



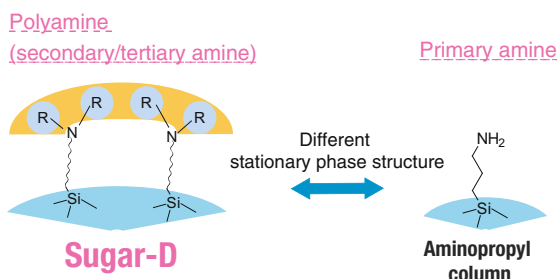
COSMOSIL

HPLC Column for Saccharide Analysis

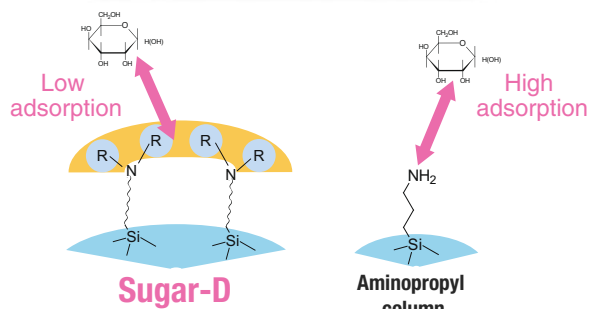
COSMOSIL Sugar-D

- Different selectivity from aminopropyl columns
- Superior quantitative results
- Superior durability
- Anomers remain unseparated

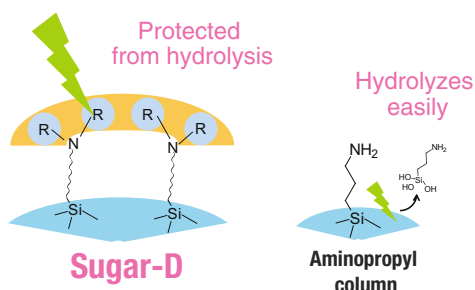
Different selectivity



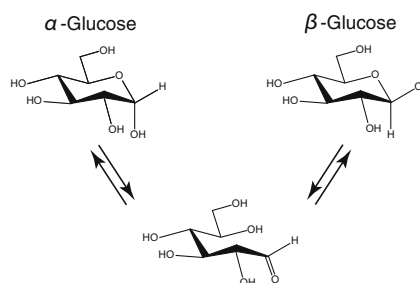
Superior quantitative results



Superior durability



Anomers elute as one peak

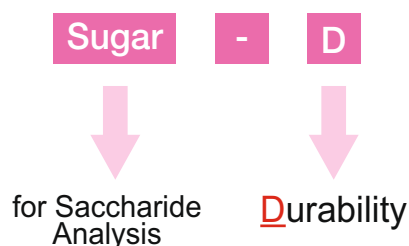


About Sugar-D

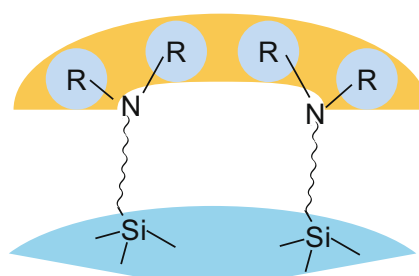
Development of Sugar-D

Aminopropyl columns are commonly used for analysis of monosaccharides and oligosaccharides; however, this type of column has several problems, including low durability, poor separation, and adsorption and peak tailing with some analytes. Carbamoyl-based columns separate anomers, which may not be desirable. To solve these problems, we developed a specialty column for sugar analysis with high durability and performance that does not induce irreversible adsorption.

