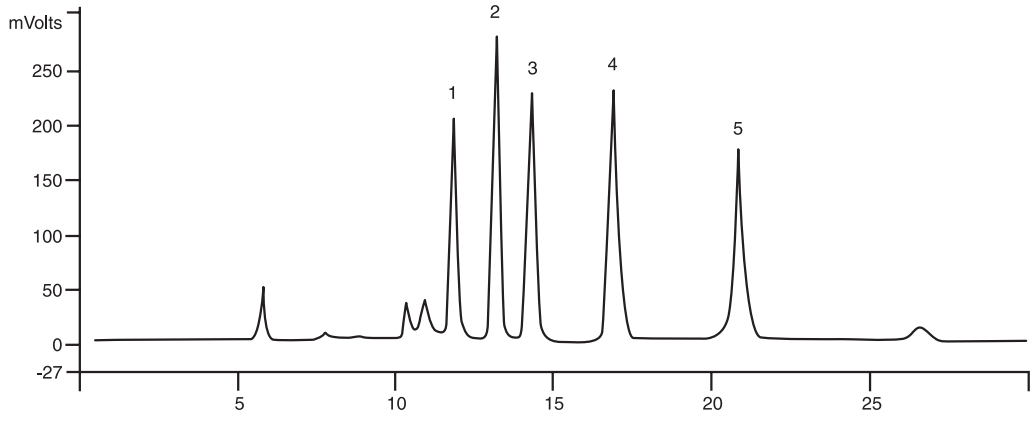
ICSep COREGEL-87H1

(7.8 x 100mm)
P/N ICE-99-5861

Organic Acid Separation on COREGEL-87H3

Analysis Conditions:
Column: COREGEL-87H3
Eluent: 0.008M Sulfuric Acid
Flow rate: 0.6 mL/min
Temperature: 35°C
Detection: UV @ 210nm
Injection: 20µL

Sample:
1. Lactic Acid
2. Formic Acid
3. Acetic Acid
4. Propionic Acid
5. Butyric Acid



ICSep COREGEL-87H3

(7.8 x 300mm)
P/N ICE-99-9861

ICSep COREGEL 87H Guard Kit

P/N ICE-99-2361

ICSep COREGEL 87H Guard Cartridge – 2/PK

P/N ICE-99-2371

ICSep ION-300

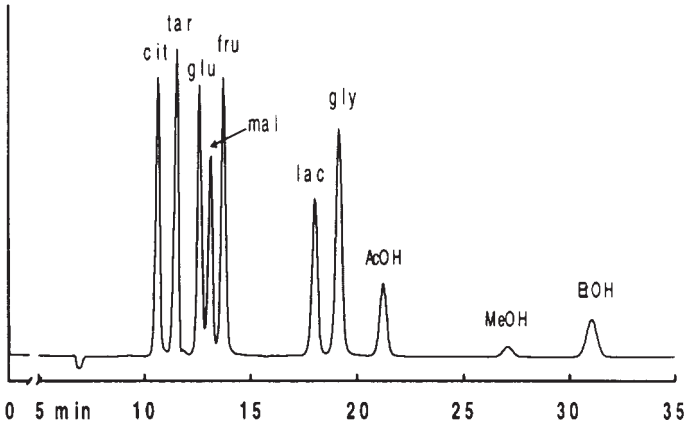
(7.8 x 300mm)
P/N ICE-99-9850
- Select when high resolution is the primary concern
- Separates Organic Acids, Alcohols and Carbohydrates all on the same column

ICSep GC-801 Guard Kit

P/N ICE-99-2354

ICSep GC-801 Guard Cartridge – 2/PK

P/N ICE-99-2364



ICSep COREGEL-107H

(7.8 x 300mm)
P/N ICE-99-9866
- New Higher Cross-linked Column
- Improved Resolution for Organic Acids

ICSep COREGEL-107H Guard Cartridge – 2/PK

P/N ICE-99-2366

Universal Guard Cartridge Holder

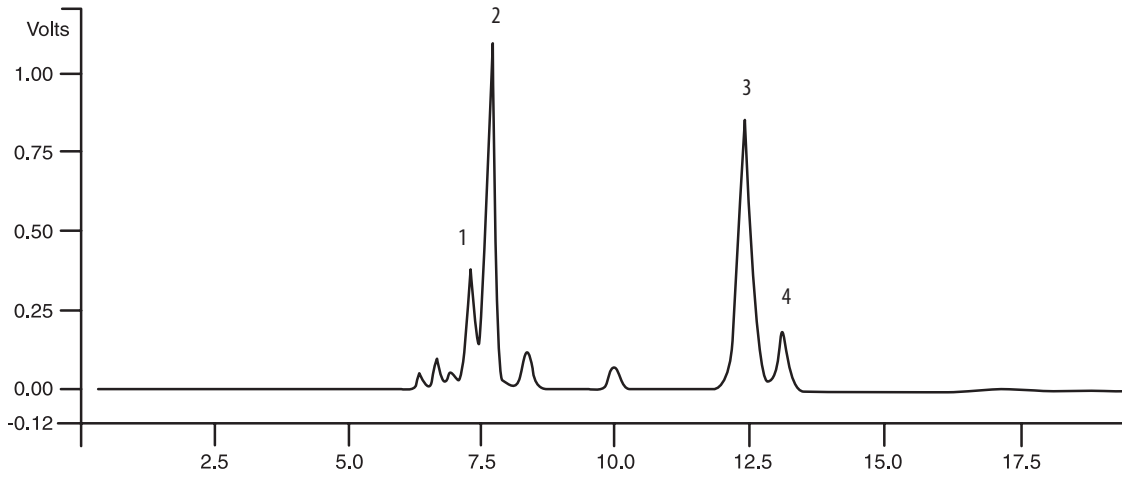
P/N AXC-99-1300

Organic Acid Separation Comparison on the NEW ICSep COREGEL-107H and Competitive Organic Acid Column

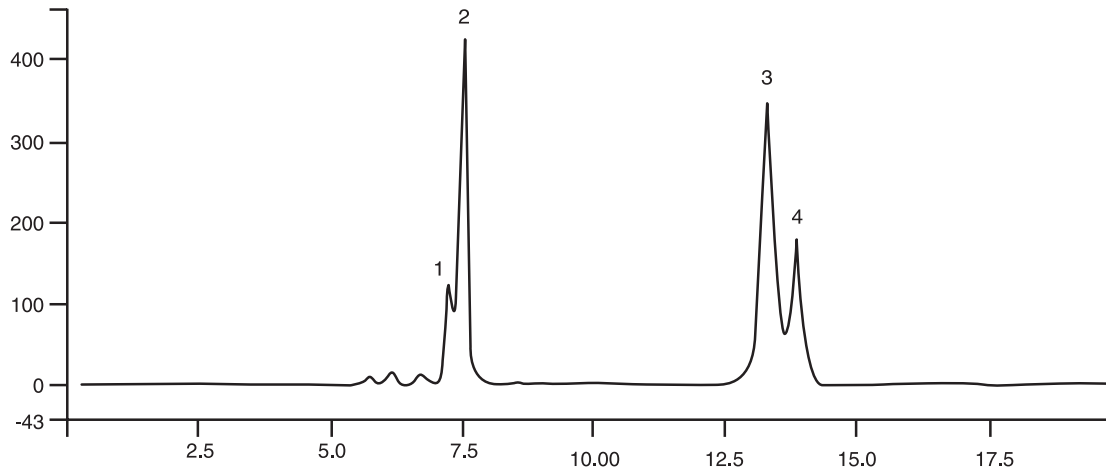
Analysis Conditions:
Column: COREGEL-107H and Competitive Organic Acid Column
Eluent: 0.008N Sulfuric Acid
Flow rate: 0.6 mL/min
Temperature: 35°C
Detection: UV @ 210nm
Injection: 20µL

