Thermo Scientific High Concentration Carbohydrate Analysis Kit

The Thermo Scientific™ High Concentration Carbohydrate Analysis Kit is specifically designed for fast and high-resolution analysis of concentrated mono- and disaccharides using the Thermo Scientific™ Dionex™ ICS-5000+ HPIC™ system and the Thermo Scientific™ Dionex™ CarboPac™ SA10 column.

In the biofuels and food & beverage industries, it is critical to separate and quantify a large number of carbohydrate samples during the production processes. High-performance anion-exchange chromatography with pulsed amperometric detection (HPAE-PAD) has been shown to be a highly selective and reproducible analysis method for these carbohydrates with no need for derivatization.

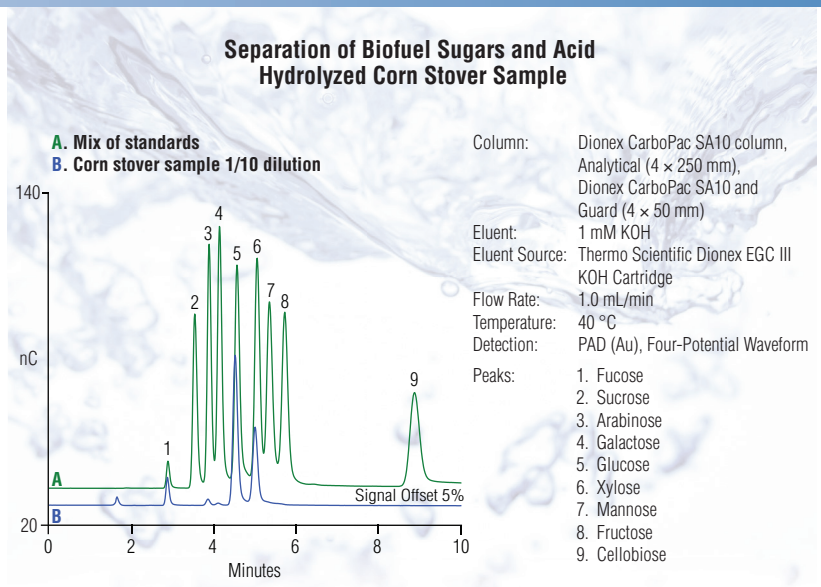

Figure 1. Separation of biofuel sugars (A) and an acid-hydrolyzed (diluted 10-fold) corn stover sample (B) using the High Concentration Carbohydrate Analysis Kit and the Dionex CarboPac SA10 column.

Biomass samples typically have a sugar concentration up to 100 - 200 mg/mL. Due to the high concentration of the carbohydrates, the samples had to be diluted multiple times before injection. This was time-consuming and prone to human errors. Thermo Scientific Application Note 282 describes a method using a 2.5 µL injection loop with a 15 mil gasket in a Dionex High-Pressure IC system and the Dionex CarboPac SA10 column. After a single 100- or 150 fold dilution, biofuel and simple food sugars were directly quantified in less than 10 minutes.

The new High Concentration Carbohydrate Kit consists of two 62-mil gaskets and matching spacer block for the electrochemical flow cells on the Dionex ICS-5000+ HPIC system. In combination with a 0.4 µL injection valve, the 62-mil gasket requires only minimal dilution (single 10-fold dilution, Figure 1). It increases the throughput, reduces dilution errors, and prevents saturating the working electrode (see Thermo Scientific Application Update 192).

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Table 1. Analysis reproducibility over 315 injections and 5 days.

Analyte	Retention Time Reproducibility (RSD) n = 315	Peak Area Precision (RSD) n = 315
Fucose	0.97	2.77
Sucrose	1.72	2.63
Arabinose	1.48	2.27
Galactose	1.65	2.26
Glucose	1.75	2.62
Xylose	1.85	2.27
Mannose	1.90	3.00
Fructose	2.10	4.36
Cellobiose	3.18	2.57

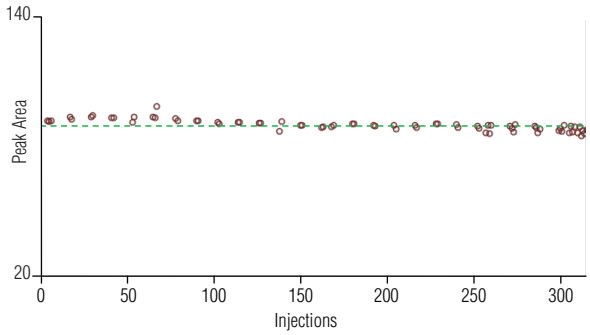

Figure 2. Glucose peak area trend over 315 injections and 5 days (1 mg/L standard sample, RSD 2.62).

The 62-mil gasket is robust and ensures highly reproducible separation results on a Dionex CarboPac SA10 column. Table 1 summarizes the retention time and peak area precisions for the 1 mg/L standard, over 315 injections in the span of 5 days. For example, the reproducibility of glucose peak area is highlighted in Figure 2. The robust nature of the data demonstrates that the ***High Concentration Carbohydrate Analysis Kit*** can be routinely used for handling large numbers of high concentration carbohydrate samples.

All data were acquired on a Dionex ICS-5000⁺ HPIC system, but the ***High Concentration Carbohydrate Analysis Kit*** is compatible with electrochemical flow cells on Thermo Scientific Dionex ICS-3000 and Thermo Scientific Dionex ICS-5000 systems.

Ordering Information

To order in the U.S., call 1-800-346-6390, or contact the Thermo Fisher Scientific office nearest you. Outside the U.S., order through your local Thermo Fisher Scientific office or distributor. Refer to the following part numbers.

Description	Part Number
High Concentration Carbohydrate Analysis Kit	085324
Gasket, Teflon, 62 mil Thick, Package of 2	075499
Dionex CarboPac SA10 Analytical Column (4 × 250 mm)	074641
Dionex CarboPac SA10 Analytical Column (2 × 250 mm)	082322
Dionex CarboPac SA10 Guard Column (4 × 50mm)	074902
Dionex CarboPac SA10 Guard Column (2 × 50mm)	082323
0.4 µL Internal Injection Valve	072050

www.thermoscientific.com/dionex

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