Product Name



Polyamine-Bonded Silica Gel



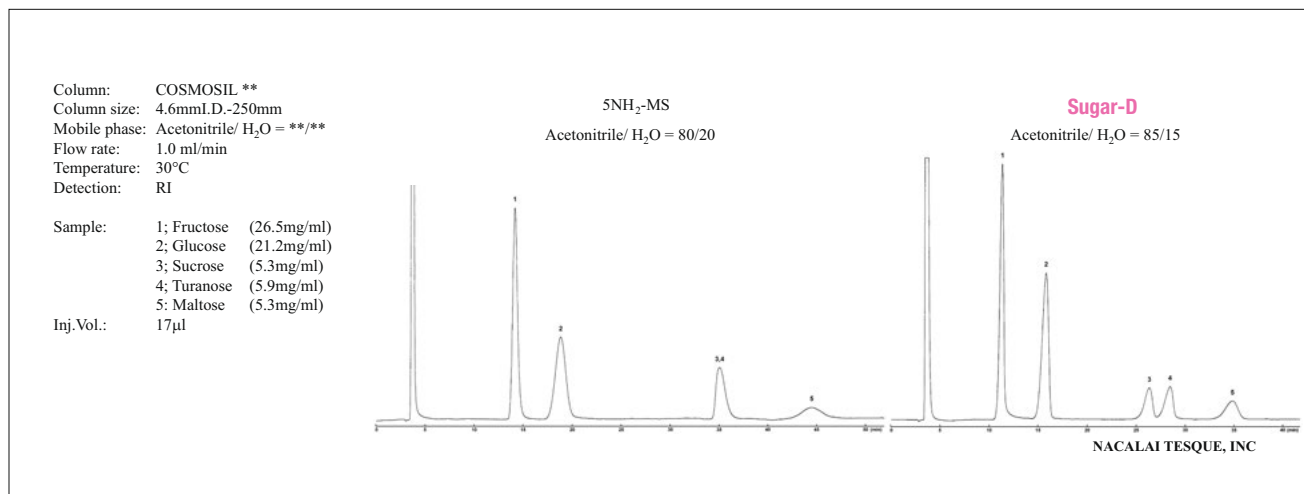
Sugar-D Stationary Phase

Different selectivity from aminopropyl columns

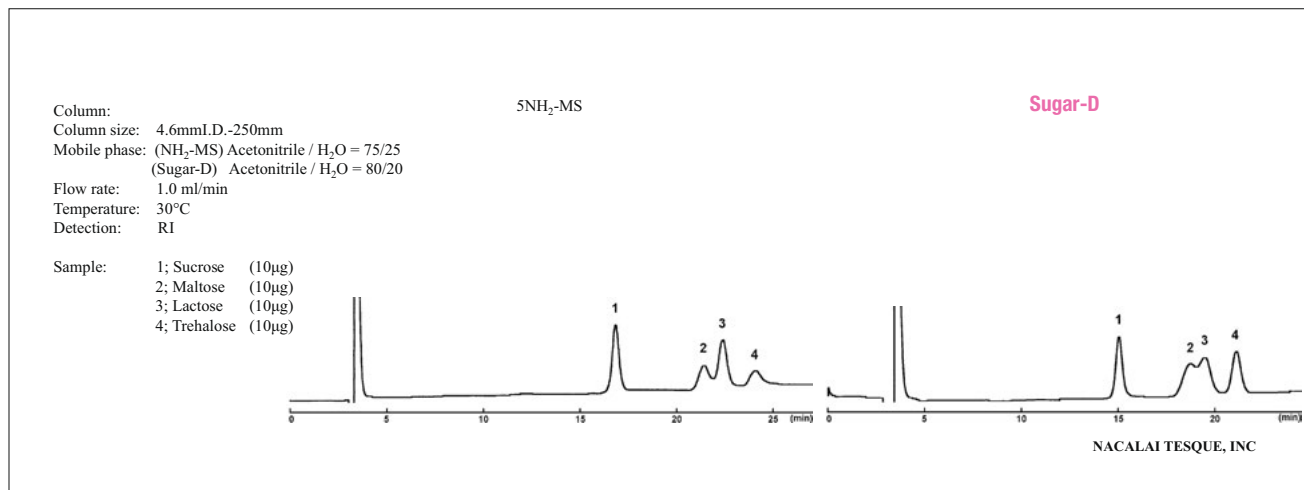
COSMOSIL Sugar-D has a polyamine-based stationary phase, which results in different selectivity from primary amine-based phases, such as aminopropyl.