Sample:
1. Citric Acid
2. Alpha Ketoglutaric Acid
3. Fumaric Acid
4. Acetic Acid

ICSep COREGEL-107H



Competitive Organic Acid Column



ICSep ORH-801

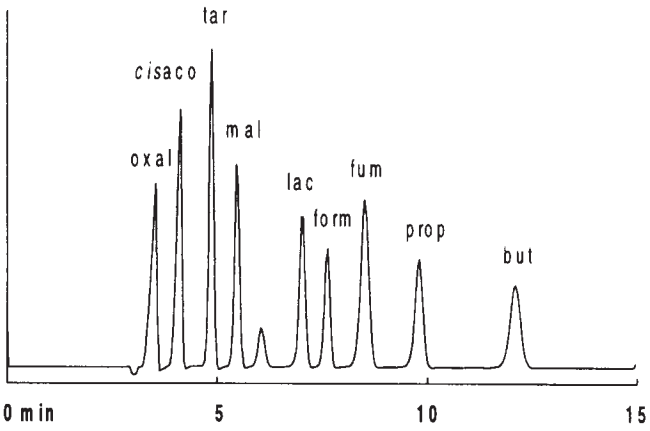
(6.5 x 300mm)
P/N ICE-99-9754
• Provides good balance of high efficiency and ruggedness
• Versatile column for Organic Acids, Alcohols and Carbohydrates

ICSep GC-801 Guard Kit

P/N ICE-99-2354

ICSep GC-801 Guard Cartridge – 2/PK

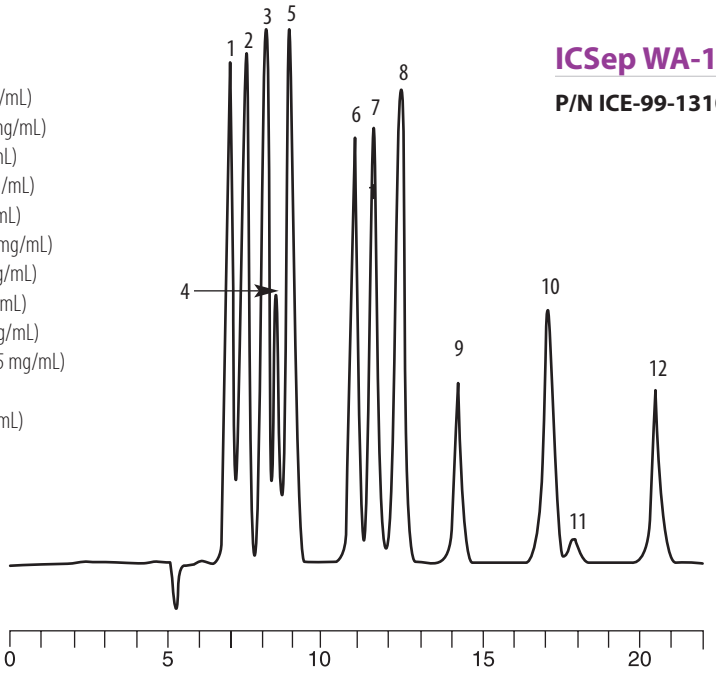
P/N ICE-99-2364



Sugar and Organic Acid Separation on ICSep Wine Analysis WA-1

Analysis Conditions:
Column: Wine Analysis WA-1
Eluent: 0.0025N Sulfuric Acid
Flow rate: 0.6 mL/min
Temperature: 45°C
Detection: RI
Injection: 20µL

Sample:
1. Citric Acid (0.5 mg/mL)
2. Tartaric Acid (2.0 mg/mL)
3. Glucose (2.0 mg/mL)
4. Malic Acid (1.0 mg/mL)
5. Fructose (2.0 mg/mL)
6. Succinic Acid (0.5 mg/mL)
7. Lactic Acid (2.0 mg/mL)
8. Glycerine (5.0 mg/mL)
9. Acetic Acid (0.5 mg/mL)
10. 2,3-Butanediol (0.5 mg/mL)
11. Isomer Impurity
12. Ethanol (10.0 mg/mL)



ICSep WA-1 Wine Analysis Column

(7.8 x 300mm)
P/N ICE-99-9810

ICSep WA-1 Wine Guard Kit

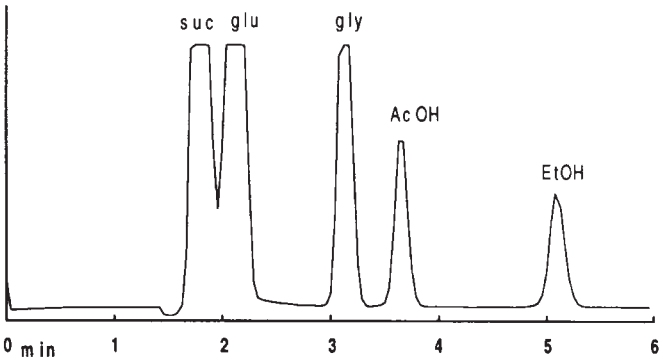
P/N ICE-99-3510

ICSep WA-1 Wine Guard Cartridge 2/PK

P/N ICE-99-1310

ICSep ION-310

(6.5 x 150mm)
P/N ICE-99-7752
• Designed for fast analysis of organic acids and alcohols
• Ideal for the analysis of borate and bicarbonate



ICSep GC-801 Guard Kit

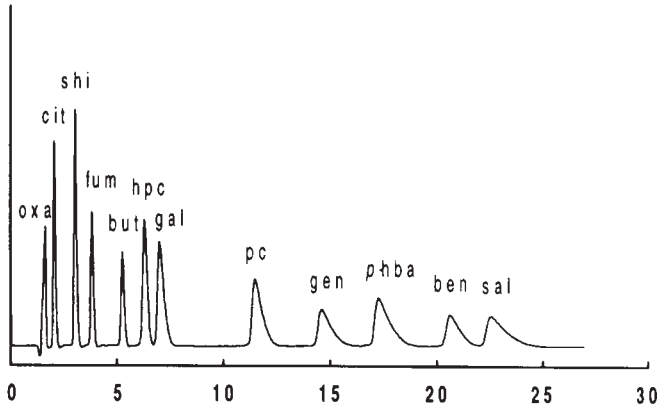
P/N ICE-99-2354

ICSep GC-801 Guard Cartridge – 2/PK

P/N ICE-99-2364

ICSep ARH-601

(6.5 x 100mm)
P/N ICE-99-5753
• Designed for the separation of Aromatic organic acids
• Uses aqueous mobile phases



ICSep GC-601 Guard Kit

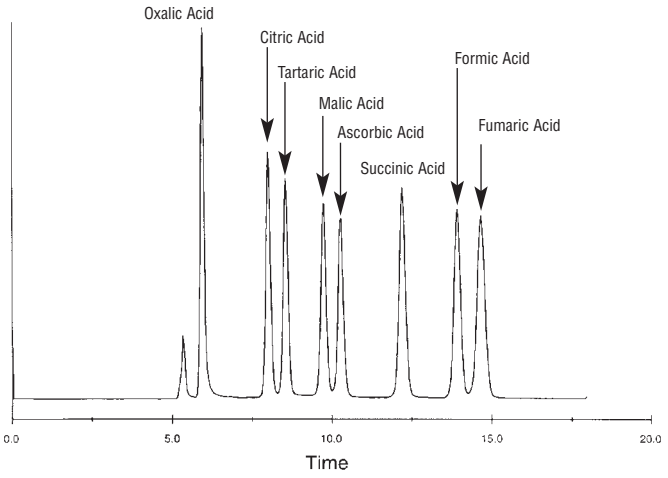
P/N ICE-99-2353

ICSep GC-601 Guard Cartridge – 2/PK

P/N ICE-99-2363

ICSep COREGEL-64H

(7.8 x 300mm)
P/N ICE-99-9860



ICSep COREGEL 64H Guard Kit

P/N ICE-99-2360

ICSep COREGEL 64H Guard Cartridge – 2/PK

P/N ICE-99-2370

POLYMERIC REVERSED *Phase*

RPSep Columns

Reversed phase is commonly referred to as adsorption chromatography. Reversed phase works by taking advantage of the hydrophobic interactions between molecules and a hydrophobic stationary phase.

