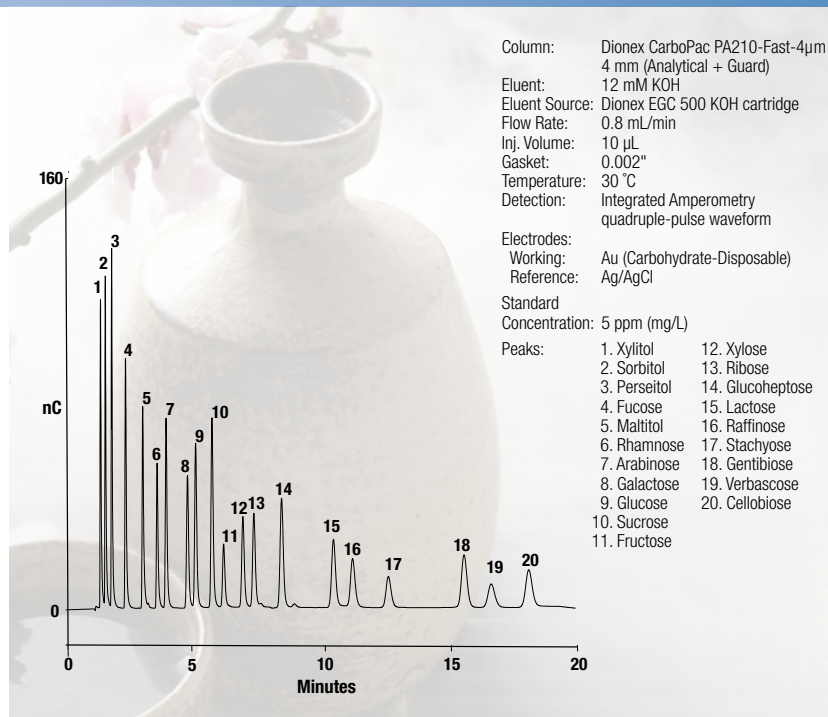


Thermo Scientific Dionex CarboPac PA210-Fast-4 μ m Column

Thermo Scientific™ Dionex™ CarboPac™ columns for high resolution analysis of mono-, di-, tri-, tetra- and pentasaccharides in various types of food samples.

- Predictable, high-resolution, high efficiency separations of food sugars
- Resolve and quantify glucose, galactose, fructose, sucrose, rhamnose, stachyose, raffinose, and verbascode in food and beverage samples in ≤ 20 minutes



Predictable, high-resolution separations of simple sugars in food matrices

The Thermo Scientific™ Dionex™ CarboPac™ PA210-Fast-4 μ m (2 mm and 4 mm) columns are the latest additions to the Dionex CarboPac family of columns for carbohydrate separations. The new column was developed to provide fast, high-resolution separations for most mono- through pentasaccharides in a variety of applications including food and beverage analyses. The columns are packed with a hydrophobic, polymeric, microporous anion exchange resin stable over entire range of pH 0–14. The unique pH-stability of this packing allows eluent compositions that are conducive to anodic oxidation of carbohydrates at gold electrodes.

Increased interest in small oligosaccharides

Numerous oligosaccharides, consisting of 3–5 monosaccharide units, occur in foods. These oligosaccharides are generally considered nondigestible. The raffinose family oligosaccharides (RFOs) include raffinose (a trisaccharide), stachyose (a tetrasaccharide), and verbascode (a pentasaccharide). They are found in vegetables, such as peas, beans, and lentils. Unlike other sugars, raffinose, stachyose,

and verbascode are not digested by human gastrointestinal enzymes in the small intestine, and are poorly absorbed by most people. As such, they are referred to as prebiotic carbohydrates. Interest in fructans and raffinose family oligosaccharides (RFOs) has increased during the last decade due to their health-promoting abilities to selectively stimulate beneficial bacteria. Aside from their prebiotic characteristics, fructans and RFOs are also emerging as important immune stimulators in animals and humans.

Isocratic separation of mono and disaccharide standards (the 5 most common sugars of interest)

The Dionex CarboPac PA210-Fast-4µm column has been designed to provide fast separations of common mono- and disaccharides, and also oligosaccharides up to five hexose units long. Using 12 mM KOH, The five sugars can be separated within 8 min on the 150 mm long columns on both the 2 mm ID and 4 mm ID column formats (Figure 1).