Comparison to aminopropyl columns

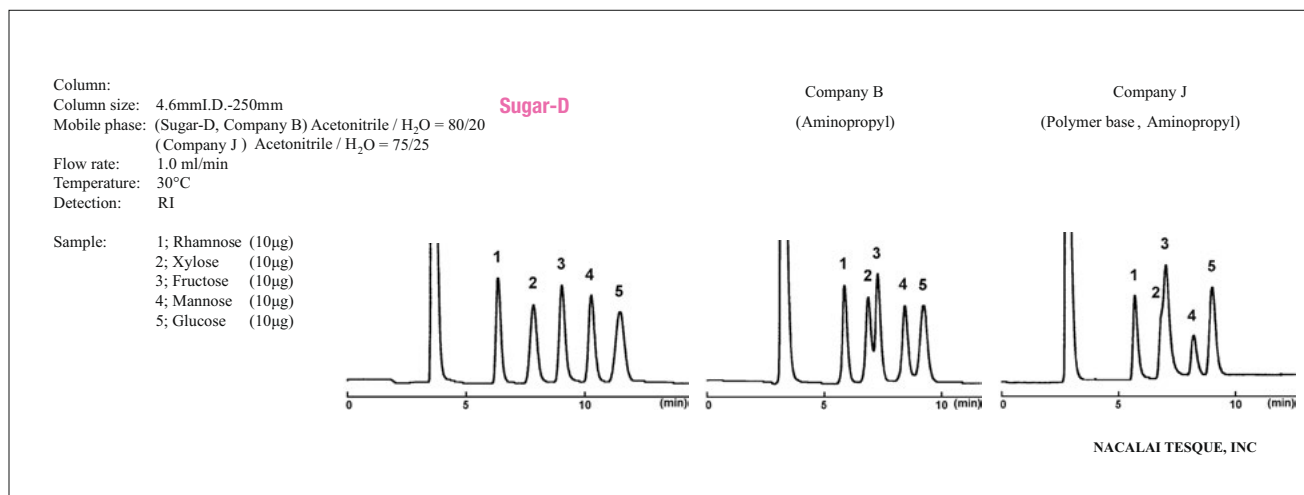
Sucrose and Turanose



Maltose and Lactose



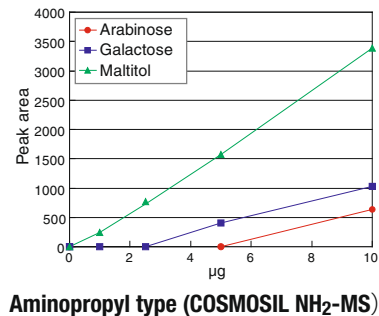
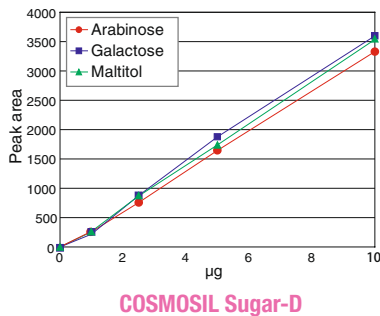
Different selectivity compared to competitor aminopropyl column