In reversed phase, molecules are adsorbed onto a hydrophobic stationary phase. Then, the molecules are desorbed by changing the hydrophobic character of the mobile phase such that the molecules will selectively partition into the mobile phase and elute from the column.

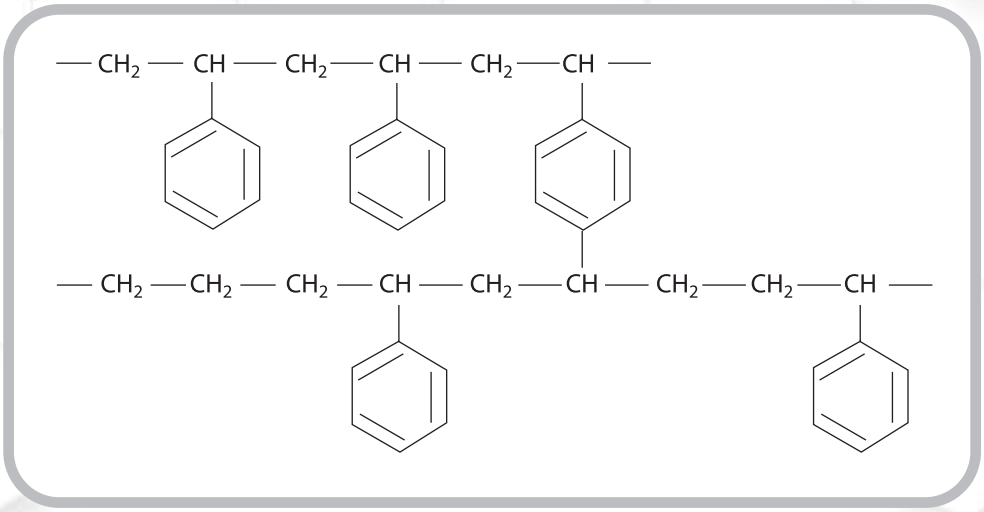
Traditionally, silica-based packings have been the most commonly used sorbants. However, as samples become more challenging, as with biological samples, supports are required that have broader pH ranges, are more rugged, and can be cleaned. Transgenomic provides a family of products all based on polystyrene-divinylbenzene sorbants that utilize our patented alkylation technology.

Features

The key features of RPSep polymeric reversed phase columns are:

- **pH stable from 0 – 14**
- **temperature stable**
- **very rugged, long lasting materials**
- **very tight particle size range (± 0.5µm) for high efficiency**
- **very high efficiency for polymeric resins**
- **both alkylated and non alkylated PS/DVB available**
- **all resins available in both analytical and bulk for scalability**

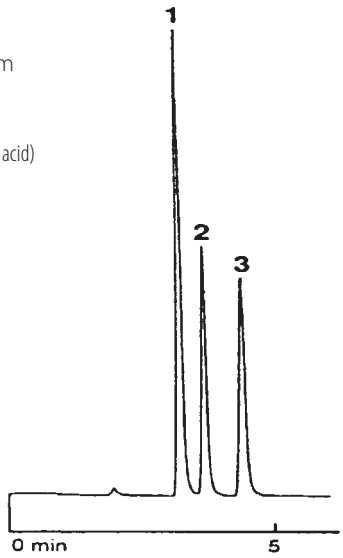
And, as with all Transgenomic Chromatography products, RPSep columns provide excellent column-to-column and lot-to-lot reproducibility.



Aspirin and Salicylic Acid on Poly-RP C0

Analysis Conditions:
Column: Poly-RP C0
Eluent: 1% H_3PO_4 (28%) in 50:50 ACN:H_2O
Flow rate: 0.75 mL/min
Temperature: Ambient
Detection: UV at 254 nm

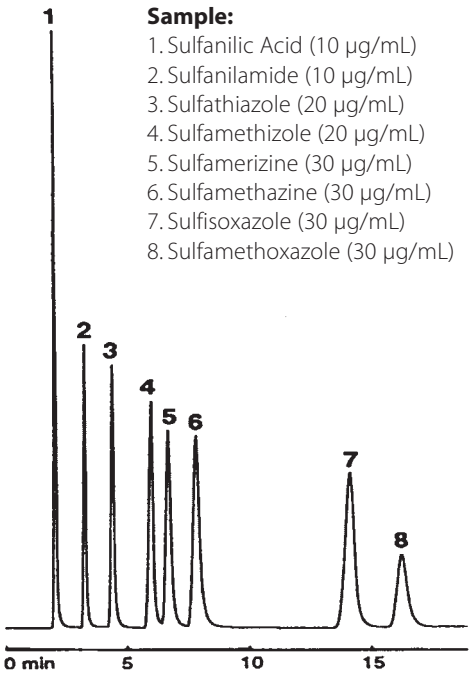
Sample:
1. Aspirin (2-(acetyloxy)-benzoic acid)
2. Benzoic Acid
3. Salicylic Acid



Separation of Sulfonamides on Poly-RP C0

Analysis Conditions:
Column: Poly-RP C0
Eluent: 0.01 *M* KH_2PO_4
in 25:75 ACN:H_2O
Flow rate: 0.75 mL/min
Detection: UV at 254 nm
Injection: 10 µL

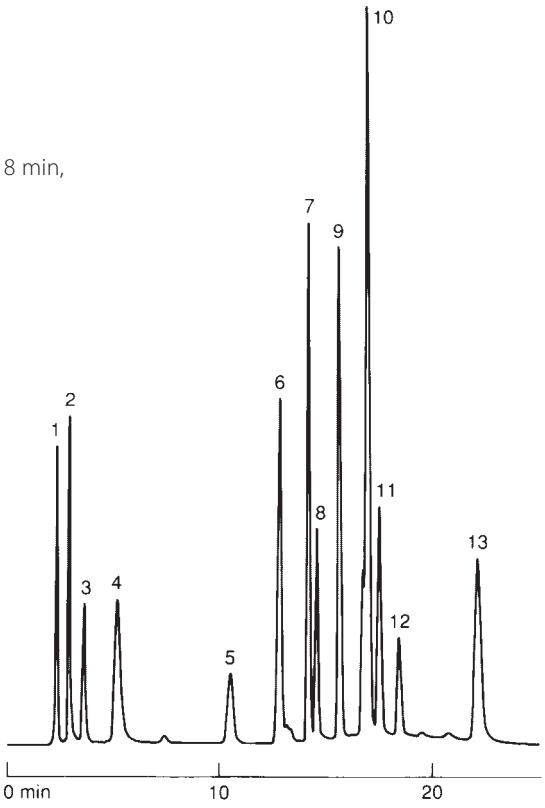
Sample:
1. Sulfanilic Acid (10 µg/mL)
2. Sulfanilamide (10 µg/mL)
3. Sulfathiazole (20 µg/mL)
4. Sulfamethizole (20 µg/mL)
5. Sulfamerizine (30 µg/mL)
6. Sulfamethazine (30 µg/mL)
7. Sulfisoxazole (30 µg/mL)
8. Sulfamethoxazole (30 µg/mL)