Analysis of Sake

Sake is a product prepared by microbial fermentation of polished rice grains. Eighteen mono- and di-saccharides are reported to be present in Sake. A standard with known concentrations of these 18 sugars was prepared. The bottom panel of Figure 2 shows the separation of the standards. The top panel of Figure 2 shows the separation of a 1000-fold diluted Sake sample. The separation reveals significant amounts of glucose, sucrose, fructose, and maltose, and smaller amounts of kojibiose, gentibiose, cellobiose, and sakebiose.

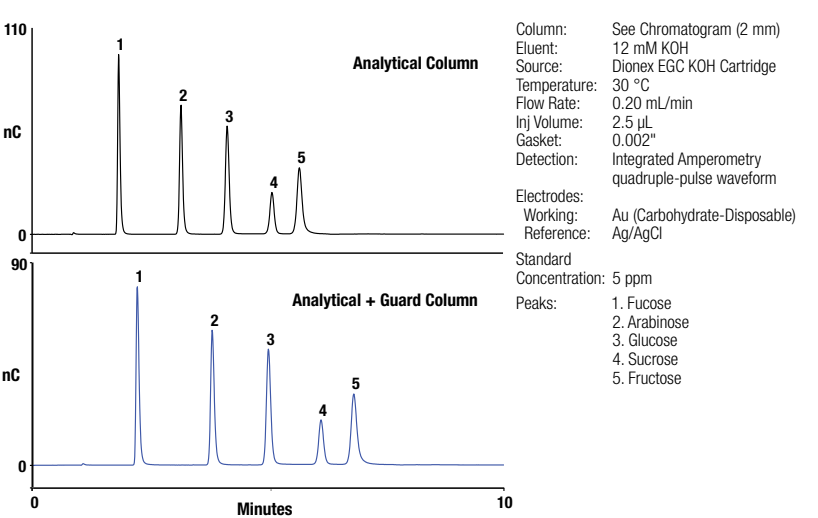


Figure 1. Separation of a five-carbohydrate standard using the Dionex CarboPac PA210-Fast-4µm, 2 mm column.

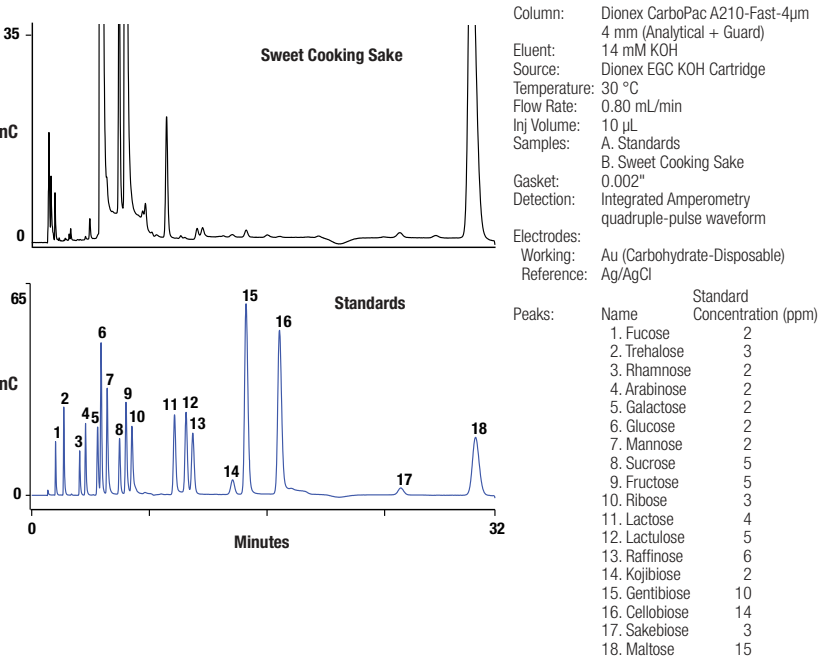


Figure 2. Separation of Sake carbohydrates using the Dionex CarboPac PA210-Fast-4µm, 4 mm column.

Analysis of Honey

Honey is natural product, and tends to contain carbohydrates found in the nectar retrieved from the source flowers by the hive. Honey preparations from a local supermarket, a local beekeeper and from New Zealand were analysed along with a known standard in Figure 3.

All the honey types were diluted 1000-fold in water and compared against a known standard of 13 sugars.

All the honey types namely supermarket clover honey, beekeeper's honey, and the manuka honey contain glucose and fructose as the most abundant sugars, and sucrose, maltose, nigerose and kojibiose are present at lower concentrations.

The carbohydrate profiles of each of the honeys is a little different which can be valuable in determining the source of the honey.

Guaranteed Performance

The unique pellicular resin of the Dionex CarboPac PA210-Fast-4µm 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 PA210-Fast-4µm column delivers reproducible performance.

