

Thermo Scientific™ Dionex™ CarboPac™ PA200 Columns for Dual EGC mode



Improved reproducibility and accuracy for complex carbohydrate analysis

Benefits

- Predictable, high-resolution, isocratic and gradient separation of oligosaccharides using electrolytically generated potassium methanesulfonate and potassium hydroxide
- Repeatable and accurate linear polysaccharide profiling
- Predictable profiling of galacto-oligosaccharides

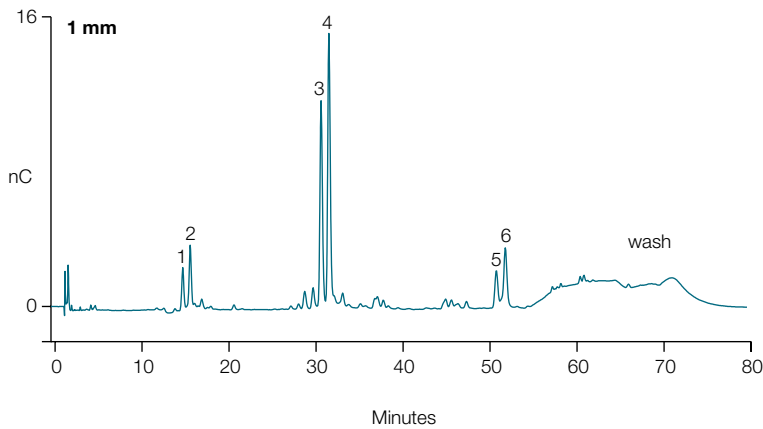
Keywords

Carbohydrates, high-performance anion exchange chromatography, pulsed amperometric detection, derivatization-free, dual eluent generation cartridge, Dual EGC mode, KOH eluent, KMSA eluent

Thermo Scientific™ Dionex™ CarboPac™ PA200 1 mm format columns are the latest addition to the Dionex CarboPac family of columns for carbohydrate separations. These columns have been specially developed to provide high-resolution separations of charged and neutral oligosaccharides. The Dionex CarboPac PA200 1 mm columns are recommended for Dual EGC applications using the Thermo Scientific™ Dionex™ ICS-6000 HPIC™ System.

Predictable, high-resolution, isocratic and gradient separation of oligosaccharides

Dionex CarboPac PA200 columns have been designed exclusively for isocratic or gradient separation of oligosaccharides using electrolytically generated potassium methanesulfonate and potassium hydroxide gradients with a combined concentration up to 200 mM. Certain separations require only isocratic conditions. However, some groups of analytes require a step or gradient elution. Retention of carbohydrates may vary with eluent concentration, in some cases changing the elution order as the eluent concentration increases.



Columns: Dionex CarboPac PA200, 1 mm (guard + separator)

Gradient: Dionex CarboPac PA200, 1 × 250 mm column:
 0–50 min: 15–64 mM KMSA in 136 mM KOH
 50–60 min: 80 mM KMSA in 90 mM KOH
 60–65 min: 100 mM KMSA in 100 mM KOH
 65–80 min: 15 mM KMSA in 136 mM KOH

Flow Rate: Dionex CarboPac PA200, 1 × 250 mm: 0.063 mL/min

Detection: Dionex CarboPac PA200, 1 × 250 mm: PAD, Au on PTFE, 1 mil gasket, Ag/AgCl ref.

Samples: 50 µmol/L fetuin oligosaccharide alditol standard

Peaks: 1. Disialylated, triantennary
 2. Disialylated, triantennary
 3. Trisialylated, triantennary
 4. Trisialylated, triantennary
 5. Tetrasialylated, triantennary
 6. Tetrasialylated, triantennary

Figure 1. Separation of Fetuin Oligosaccharides using Dionex CarboPac PA200, 1 mm column.

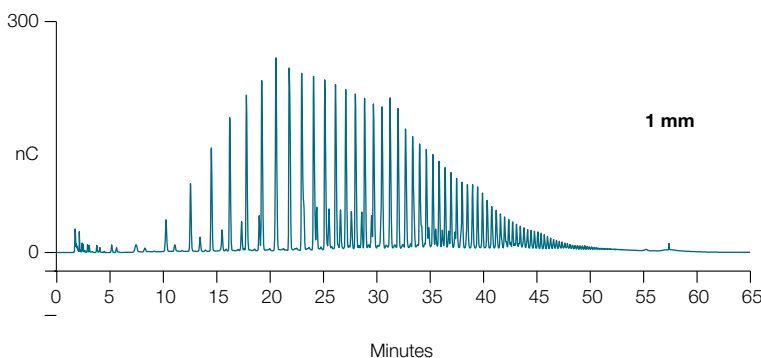
The figure above shows the high resolution separation capability of the Dionex CarboPac PA200 column. Dionex CarboPac columns separate mono-, oligo- and polysaccharides on the basis of fine structural differences in branching, linkage isomerism, anomericity, and sialylation. In the fetuin oligosaccharide alditol standard, shown above, peaks are separated according to branching, sialylation, and linkage isomerism. The disialylated biantennary peaks are eluted before the trisialylated triantennary peaks, which are eluted before the tetrasialylated triantennary peaks.

The introduction of HPAE-PAD revolutionized carbohydrate analyses by allowing separations at high pH and detection without the need for derivatization.

The major advantages of HPAE-PAD are (1) fast analyses, (2) ease of use—samples are directly analyzed without the need for derivatization, (3) low- to sub-picomole range sensitivity, and (4) high resolution separations.

Linear polysaccharide profiling

Inulins are increasingly used as functional food ingredients. Chain-length distribution profiles of commercial products such as those derived from inulins can be determined by using HPAE-PAD with gradient elution (Figure 2). By adjusting the initial gradient profile, smaller oligofructose chains can be distinguished from the inulin chains and separations up to and exceeding DP80 are possible.