Separation of PGRs and Herbicides

Analysis Conditions:
Column: Poly-RP C0
Eluent: 30:70 ACB:1% acetic acid, B: 100% ACN
Gradient: 100% A for 4 min, 100% A to 50% A in 8 min, hold for 4 min
Flow rate: 0.6 mL/min
Temperature: Ambient
Detection: UV at 280 nm
Injection: 20 µL

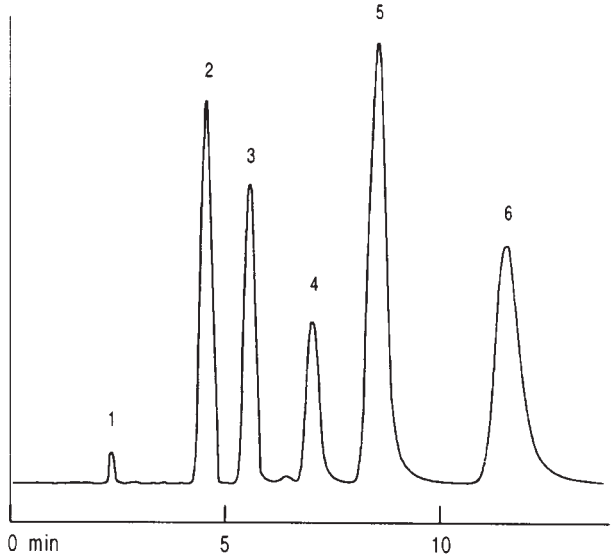
Sample:
1. Maleic Acid Hydrazide
2. Kinetin
3. 6-benzylaminopurine riboside
4. Colchicine
5. Indole-3-Acetic-Acid
6. α -naphthaleneactamide
7. Indole-3-Propanoic Acid
8. p-Chlorophenoxy-Acetic Acid
9. Indole-3-Butyric Acid
10. α -Naphthaleneacetic Acid
11. β-naphthalene-Acetic Acid
12. 2,4,5-trichlorophenoxyacetic Acid
13. Indole-3-Acetic Ethyl Ester



Separation of Triazine Herbicides on Poly-RP-C0

Analysis Conditions:
Column: Poly-RP C0
Eluent: 60:40 ACN:H_2O
Flow rate: 0.75 mL/min
Temperature: Ambient
Pressure: 107 Bar
Detection: UV at 254 nm

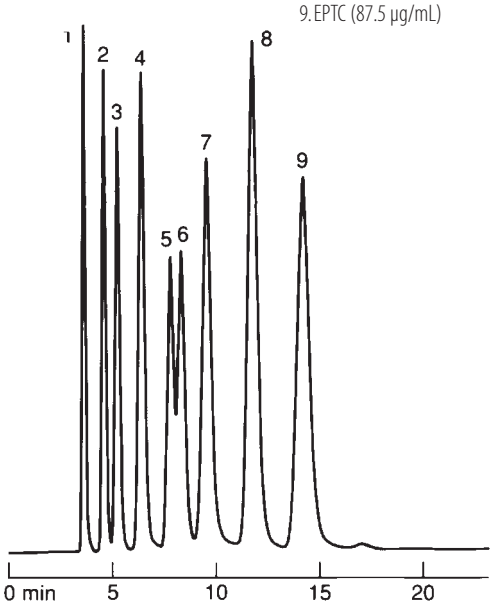
Sample:
1. Aminotriazole
2. Simazine
3. Atrazine
4. Propazine
5. Ametryne
6. Prometryne



Carbamates

Analysis Conditions:
Column: ACT-1
Eluent: 70:30 ACN:H_2O
Flow rate: 0.5 mL/min
Temperature: Ambient
Detection: UV at 240 nm
Injection: 20 µL

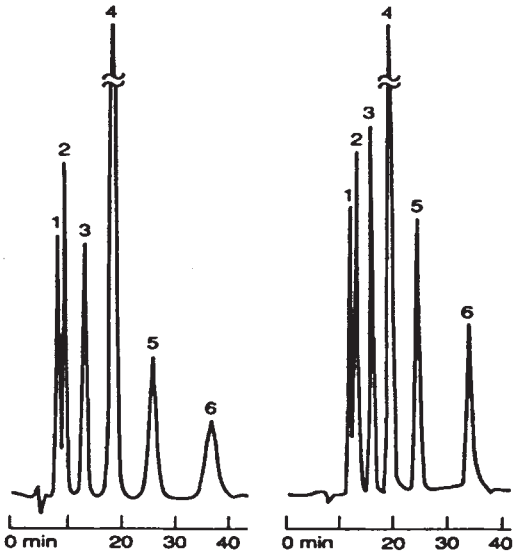
Sample:
1. Oxamyl (5 µg/mL)
2. Aldicarb (30 µg/mL)
3. Carbofuran (30 µg/mL)
4. Carbaryl (30 µg/mL)
5. Propham (2.5 µg/mL)
6. Methiocarb (12.5 µg/mL)
7. Ferbam (9 µg/mL)
8. ChlorolPC (9 µg/mL)
9. EPTC (87.5 µg/mL)



Separation of polar and Non-polar Compounds

Analysis Conditions:
Column: ACT-1
Eluent: 60:40 ACN:H_2O
Flow rate: 0.3 mL/min
Temperature: Ambient
Detection: UV at 254 nm

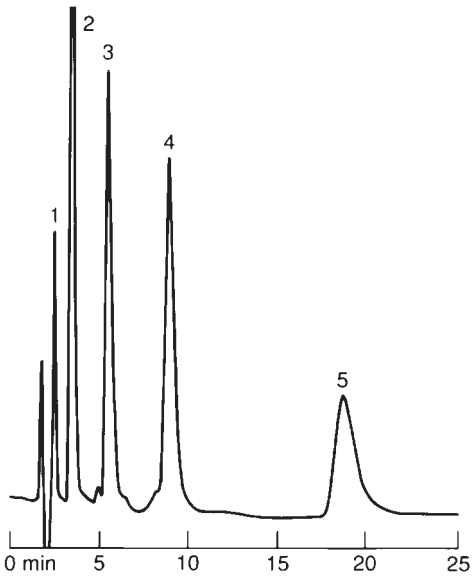
Sample:
1. Unknown
2. Phenol
3. Aniline
4. Acetophenone
5. Nitrobenzene
6. Toluene



Tertiary Amines on Poly-RP C0

Analysis Conditions:
Column: Poly-RP C0
Eluent: 0.1 *M* Ammonia in 80:20 ACN:H_2O
Flow rate: 0.75 mL/min
Temperature: Ambient
Detection: UV at 210 nm

