CHROMATOGRAPHY

Aminex® HPLC Columns

Aminex HPLC columns, which are packed with a polymer-based matrix, are the research and industry standard for the analysis of carbohydrates, alcohols, and organic acids in food and beverage, biochemical, biofuel, biomedical, and biotechnology applications. These columns allow the use of simple isocratic methods and eluting with water, organically modified water, or dilute acid. Minimal sample preparation is required, filtration through a 0.45 µm filter is usually sufficient, and no derivatization is necessary.

Three of our most popular columns and applications are highlighted here. A comprehensive list of research applications and column choices is provided in Table 1.

The Aminex HPX-87C column is the column of choice for most general sweetener analyses. This column is optimized for analyzing monosaccharides and also provides class separation of di-, tri-, and tetrasaccharides. It is used primarily for the quantitation of glucose and fructose in high fructose corn syrup, and for general monosaccharide analysis.

Conditions	
Column:	Aminex HPX-87C column, 250 x 4 mm
Sample:	Sugar alcohol standards
Eluant:	30% acetonitrile/H_2O
Flow rate:	0.2 ml/min
Temperature:	70°C
Detection:	RI @ 64x

Peaks:

1. Glucose
2. Erythritol
3. Ribitol and pentaerythritol
4. Mannitol
5. Arabitol
6. Galactitol
7. Xylitol
8. Sorbitol
9. Iditol

Fig. 1. Separation of sugar alcohols on the Aminex HPX-87C column containing added corn syrup.

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The Aminex HPX-87P column provides excellent resolution of sucrose, lactose, and fructose in dairy products. It is therefore useful for analyzing samples that contain different types of sweeteners.

Conditions

Column:	Aminex HPX-87P column, 300 x 7.8 mm
Sample:	A. Plain yogurt, diluted 1:1, 20 µl B. Strawberry yogurt, diluted 1:2, 20 µl C. Blueberry yogurt, diluted 1:1, 20 µl
Eluant:	H_2O
Flow rate:	0.6 ml/min
Temperature:	85°C
Detection:	RI @ 32x

Peaks:

1. Sucrose (and maltose in C)
2. Lactose
3. Glucose
4. Galactose
5. Fructose

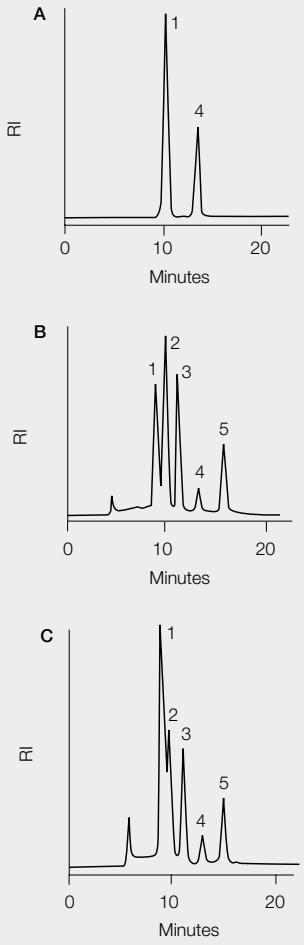

Fig. 2. Carbohydrate profile of different types of yogurts. A, plain yogurt containing natural lactose and galactose; **B**, strawberry yogurt with corn sweetener added for flavor enhancement; and **C**, blueberry yogurt containing added corn syrup. RI, retention index.

The Aminex HPX-87H column is used for the analysis of carbohydrates found in solution with carboxylic acids, volatile fatty acids, short chain fatty acids, alcohols, ketones, and many neutral metabolic by-products. Most often used for organic acids analysis, this hydrogen-form column is also useful for fermentation monitoring, biological fluid analysis, and acetylated amino sugar separations.

The Aminex HPX-87H column is especially useful for profiling monosaccharides and organic acids simultaneously.

Conditions

Instrument:	GlycoChrom analyzer
Column:	Aminex HPX-87H column, 300 x 7.8 mm
Sample:	Fermentation standards
Eluant:	5 mM sulfuric acid
Flow Rate:	0.60 ml/min
Temperature:	50°C
Detection:	UV 210 nm RI

Peaks:

1. Maltotriose
2. Maltose
3. Citric acid
4. Tartaric acid
5. Glucose
6. Fructose
7. Succinic acid
8. Lactic acid
9. Glycerol
10. Acetic acid
11. Pyroglutamic acid
12. Methanol
13. Ethanol

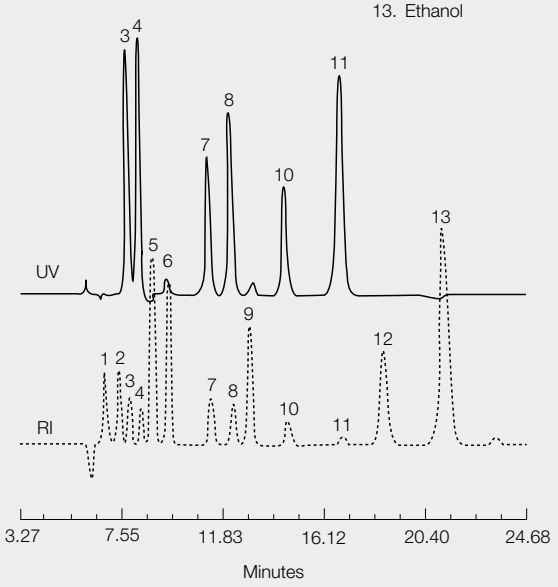

Fig. 3. Fermentation standard separated on the Aminex HPX-87H column. The standard was detected with both a UV monitor and a refractometer.

