

Analysis - Carbohydrate analysis

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. Ligand exchange resins are highly sulfonated cation exchange resins that have group 1, 2 or transition series metals loaded on. This metal ion provides the positive charge that interacts with the negative charge on the sugar. Since the ionic charge is different for every sugar, separation of the sugars occurs.

CARBOSep™ columns are provided in a large variety of resin types and metals to provide selectivities that meet your separation needs.

Column features

Column	Application	Form	Particle Size	Mobile Phase (typical)	Flow Rate (recommended)	Temperature (recommended)
CARBOSep CHO-411	Oligosaccharides up to DP 10. Corn syrup. molasses	Sodium	20 µm	Water	0.4 ml /min	75°C
CARBOSep CHO-611	Oligosaccharides up to DP DP5	Sodium	10 µm	Water	0.5 ml /min	90°C
CARBOSep CHO-611-0H	Mono and oligosaccharides w/PAD detection	Sodium	10 µm	Sodium hydroxide	0.5 ml /min	90°C
CARBOSep CHO-620	Hight fructose corn syrup, mono-, ditisaccharides and sugars alcohols	Calcium	10 µm	Water	0.5 ml /min	90°C
CARBOSep CHO-682	Mono and disaccharides, sucrose, maltose, lactose	Lead	7 µm	Water	0.4 ml /min	80°C
CARBOSep CHO-820	Simple sugars, sugars alcohols	Calcium	8 µm	Water	0.5 ml /min	90°C
CARBOSep COREGEL -42AG	Oligosaccharides up to DP 11	Silver	20 µm	Water	0.4 ml /min	75°C
CARBOSep COREGEL 87 MM	Mono, di, and trisaccharides. and sugars alcohols	Cal/ sodium	8 µm	Water	0.5 ml /min	85°C
CARBOSep COREGEL 87C	Mono and disaccharides	Calcium	9 µm	Water	0.6 ml /min	85°C
CARBOSep COREGEL 87K	Beet sugar, cane sugar, corn syrup, molasses	Potassium	8 µm	Water	0.6 ml /min	85°C
CARBOSep COREGEL 87N	Beet sugar, mono and oligosaccharides	Sodium	8 µm	Water	0.6 ml /min	85°C
CARBOSep COREGEL 87P	Pentose, hexose, monosaccharides, alcohols	Lead	8 µm	Water	0.8 ml /min	85°C
CARBOSep ION 300	Glucose and fructose in organic acid mixtures	Hydrogen	8 µm	Sulfuric acid	0.4 ml /min	70°C
CARBOSep ION 310	Grape must analysis	Hydrogen	8 µm	Sulfuric acid	0.8 ml /min	50°C
CARBOSep USP L19	USp L-19 specifications for separation of sorbitol and mannitol	Calcium	9 µm	Water	0.2 ml /min	30°C
ICSep COREGEL 87H1	Fast analysis of organic acids, alcohols, sugar mixtures	Hydrogen	9 µm	Sulfuric acid	0.6 ml /min	85°C
ICSep COREGEL 87H3	Organic acids, alcohols.sugar mixtures	Hydrogen	9 µm	Sulfuric acid	0.6 ml /min	85°C

Mobile phase : 100% water

Flow rate : 0.5 ml /min.

Temperature : 90°C

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Selectivity chart

Compound / retention (min)	CHO-620	CHO-611	CHO-682	Coregel 87H	Coregel 87P	Coregel 87N	Coregel 87K	Coregel 87C
Arabinose	10.64	11.08	23.95	12.08	16.32	12.64	14.72	13.92
Arabitol	12.32	10.52	39.82	12.65	25.24	11.64	12.1	18.36
Cellobiose	6.65	7.17	15.58	8.43	10.98	7.9	9.26	8.94
Digitaxose	10.26	10.18	21.95	-	15.48	11.4	12.32	14.19
Fructose	10.07	10.33	25.84	11.25	16.96	11.61	13.31	13.63
Galactitol	13.05	10.23	52.43	11.8	31.6	11.15	11.61	20.46
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
Lactitol	8.55	7.87	33.23	9.26	19.5	8.45	9.34	12.17
Lactose	7.01	7.51	17.37	8.77	11.84	8.18	9.63	9.44
Lactulose	7.57	7.85	20.7	9	13.24	8.48	10.08	10.17
Maltitol	8.54	7.68	30.38	9	17.76	8.28	9.06	12.22
Maltoheptose	4.66	4.6	11.74	6.96	8.52	5.84	6.61	7.28
Maltohexose	4.78	4.87	12.24	7	8.8	5.94	6.74	7.38
Maltopentose	5	5.08	13.08	7.1	9.34	6.11	7.02	7.53
Maltotriose	5.91	6.22	15.17	7.72	10.54	6.98	8.16	8.28
Maltose	6.89	7.37	16.61	8.57	11.54	8.08	9.48	9.17
Maltotetrose	5.37	5.54	14.07	7.3	9.84	6.42	7.46	7.8
Mannitol	11.84	9.9	40.03	11.66	24.98	10.81	11.42	17.81
Mannose	9.79	10.27	25.5	11.13	16.76	11.57	13.74	12.76
Melezitose	5.78	6.01	13.85	-	13.08	6.81	7.82	8.2
Melibiose	6.99	7.46	17.63	8.56	12.02	8.19	9.72	9.36
Myo-inositol	10.82	11.01	35.58	11.02	20.06	12.48	14.08	14.27
Nitrate	4.5	4.2	10.3	6.85	8.4	5.7	6.4	7.3
Raffinose	5.86	6.1	14.4	-	10.22	6.88	7.92	8.24
Rhamnose	9.64	9.88	22.56	11.94	15.26	11.08	12.83	12.86
Ribitol	10.94	10.13	30.72	12.44	20.44	11.26	11.84	15.55
Sorbitol	13.64	10.38	56.56	11.77	33.4	11.32	11.86	21.34
Sorbose	9.5	9.93	22.38	10.08	15.24	11.08	12.66	12.86
Stachyose	5.28	5.39	13.41	-	9.58	6.33	7.28	7.77
Sucrose	6.76	7.27	15.7	-	11.1	7.99	9.11	9.09
Tagatose	11.53	10.29	-	11.15	20.8	11.36	12.82	16.46
Trehalose	6.7	7.14	15.98	8.64	11.2	7.85	9.02	9.07
Xylitol	13.93	11.01	51.15	12.82	31.1	12.16	12.64	21.3
Xylose	9.56	10.34	20.64	11.32	14.42	11.77	13.69	12.32