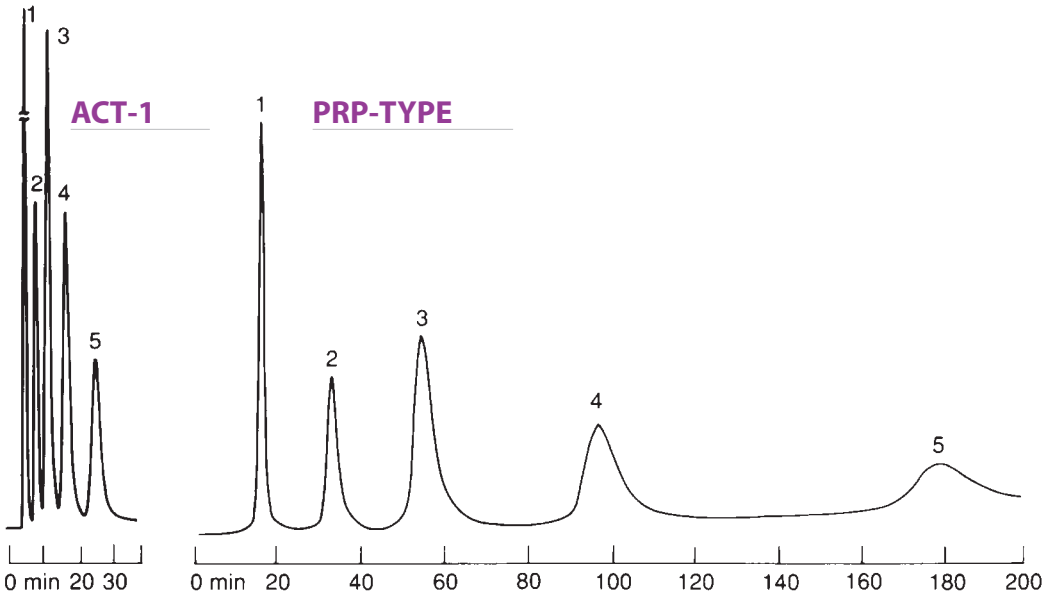
Sample: 0.05 µL/mL of
1. Trimethylamine
2. Triethylamine
3. Diisopropylethy-lamine
4. Tripropylamine
5. Tribitylamine



Comparison of ACT-1 with PRP-type Column

Analysis Conditions:
Column: ACT-1
Eluent: 80:20 Methanol: Water
Linear Velocity: 4.2 cm/min
Temperature: Ambient
Detection: UV at 254 nm

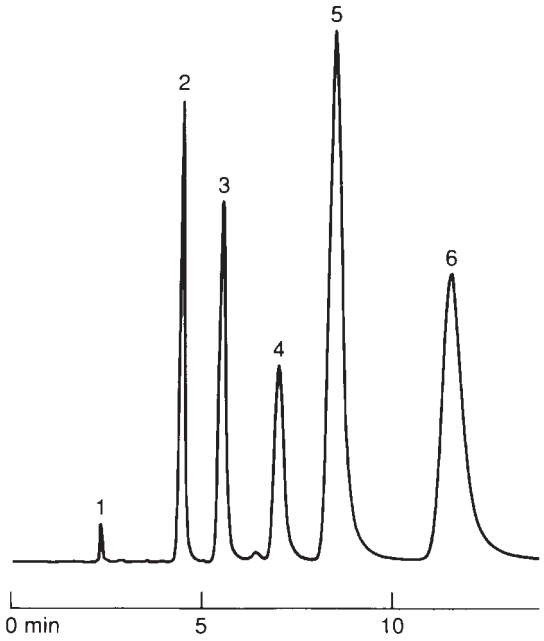
Sample:
1. Methylphenone
2. Ethylphenone
3. Propylphenone
4. Butylphenone
5. Pentylphenone



RPSep PRX-1 Column

(2.1 x 50mm)
P/N RPC-99-3014
(4.6 x 150mm)
P/N RPC-99-7514
(4.6 x 250mm)
P/N RPC-99-8514

- Porous PS/DVB Polymer
- Ideal for the separation of peptides and small molecules
- Works in entire pH range



RPSep PRX-1 Guard Kit

P/N RPC-99-2324

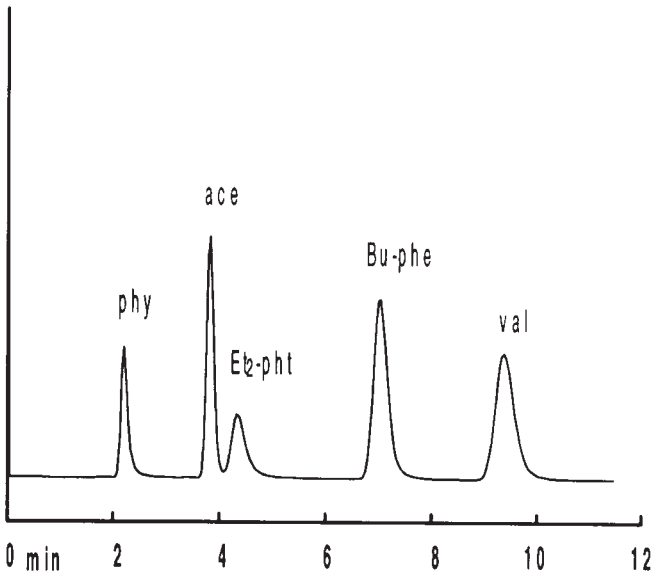
RPSep PRX-1 Guard Cartridge – 2/PK

P/N RPC-99-1314

RPSep ACT-1 C18 Column

(2.1 x 50mm)
P/N RPC-99-3150
(2.1 x 150mm)
P/N RPC-99-7150
(4.6 x 150mm)
P/N RPC–99-7550
(4.6 x 50mm)
P/N RPC-99-3550

- Employs proprietary alkylation technology
- Very stable, highly efficient C18 adsorbant
- Can be used in pH range of 2-14



RPSep ACT-1 C18 Guard Kit

P/N RPC-99-2350

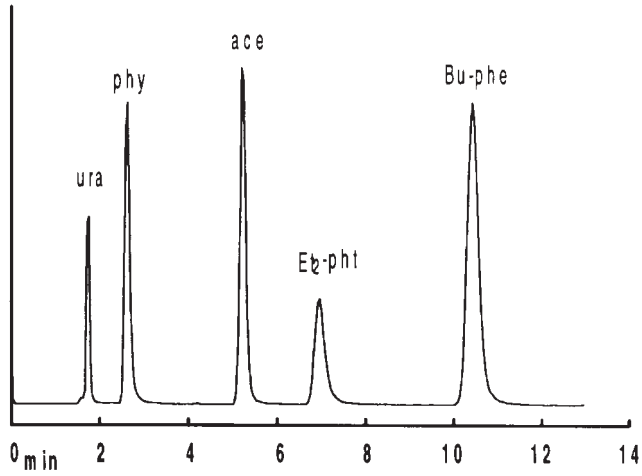
RPSep ACT-1 C18 Guard Cartridge – 2/PK

P/N RPC-99-2360

RPSep Poly-RP Column

(4.6 x 150mm)
P/N RPC-99-7551

- Non-alkylated PS/DVB sorbant
- 4 micron particle size for highest efficiency



RPSep Poly-RP Column Guard Kit

P/N RPC-99-2351

RPSep Poly-RP Column Guard Cartridge – 2/PK

P/N RPC-99-2361

ION *Chromatography*

Introduction

Ion Chromatography (IC) is the separation of inorganic and organic ionic species by ion exchange chromatography followed by suppressed conductivity detection. The technique was pioneered by Dow Chemical Company in 1974 and has grown in popularity since.

The species analyzed by IC include both anions and cations. The separation of anions is accomplished via anion exchange chromatography. The separations of cations are accomplished via cation exchange chromatography. Transgenomic provides a broad range of columns for the separation of both anions and cations.

The resins used for anion and cation exchange chromatography in IC employ a functionalized, macroporous polystyrene/divinyl benzene copolymer. Resins functionalized with quaternary alkyl or alkynol ammonium groups are used with hydroxide or carbonate-based eluents for anion exchange IC. Resins functionalized with sulfonic acid or carboxylic acid groups are used with acidic eluents for cation exchange IC.

Features

The key features of the Transgenomic IC columns are:

- **Polymeric substrate**
- **Solvent compatibility**
- **High efficiency**
- **Reproducibility**
- **pH Stability from 0 to 14**

Column Selection

Transgenomic IC columns have been designed to run on a variety of systems. They are tested to be compatible with Ion Chromatographs from: Metrohm-Peak, Dionex, Hach-Lachat, and Alltech. The selectivities have been optimized to be compatible with many of the common IC columns currently available. This includes columns that meet the requirements of E.P.A. methods 300 parts a and b, and E.P.A. method 300.1.