Superior quantitative results

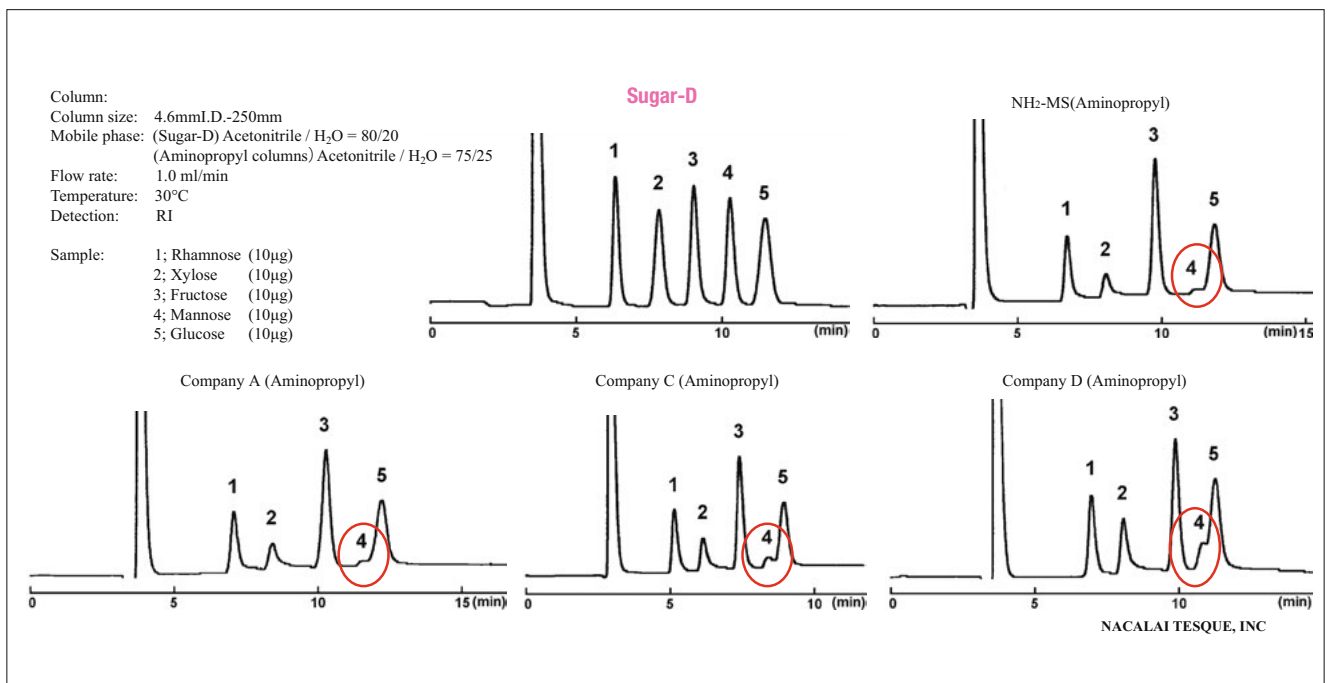
Aldehyde groups in the open-chain form of sugars can form Schiff bases with the amino groups on aminopropyl columns, causing low recovery and peak tailing. COSMOSIL Sugar-D was designed to avoid this, so sugars like arabinose and galactose, which are problematic on aminopropyl columns, elute with sharp peaks. Sugar-D is especially useful for samples of low concentration.