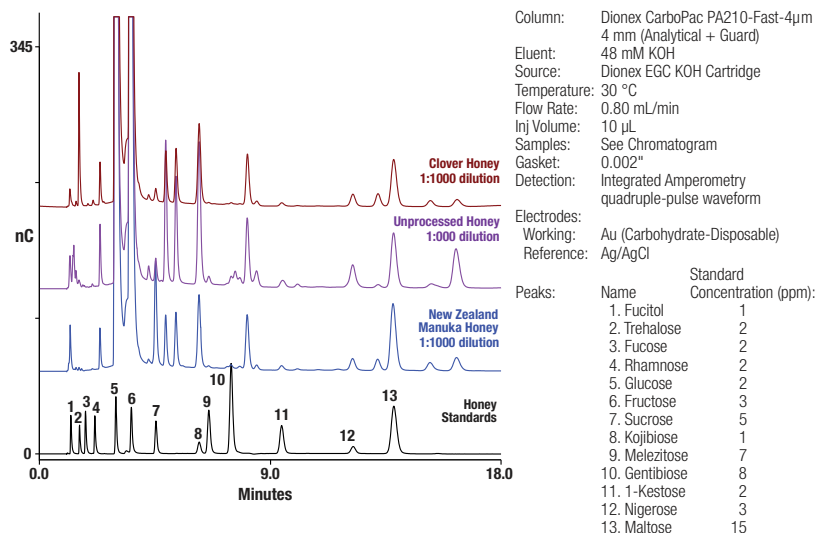


Figure 3. Comparison of honey carbohydrates on a Dionex CarboPac PA210-Fast-4µm, 4 mm column.

SPECIFICATIONS

Resin Composition:	4.0 µm diameter ethylvinylbenzene/divinylbenzene substrate (55% cross-linking) agglomerated with 43 nm MicroBead 6% cross-linked quaternary amine-functionalized latex
Anion Exchange Capacity:	66 µeq/column
Chemical Compatibility:	pH 0-14, 80% compatible with common HPLC Solvents
Temperature Limit:	60 °C
Typical Operating Conditions:	4,000 psi at 0.2 mL/0.8 mL per minute (guard and analytical) 2 mm/4 mm × 150 mm
Recommended Operating Temperature:	30 °C
Recommended Flow Rate:	0.2 mL/min 2 mm; 0.8 mL/min 4 mm
Ionic Forms Eluents:	Potassium or Sodium Hydroxide

Ordering Information

For more information or to place an order, contact the Thermo Scientific Dionex Products office nearest you or your local distributor. Phone numbers and addresses for worldwide subsidiaries can be found in the About Us section of www.thermoscientific.com.

Description	Part Number
Dionex CarboPac PA210-Fast-4µm Analytical Column (4 × 150 mm)	088953
Dionex CarboPac PA210-Fast-4µm Analytical Column (2 × 150 mm)	088954
Dionex CarboPac PA210-Fast-4µm Guard Column (4 × 30 mm)	088955
Dionex CarboPac PA210-Fast-4µm Guard Column (2 × 30 mm)	088956

www.thermofisher.com/chromatography

©2016 Thermo Fisher Scientific Inc. All rights reserved. ISO is a trademark of the International Standards Organization. All other 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 representative for details.



Thermo Fisher Scientific,
Sunnyvale, CA USA is
ISO 9001 Certified.

Africa +43 1 333 50 34 0
Australia +61 3 9757 4300
Austria +43 810 282 206
Belgium +32 53 73 42 41
Brazil +55 11 2730 3006
Canada +1 800 530 8447
China 800 810 5118 (free call domestic)
 400 650 5118

Denmark +45 70 23 62 60
Europe-Other +43 1 333 50 34 0
Finland +358 10 3292 200
France +33 1 60 92 48 00
Germany +49 6103 408 1014
India +91 22 6742 9494
Italy +39 02 950 591

Japan +81 6 6885 1213
Korea +82 2 3420 8600
Latin America +1 561 688 8700
Middle East +43 1 333 50 34 0
Netherlands +31 76 579 55 55
New Zealand +64 9 980 6700
Norway +46 8 556 468 00

Russia/CIS +43 1 333 50 34 0
Singapore +65 6289 1190
Sweden +46 8 556 468 00
Switzerland +41 61 716 77 00
Taiwan +886 2 8751 6655
UK/Ireland +44 1442 233555
USA +1 800 532 4752

Thermo
SCIENTIFIC

A Thermo Fisher Scientific Brand