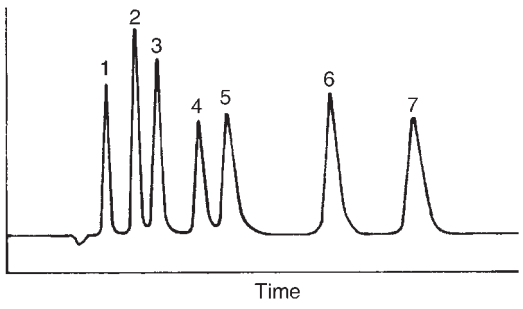
Column Equivalents Guide

TRANSGENOMIC COLUMN	COMPETITIVE COLUMNS	APPLICATION
ICSep AN300	Dionex AS4A	F^-, Cl^-, NO_2^-, Br^-, NO_3^-, HPO_4^{2-}, SO_4^{2-}, By E.P.A. Method 300.0(a)
ICSep AN1	Dionex AS9-HC	F^-, Cl^-, NO_2^-, Br^-, NO_3^-, HPO_4^{2-}, SO_4^{2-}, Low molecular weight, Organic acids in medium to high ionic strength matrices
		Cr(III), Cr(VI) as CrO_3^-, CrO_4^{2-}
ICSep ANSC	Dionex AS4A-SC	Polyvalent Phosphates,Arsentate, Sulfite Selenate, Arsenite, Selenite, F^-, Cl^-, NO_2^-, Br^-, NO_3^-, HPO_4^{2-}, SO_4^{2-}, Low molecular weight, Organic acids
ICSep AN1SC	Dionex AS9-HC	F^-, Cl^-, NO_2^-, Br^-, NO_3^-, HPO_4^{2-}, SO_4^{2-}, Low molecular weight, Organic acids in medium to high ionic strength matrices
ICSep AN2	Dionex AS14	Arsenate, Sulfite, Selenate, Arsenite, Selenite F^-, Cl^-, NO_2^-, Br^-, NO_3^-, HPO_4^{2-}, SO_4^{2-}, Low molecular weight Organic acids
ICSep AN300B	Dionex AS9	F^-, Cl^-, NO_2^-, Br, NO_3^-, HPO_4^{2-}, SO_4^{2-}, ClO_2^-, ClO_3^-, BrO_3^-
ICSep CN2	Dionex CS15	Li^+, Na^+, K^+, Rb^+, Cs^+, Mg^{2+}, Ca^{2+}, NH^{4+}, Cu^{2+}, Ni^{2+}, Zn^{2+}, Co^{2+}, Cd^{2+}, Pb^{2+}, Mn^{2+}, Fe^{2+}, Fe^{3+}

Anions by E.P.A. Method 300.0(a)

Conditions
Column: ICSep AN300
Eluent: 1.7mM Sodium Carbonate, 1.8mM Sodium Bicarbonate
Flow rate: 2.0 mL/min
Detection: suppressed conductivity

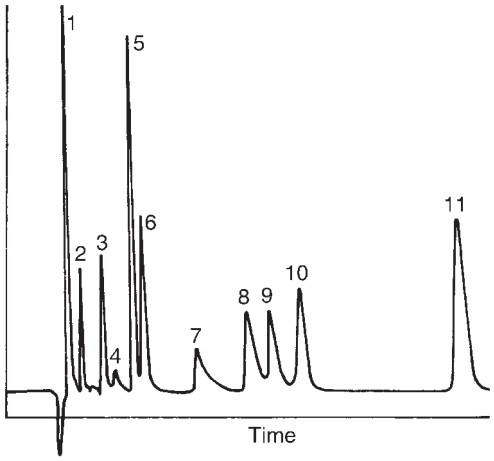
Sample:
1. Fluoride
2. Chloride
3. Nitrite
4. Bromide
5. Nitrate
6. Phosphate
7. Sulfate



Anions by E.P.A. Method 300.1

Conditions
Column: ICSep AN300B
Eluent: 3.5mM Sodium Carbonate
Flow rate: 1.0 mL/min
Detection: conductivity

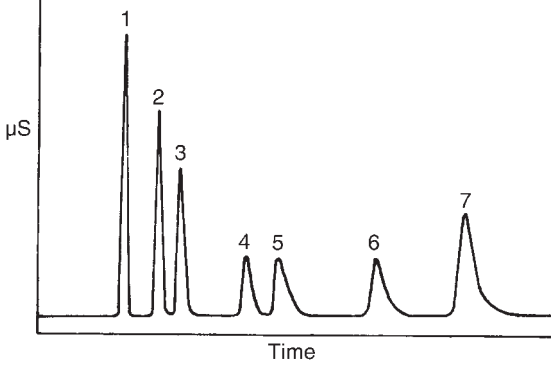
Sample:
1. Fluoride
2. Chlorite
3. Bromate
4. Dichloroacetate
5. Chloride
6. Nitrite
7. Chlorate
8. Nitrate
9. Bromide
10. Phosphate
11. Sulfate



Anion Separation using ICSep ANSC

Conditions
Column: ICSep ANSC
Eluent: 1.8mM Sodium Carbonate, 1.7mM Sodium Bicarbonate
Flow rate: 1.2 mL/min
Detection: suppressed conductivity

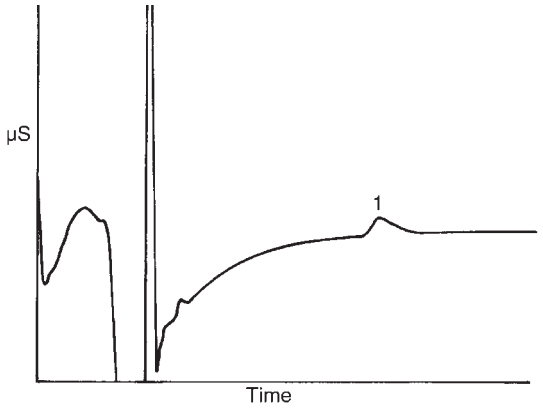
Sample:
1. Fluoride
2. Chloride
3. Nitrite
4. Bromide
5. Nitrate
6. Phosphate
7. Sulfate



Determination of Perchlorate using ICSep ANSC

Conditions
Column: ICSep ANSC with guard
Eluent: 30mM Sodium Hydroxide, 10mM Cyanophenol
Flow rate: 1.2 mL/min
Detection: suppressed conductivity

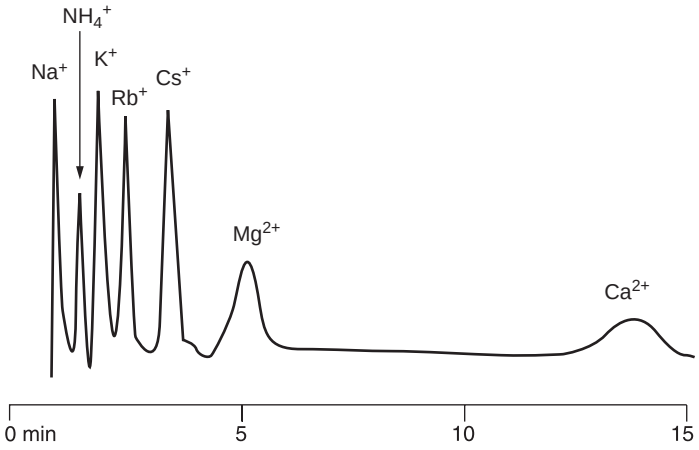
Sample:
1. 4ppb ClO_4



Cations using ICSep CN2

Conditions
Column: ICSep CN2
Eluent: 0.1mM Ce (III)
Flow rate: 1.0 mL/min
Detection: UV @ 254nm