Quantitation at low concentration



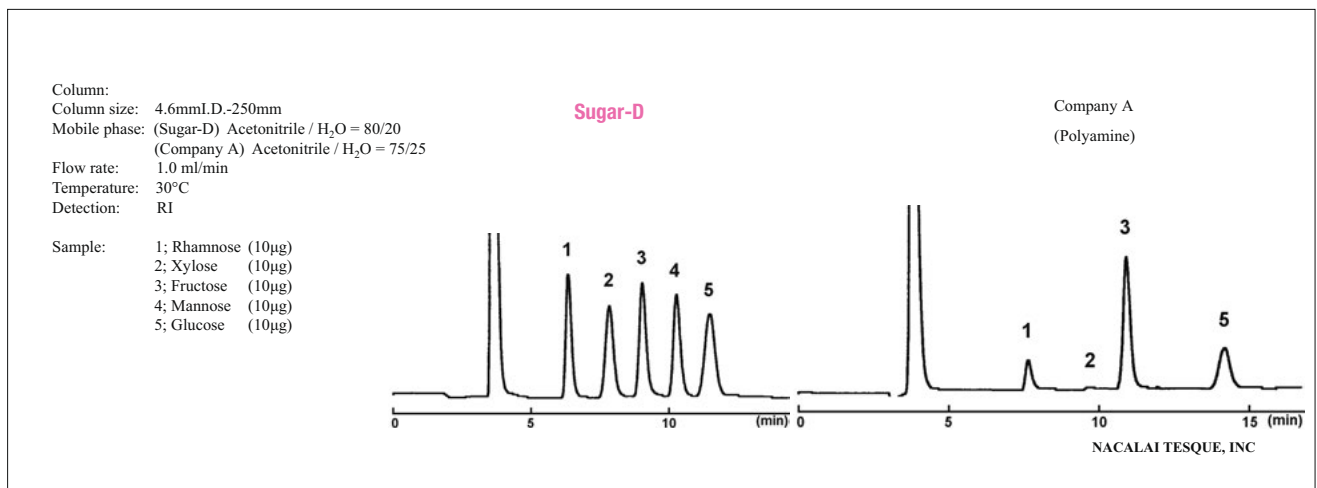
Comparison to competitor aminopropyl columns

COSMOSIL Sugar-D achieves good peak shape, even with sugars that adsorb to aminopropyl columns.



Comparison to competitor polyamine columns

COSMOSIL Sugar-D uses a secondary/tertiary amine-based stationary phase to achieve good performance with difficult samples, such as xylose and mannose. It even exhibits better performance than similar competitors.