Mobile Phase : 100% Water

Flow rate : 0.5 ml /min

Temperature : 90°C

Analysis - Carbohydrate analysis

CARBOSep™ columns

Coregel 87C (calcium form)

- Monosaccharide and sugar alcohol analysis

Description	P/N
Column 300 x 7.8 mm	CHO-99-9860
Guard column 50 x 7.8 mm	CHO-99-3560
20mm guard cart kit (1 holder + 2 cartridges)	CHO-99-2360
Replacement guard cartridge 20 x 4 mm (2 units)	CHO-99-1360

Coregel 87N (sodium form)

- Monosaccharide and sugar alcohol rapid analysis

Description	P/N
Column 300 x 7.8 mm	CHO-99-1363
Guard holder 20 mm	CHO-99-1300
Replacement guard cartridge 20 x 4 mm (2 units)	CHO-99-1363

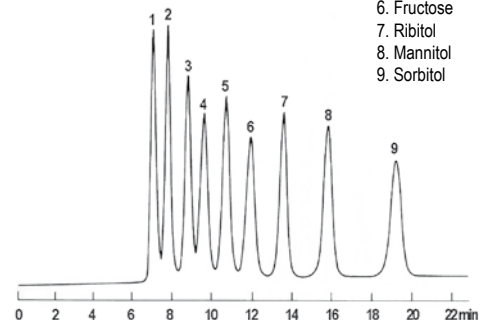
Coregel 87P (lead form)

Description	P/N
Column 300 x 7.8 mm	CHO-99-9864
Guard holder 20 mm	CHO-99-1300
Replacement guard cartridge 20 x 4 mm (2 units)	CHO-99-1364

Coregel-87C

Column : 7.8 mm x 300
Eluent : Distilled Water
Flow rate : 0.6 ml /min
T° : 85°C
Pressure : 425 psi
Detector : RI Range 18x
Injection : 20µl

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



Analysis - Carbohydrate analysis

CARBOSep™ columns

Coregel 87MM (calcium /sodium form)

Enhanced glucose, fructose and sugar alcohol analysis

Description	P/N
Column 300 x 7.8 mm	CHO-99-9865
Guard holder 20 mm	AXC-99-1300
Replacement guard cartridge 20 x 4 mm (2 units)	CHO-99-1365

Coregel 87K (potassium form)

Description	P/N
Column 300 x 7.8 mm	CHO-99-9862
Guard holder 20 mm	AXC-99-1300
Replacement guard cartridge 20 x 4 mm (2 units)	CHO-99-1362

Coregel 42AG (silver form)

Description	P/N
Column 300 x 7.8 mm	CHO-99-9851
Guard holder 20 mm	AXC-99-1300
Replacement guard cartridge 20 x 4 mm (2 units)	CHO-99-1366

CARBOSep™ USP L19

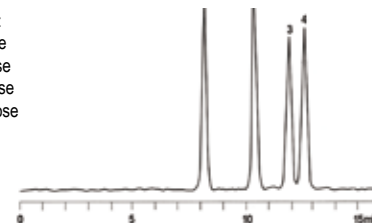
Complies with USP L-19 specifications for the separation of sorbitol and mannitol
Separates a wide number of additional carbohydrates

Description	P/N
Column 200 x 4.0 mm	CHO-99-8453

Carbohydrate analysis on Coregel 87MM

Eluent : Water
Flow rate : 0.6 ml /min
Detector : RI

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



Analysis - Carbohydrate analysis

Oligosaccharides CARBOSep™ columns

CHO-611

- Separates by both ligand exchange and size exclusion
- Designed for the separation of oligosaccharides up to DP5
- Reproducible separation of corn syrup

Description	P/N
Column 300 x 6.5 mm	CHO-99-9751

CHO-511

- Separates by both ligand exchange and size exclusion
- Designed for the separation of oligosaccharides up to DP6. Separate up to DP11 with two columns.
- Improved peak shapes over other oligosaccharide separation columns
- Reproducible separation of corn syrup

Description	P/N
Column 300 x 7.8 mm	CHO-99-8500

CARBOSep™ CHO-411

- Separates by both ligand exchange and size exclusion
- Designed for the separation of oligosaccharides up to DP10
- Reproducible separation of corn syrup

Description	P/N
Column 300 x 7.8 mm	CHO-99-9850

High Fructose Corn Syrup on CHO-511

Sample Points	Retention Time (min)
DP7+	6.498
DP7	7.877
DP6	8.746
DP5	9.658
DP4	10.830
DP3	12.384
Maltose	14.700
Glucose	18.749
Fructose	20.246