Sample:
1. 3ppm sodium
2. 3ppm ammonium
3. 5ppm potassium
4. 30ppm rubidium
5. 30ppm cesium
6. 10ppm magnesium
7. 10ppm calcium



Ordering Information

DESCRIPTION	PART NUMBER
ICSep AN2, 4.6mm x 250mm	ANX-99-8515
ICSep AN2 Guard Column, 4.6mm x 50mm	ANX-99-3515
ICSep AN2 Guard Cartridges, 3/pk, 3.0mm x 10mm	ANX-99-0015
ICSep AN1, 4.6mm x 250mm	ANX-99-8511
ICSep AN1 Guard Column, 4.6mm x 50mm	ANX-99-3510
ICSep AN1 Guard Cartridges, 3/pk, 3.0mm x 10mm	ANX-99-0010
ICSep AN1-SC, 4.6mm x 250mm	ANX-99-8514
ICSep AN1-SC Guard Column, 4.6mm x 50mm	ANX-99-3514
ICSep AN1-SC Guard Cartridges, 3/pk, 3.0mm x 10mm	ANX-99-0014
ICSep AN300, 5.5mm x 150mm	ANX-99-7613
ICSep AN1 Guard Column, 4.6mm x 50mm	ANX-99-3510
ICSep AN1 Guard Cartridges, 3/pk, 3.0mm x 10mm	ANX-99-0010
ICSep AN300B, 4.6mm x 250mm	ANX-99-8516
ICSep AN300B Guard Column, 4.6mm x 50mm	ANX-99-3516
ICSep AN300B Guard Cartridges, 3/pk, 3.0mm x 10mm	ANX-99-0016
ICSep ANSC, 4.6mm x 250mm	ANX-99-8512
ICSep ANSC Guard Column, 4.6mm x 50mm	ANX-99-3512
ICSep ANSC Guard Cartridges, 3/pk, 3.0mm x 10mm	ANX-99-0012
ICSep ION-120, 4.6mm x 120mm	ANX-99-6550
ICSep ION-120 Guard Kit, 4.0mm x 24mm	ANX-99-2350
ICSep ION-120 Guard Cartridges, 3/pk, 4.0mm x 24mm	ANX-99-0090
ICSep CN2, 3.2mm x 100mm	CTX-99-5250
ICSep CN2 Guard Cartridges, 2/pk, 3.0mm x 10mm	CTX-99-1350
ICSep CN2 FA, 4.6mm x 50mm	CTX-99-3550
ICSep CN2 Guard Cartridges, 2/pk, 3.0mm x 10mm	CTX-99-1350

GUARD-DISC® PROTECTION *System*

Guard-Disc System

The Transgenomic Guard-Disc System is a patented column protection system that is designed to provide the protection capabilities of a guard column without adding any extra volume that might interfere with chromatographic separation.

The Guard-Disc System is comprised of a disc, which is available in a variety of functionalities, and a disc holder that couples directly to the column.

The disc is a PEEK ring that contains a functionalized chromatographic membrane. This chromatographic membrane is available in a variety of stationary phases for both HPLC and Ion Chromatography applications.

Phases

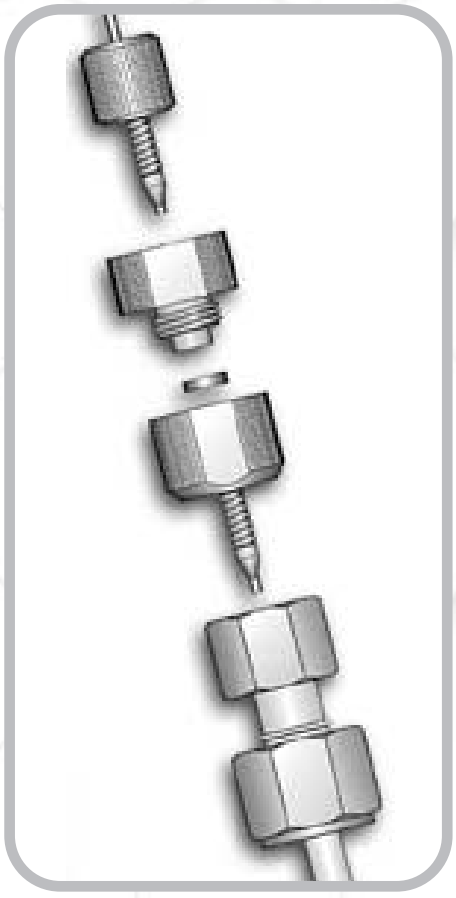
The stationary phases that Guard-Discs Systems are available in include:

- **C18**
- **C8**
- **Styrene/DVB**
- **Anion Exchange**
- **Cation Exchange**

It is these functional groups that bind the contaminants that would otherwise be trapped on your analytical column.

Double Protection

Transgenomic Guard-Disc Systems are porous as well. Not only do they bind species that may contaminate your analytical column, they also filter out particulates that would otherwise be trapped on your analytical column. The Transgenomic Guard-Disc System provides double protection for your chromatographic column.



Guard-Disc System Characteristics

Membrane Functionality	Application	Porosity (µm)	Solvent Compatibility	pH Range
C18-A	Reversed Phase	0.2	All	2-8
C18-B	Reversed Phase	0.8	Acetonitrile Methanol	2-8
C8	Reversed Phase	0.2	All	2-8
S/DVB	Reversed Phase	0.2	All	1-13
ANEX	Anion Exchange	0.2	All	1-13
CATEX	Anion Exchange	0.2	All	1-13

TRANSGENOMIC GUARD *Discs*®

Ion Exchangers

ANEX Guard-Disc – (10/pk)

P/N GRD-99-0704

CATEX Guard-Disc – (10/pk)

P/N GRD-99-0705

Adsorbants

C18A Guard-Disc (10/pk)

P/N GRD-99-0701

C18B Guard-Disc (10/pk)

P/N GRD-99-0731

C8 Guard-Disc (10/pk)

P/N GRD-99-0702

S/DVB Guard-Disc (10/pk)

P/N GRD-99-0706

TRANSGENOMIC GUARD *Disc*® *Holders*

Guard-Disc Direct Holder 1

(Parker Type)
P/N AXC-99-0002

Guard-Disc Direct Holder 2

(Waters Type)
P/N AXC-99-0003

Guard-Disc Universal Holder 1N

(Universal)
P/N AXC-99-0004

SOLID PHASE *Extraction*

Transgenomic POLYSorb™ Products for Solid Phase Extraction

Solid Phase Extraction (SPE) is a sample preparation technique that is employed to clean up or concentrate samples prior to analysis. SPE can be used to clean-up samples by removing interferences that would otherwise compromise analysis. It can be used to concentrate by allowing a large volume of sample to be reduced into a small elution volume. Compared to other sample preparation techniques, such as liquid-liquid extraction, SPE provides cleaner extracts with high recoveries. SPE is also faster and uses less solvent which saves money.

Modes

SPE tubes can be used in two modes:

1. In the flow-through mode the sample can be passed through the tube. While passing through the tube, the contaminants present are retained while the analyte of interest is allowed to pass through. The steps for this mode are 1) Load the sample into the tube 2) Wash to elute the analyte of interest.

2. In the selective elution mode the sample is passed through the tube. But in this mode, the analyte of interest is retained while contaminants pass through. After the sample is loaded onto the column, the analyte of interest is selectively eluted by choosing elution conditions that will elute the analyte from the column while retaining interfering components. The steps used with this mode are 1) Load the sample onto the column 2) Wash through weakly retained or unretained contaminants 3) Elute the analyte of interest.