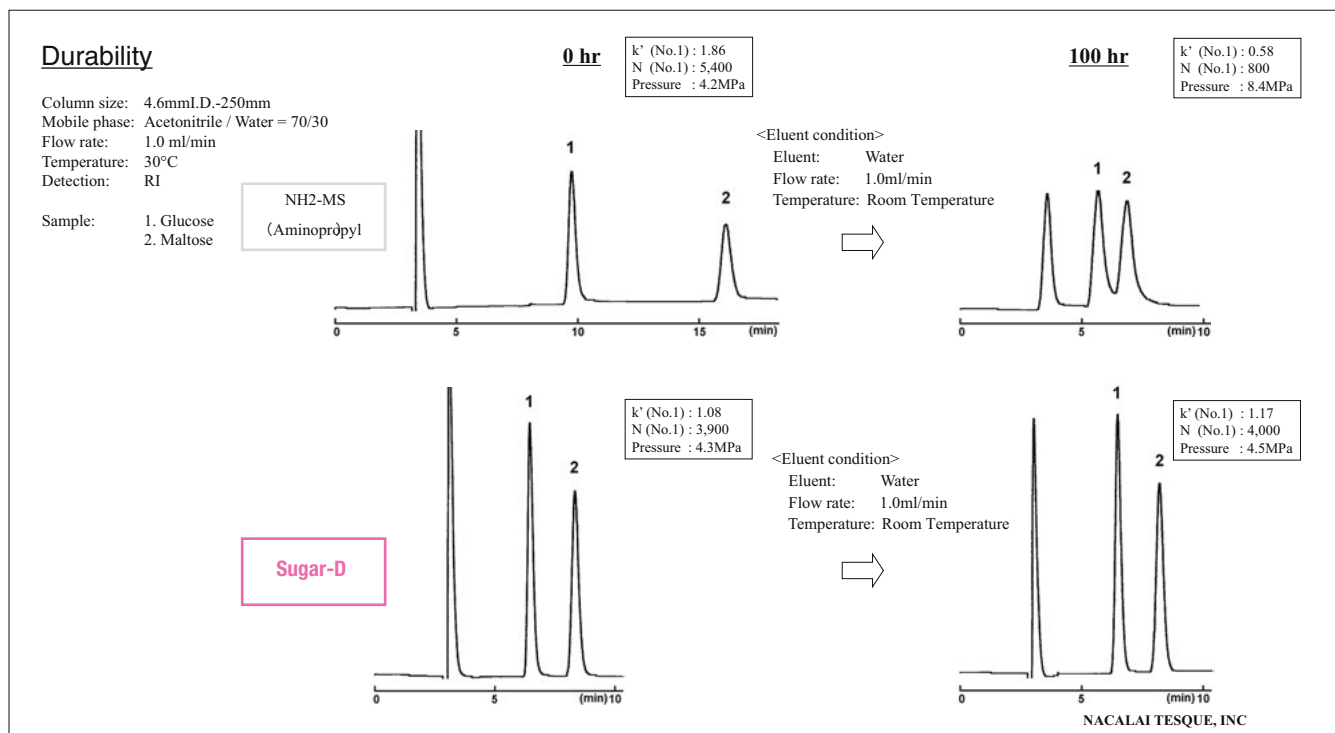


Superior durability

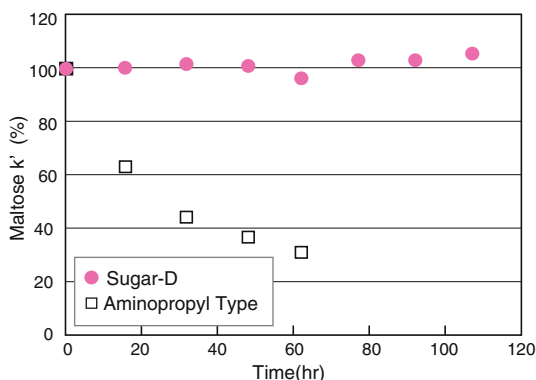
The stationary phase of COSMOSIL Sugar-D is not easily hydrolyzed, so even using water as the mobile phase does not affect it much.

Comparison to aminopropyl columns

After running water for 100 hours, the aminopropyl column's performance was severely degraded, with lower retention and number of theoretical plates. In contrast, Sugar-D was nearly unaffected.



Change in retention factor



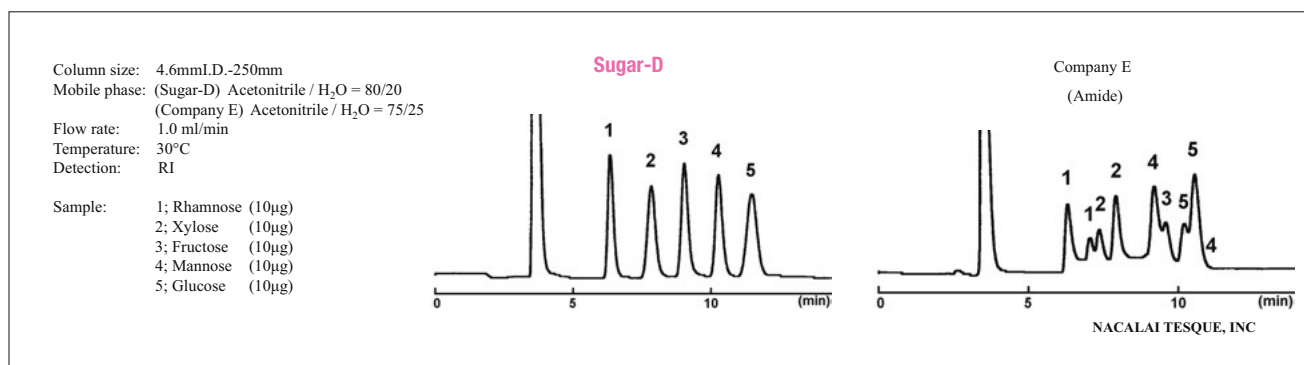
[Eluent Condition]
 Eluent Water
 Flow Rate 1.0 ml/min
 Temperature RT

[Test Condition]
 Column Size 4.6 mm I.D. x 250 mm
 Mobile Phase Acetonitrile : Water = 70 : 30
 Flow Rate 1.0 ml/min
 Temperature 30°C
 Detection RI
 Sample Maltose

Anomers remain unseparated

When analyzing sugars with amide columns, anomers may separate unless harsh conditions, such as high temperature and basic solvents, are employed. COSMOSIL Sugar-D does not separate anomers, even under mild conditions.