Table 1. Aminex Column Selection by Application.

Phases Available	Applications	Description	Column
Monosaccharide	• Column of choice for monosaccharides and sugar alcohols from sweeteners, corn, and cane sugars • For class separation of di-, tri-, and tetrasaccharides • Primarily used for the quantitation of glucose and fructose, and for general monosaccharide analysis	8% cross-linked resin **calcium** ionic form Particle size: 9 µm pH range: 5–9 Column size: 300 x 7.8 mm	Aminex HPX-87C Catalog #125-0095
Monosaccharide	• For analysis of carbohydrates found in solution with carboxylic acids, volatile fatty acids, short chain fatty acids, alcohols, ketones, and many neutral metabolic by-products • Most commonly used for organic acid analysis, fermentation monitoring, biological fluid analysis, acetylated amino sugar separations, and quantification of biomass to biofuels analysis	8% cross-linked resin **hydrogen** ionic form Particle size: 9 µm pH range: 1–3 Column size: 300 x 7.8 mm	Aminex HPX-87H Catalog #125-0140
Monosaccharide	• Monosaccharides and sugar alcohol analysis • Tailored for the separation of cellulose-derived monosaccharides • For analyses of pentoses and hexoses in wood products, especially cellobiose, glucose, xylose, galactose, arabinose, and mannose • Excellent resolution of sucrose, lactose, and fructose in dairy products	8% cross-linked resin **lead** ionic form Particle size: 9 µm pH range: 5–9 Column size: 300 x 7.8 mm	Aminex HPX-87P Catalog #125-0098
Mono-, di-, and oligosaccharides	HPLC carbohydrate analysis column: • Optimized for analysis of mono- and disaccharides in starch hydrolysates • Provides high-resolution separations of oligosaccharides as large as DP-10	4% cross-linked resin **calcium** ionic form Particle size: 25 µm pH range: 5–9 Column size: 300 x 7.8 mm	Aminex HPX-42C Catalog #125-0096
Mono-, di-, and oligosaccharides	HPLC carbohydrate analysis column: • For fast, high-resolution oligosaccharide analysis • Separates oligosaccharides as large as DP-11 in 25 minutes	4% cross-linked resin **silver** ionic form Particle size: 25 µm pH range: 6–8 Column size: 300 x 7.8 mm	Aminex HPX-42A Catalog #125-0097
Mono-, di-, and oligosaccharides	HPLC carbohydrate analysis column: • Optimized for analysis of mono-, di-, and trisaccharides in samples such as corn syrup, brewing wort • High-quality separations of glucose, maltose, and maltotriose	8% cross-linked resin **potassium** ionic form Particle size: 9 µm pH range: 5–9 Column size: 300 x 7.8 mm	Aminex HPX-87K Catalog #125-0142
Organic acid	• Separation of organic acids alone or in combination with carbohydrates, alcohols, fatty acids or neutral compounds; separation of amino sugars • Analysis time: 20 minutes for most analyses • Sensitivity: nanogram level • Separation conditions: from ambient temperature to 60˚C; flow rates of 0.4 to 1.0 ml/min • Column of choice when many compounds in a formulation must be analyzed or when high-resolution separations are required	8% cross-linked resin **hydrogen** ionic form Particle size: 9 µm pH range: 1–3 Column size: 300 x 7.8 mm	Aminex HPX-87H Catalog #125-0140

Table 1. (contd.)

Phases Available	Applications	Description	Column
Organic acid and alcohol	HPLC organic acid and alcohol column: • Optimized to resolve maltotriose, maltose, glucose, and fructose while separating acids and alcohols • Column of choice when analyzing sugars in a fermentation broth	8% cross-linked resin **hydrogen** ionic form Particle size: 9 µm pH range: 1–3 Column size: 150 x 7.8 mm	Fermentation monitoring Catalog #125-0115
Fast carbohydrate	HPLC carbohydrate analysis column: • Designed for extremely fast separations of specific carbohydrates • Optimized for 5-minute analyses of sucrose, glucose, galactose, and fructose	8% cross-linked resin **lead** ionic form Particle size: 9 µm pH range: 5–9 Column size: 100 x 7.8 mm	Fast carbohydrate analysis Catalog #125-0105
Fast acid, organic acid, and alcohol	HPLC organic acid and alcohol column: • Optimized for analysis of alcohols, glycols, and hydrophobic organic acids; rapid screening of fruit quality • Analysis time: decreased fourfold when compared to research-length columns; analyses can be completed in 3–5 minutes • Quality results: shorter column results in taller, narrower peaks with improved detection limits and smaller sample load requirements • Provides fast separations of specific organic acids	8% cross-linked resin **hydrogen** ionic form Particle size: 9 µm pH range: 1–3 Column size: 100 x 7.8 mm	Fast acid analysis Catalog #125-0100
Sugar analysis with high salt concentrations	• Optimized for sugar analysis in samples with high salt concentrations such as beet sugars and molasses • Compatible with salts, no need for desalting prior to analysis	8% cross-linked resin **sodium** ionic form Particle size: 9 µm pH range: 5–9 Column size: 300 x 7.8 mm	Aminex HPX-87N Catalog #125-0143
Sugar alcohols and organic acids with carbohydrates	• For sugar analysis according to USP procedures • Appropriate for sugar alcohol separations and can be fine-tuned for organic acid analysis • For analyzing organic acids in combination with carbohydrates	8% cross-linked resin **calcium** ionic form Particle size: 9 µm pH range: 5–9 Column size: 250 x 4.0 mm	Sugar alcohol analysis Aminex HPX-87C Catalog #125-0094

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