The most common SPE packing are polar adsorbants. These adsorbants are used to remove organic interferences from samples. Also, commonly used are ion exchangers to remove charged species as interferences. Transgenomic offers products for both adsorption and ion exchange.

Key Features of Transgenomic SPE products

As with all of Transgenomic's chromatography products, the SPE products are all based on polymeric resins. Polymer-based resins are used because of the broad pH range available and the chemical and physical stability of the materials. These cartridges are ideally suited for cleaning up samples in tough matrices.

Transgenomic POLYSorb cartridges provide very high loading capacities to accommodate for concentrated samples. POLYSorb cartridges also provide excellent selectivity even for trace level analysis.

POLYSorb Cartridges in the format you need

Transgenomic POLYSorb cartridges are provided in three stationary phase formats:

- **Unmodified Poly-[styrene/divinylbenze] (PS/DVB)**
- **Alkylated (C18) PS/DVB**
- **Sulfonated PS/DVB**

Transgenomic offers each of these cartridges in either 100mg or 400mg tubes, or we can custom pack in sizes to meet your specific needs.

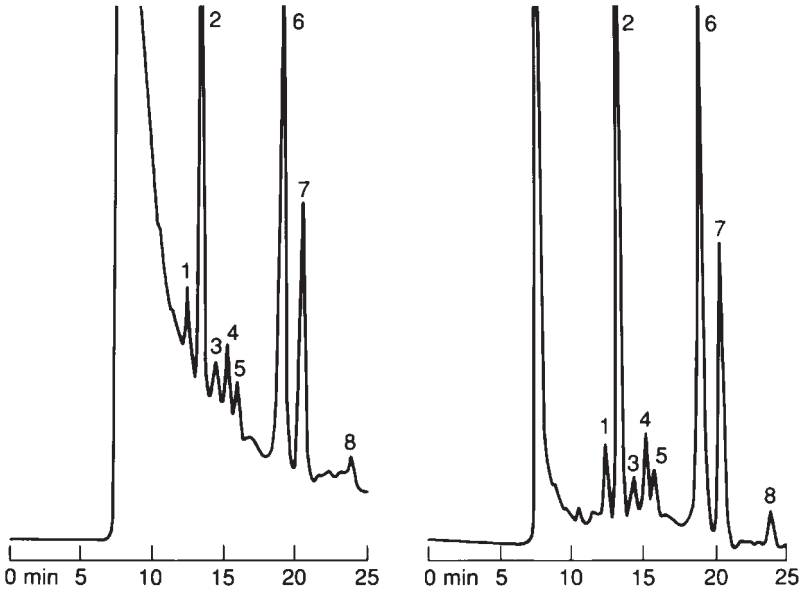
POLYSorb tubes are compatible with off-the-shelf SPE vacuum manifolds, automated workstations or other commonly used accessories.

Extraction of Organic Acids from Burgundy Wine with ACT-1

Sample Preparation:
Dilute wine 1:10 with distilled water
Conditioning Step:
Wet tube with 1 mL of methonal followed by 1 mL of 10:90 methonal:water
Sample Addition:
Load 500 µL of dilute wine
Wash Step:
1.0 mL of water
Elution Step:
1.0 mL of 0.05 N H_2SO_4

Analysis Conditions:
Column: ION-300
Eluent: 0.01 N H_2SO_4
Flow rate: 0.5 mL/min
Temperature: 60°C
Detection: UV at 214 nm
Injection: 20 µL

Sample:
1. Citric Acid
2. Tartaric Acid
3. Glucose
4. Malic Acid
5. Fructose
6. Glycerol
7. Succinic Acid
8. Acetic Acid



Before Sample Prep

After Sample Prep

POLYSorb ACT-1, C18, 100mg

(100/box)
P/N SPE-99-0100

POLYSorb ACT-1, C18, 400mg

(50/box)
P/N SPE-99-0101
- Patented, Octadecyl-Alklyated PS/DVB
- Ideal for removal of polar compounds
- Stable over pH 0-14, very rugged

POLYSorb, MP-3, Highly Sulfonate, 100mg

(100/box)
P/N SPE-99-0104

POLYSorb, MP-3, Highly Sulfonated, 400mg

(50/box)
P/N SPE-99-0105
- pH stable cation exchange resin
- Ideal for removing amines
- Remove cations from ICP analysis

POLYSorb, MP-DVB, PS/DVB 100mg

(100/box)
P/N SPE-99-0108

POLYSorb, MP-DVB,PS/DVB 400mg

(50/box)
P/N SPE-99-0109
- Non-functionalized styrene-divinylbenzene
- Ideal for removing polar compounds
- pH stable from 0-14
- Also available in bulk

BULK POLYMERIC *Resin*

Transgenomic has scale-up in mind every time we develop a new resin. The resin in any column discussed in this catalogue is also available in bulk. This allows you to pack your own analytical columns, then quickly and easily scale your analytical application to semi-prep and preparative scales without redevelopment.

If we do not have the resin or particle size that you need, simply call. We have over 20 years experience in the development of polymer materials for analytical and preparative chromatography applications; allow us to put our expertise to work for you.

BUFFERS and SOLVENTS FOR *HPLC*

Buffers and Solvents for Reversed Phase Chromatography

Part Number	Description	Size
56011	Acetonitrile, HPLC Grade	1 liter
700002	Water, HPLC Grade	4 liter
553303	Triethlammonium acetate solution, 2M	200 mL
SP5890	Triethlammonium acetate solution, 2M	6 x 200 mL

Amino Acid Analysis Buffers

Part Number	Description	Size
AAA-99-4086	Sodium Diluent Na200	4 liter
AAA-99-4081	Sodium Eluent Na315	4 liter
AAA-99-4096	Sodium Eluent Na740	4 liter
AAA-99-4085	Sodium Regenerant RG011	4 liter

Custom Amino Acid Buffers are available for your analysis, please contact Transgenomic for further information

Hardware

Column Coupler

The patented Column Coupler was developed for the demanding constraints of high efficiency HPLC columns. The Column Coupler permits the quick and easy connection of two analytical HPLC columns in series, or direct connection between a Valco injection valve and an analytical column. Seals are rated to 5,000psi

The unit is a precision-machined, double-ended PEEK connector with 10-32 threads and a non-wetted Delrin® knurled body. The inert composition and the large knurled handle allow easy, finger-tight connections and leakproof seal to 5,000psi. The 0.010" through-hole minimizes extra column volume effects and is compatible with the demanding constraints imposed with use of 3µm packing and microbore HPLC. These couplers are not capable of universal applications since the tip sizes are fixed

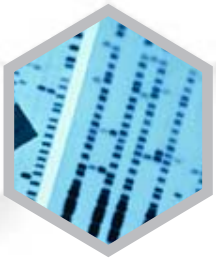
Guard Cartridge Holder

The Universal Guard Cartridge Holder was designed for use with Transgenomic guard cartridges.

Ordering Information:

Part Number	Description
282013	Column Coupler, PEEK
AXC-99-1300	Universal Guard Cartridge Holder, 4.0mm x 24mm

The unit is a stainless steel body with dimensions of 4.0mm x 24mm



COLUMN *Index*

Amino Acid Columns

Carbohydrate Analysis Columns

Organic Acid Analysis Columns

Polymeric Reversed Phase Columns

Ion Analysis Columns

TRANSGENOMIC®
BIOCONSUMABLES™

To order catalog items:

TRANSGENOMIC CORPORATE HEADQUARTERS
12325 Emmet Street
Omaha, NE, USA 68164

Tel: **1-888-233-9283**
Fax: **1-402-452-5401**
E-mail: **orders@transgenomic.com**

For technical support:

TRANSGENOMIC – SAN JOSE OFFICE
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