Columns: Dionex CarboPac PA200, 1 mm (guard + separator)

Gradient: Dionex CarboPac PA200, 1 × 250 mm:
 0–45 min: 40 mM KMSA/60 mM KOH to 156 mM KMSA/22 mM KOH
 45–50 min: 156 mM KMSA/22 mM KOH
 50–65 min: 40 mM KMSA/ 60 mM KOH

Flow Rate: Dionex CarboPac PA200 1 mm: 0.063 mL/min

Detection: Dionex CarboPac PA200, 1 × 250 mm: PAD, Au on PTFE, 1 mil gasket, Ag/AgCl ref.

Samples: 5 mg/mL Inulin from chicory

Figure 2. Inulin profiles showing the comparison of the Dionex CarboPac PA200, 1 mm column.

Profiling of Galacto-oligosaccharides

Galacto-oligosaccharides (GOS) are non-digestible neutral carbohydrates with the ability to manipulate the composition of colonic microflora in order to improve gastrointestinal health. These carbohydrates are enzymatically produced by transgalactosylation reactions of lactose catalyzed by β -galactosidases to give rise to galactose oligomers with a terminal glucose, with different glycosidic linkages and degrees of polymerization (DP). Depending on the enzymatic source used for their synthesis, the chemical structure of these oligosaccharides varies and, consequently, their effect on gut microflora can change. The characterization of GOS structures is a required and important task to understand their mechanism of action on the human gut.

The application in Figure 3 demonstrates the performance of the Dionex CarboPac PA200 1 mm column with Dual EGC.

Exceptional Performance

The unique pellicular resin of the Dionex CarboPac PA200 columns offers exceptional selectivity and stability over the entire pH range. Its highly cross-linked structure ensures long column life and easy cleanup. The entire manufacturing process (resin synthesis, amination, and packing and testing of the chromatographic columns) is carefully controlled to ensure that every Dionex CarboPac PA200 column delivers reproducible performance. Dionex CarboPac PA200 columns are tested with two isomers of *N*-acetyl neuraminosyl-D-lactose to ensure lot-to-lot reproducibility.

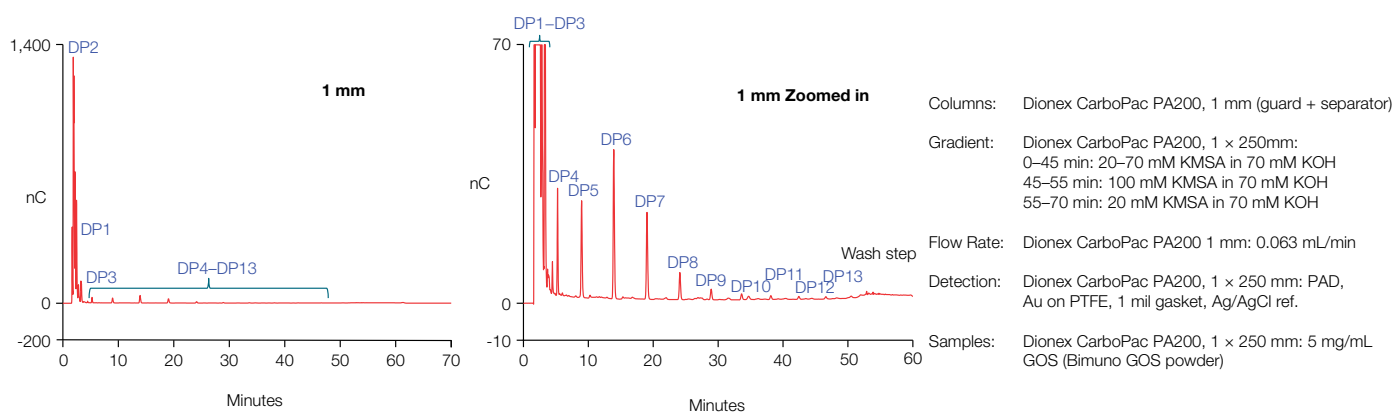


Figure 3. GOS Profile separation using the Dionex CarboPac PA200, 1 mm column.

Specifications

Resin Composition:	5.5 µm diameter ethylvinylbenzene/divinylbenzene substrate (55% cross-linking) agglomerated with 43 nm MicroBead 6% cross-linked quaternary amine-functionalized latex
Anion Exchange Capacity:	1 mm – 4 µeq/column
Chemical Compatibility:	pH 0–14, 100% compatible with common HPLC solvents
Temperature Limit:	60 °C
QAR:	Separation of alpha (2,6) and alpha (2,3) NANLac isomers
Typical Operating Conditions:	Temperature – 30 °C Maximum Pressure – 4500 psi
Recommended Flow Rate:	0.063 mL/min 1 mm
Typical Eluents:	potassium hydroxide, potassium methanesulfonate

Ordering information

Description	Part Number
Dionex CarboPac PA200 Analytical Column (1 × 250 mm)	302861
Dionex CarboPac PA200 Guard Column (1 × 50 mm)	302862

Find out more at thermofisher.com/IC

General Laboratory Equipment – Not For Diagnostic Procedures. © 2018-2024 Thermo Fisher Scientific Inc. All rights reserved. All trademarks are the property of Thermo Fisher Scientific and its subsidiaries. This information is presented as an example of the capabilities of Thermo Fisher Scientific products. It is not intended to encourage use of these products in any manners that might infringe the intellectual property rights of others. Specifications, terms and pricing are subject to change. Not all products are available in all countries. Please consult your local sales representatives for details. **PS72652-EN 0224M**

ThermoFisher
SCIENTIFIC