Comparison to amide column

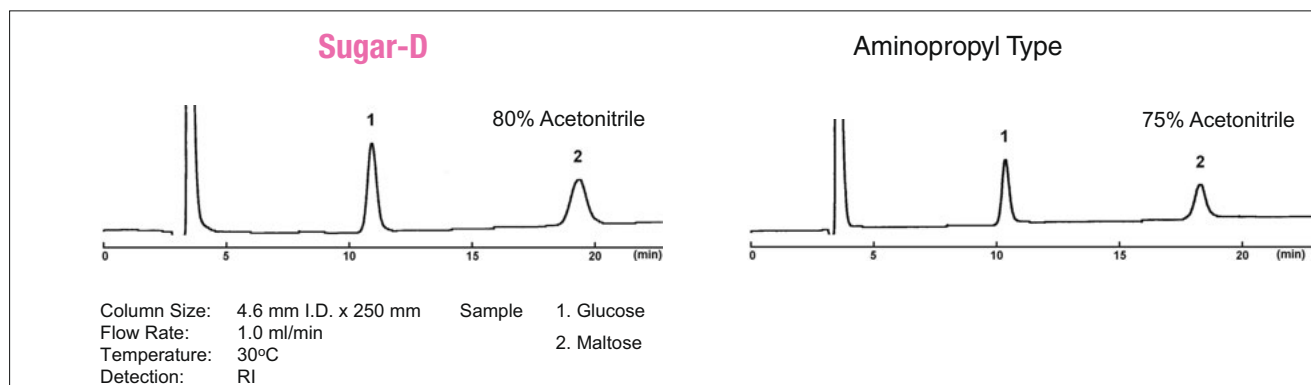


FAQ

Mobile Phase	
Q1	Usable pH Range
A1	When using a buffer, a pH of 2 to 7.5 is recommended. Under acidic conditions, retention generally becomes shorter, so a neutral pH is recommended.
Q2	Buffers
A2	If a column is used with a buffer, we recommend using it exclusively for buffered mobile phases. Buffers and acids can permanently change separation characteristics, leading to unexpected behavior when using a non-buffered mobile phase. Always filter buffers with a 0.5 µm or finer filter before use.
Q3	Organic Solvent
A3	Please use an aprotic, water-soluble organic solvent, such as acetonitrile. Protic solvents like methanol may cause shortened retention.
Q4	Difference in Retention from Aminopropyl Columns
A4	Compared to conventional aminopropyl columns, Sugar-D exhibits slightly lower retention. When transferring methods from aminopropyl columns, increasing the organic solvent ratio by 5 to 10% should result in similar retention time. (See below for an example.)
Column Conditioning	
Q1	Equilibration Time
A1	Compared to C18 columns, HILIC mode columns (including Sugar-D) require longer equilibration time for reproducible analysis.
Q2	Retention Time
A2	During initial use, a column's retention may increase gradually. To stabilize, wash overnight with 100% water.
Washing and Storage	
Q1	Washing
A1	The baseline may destabilize due to impurities adsorbed to the column. To resolve this, please wash with 50:50 acetonitrile/water. If the problem persists, wash again with an increased ratio of water (up to 100%).
Q2	Storage
A2	Wash with a solvent that does not contain buffer or acid, then replace with 90:10 acetonitrile/water. Tightly plug the ends and store in a cool place at room temperature.

Retention Comparison

Compared to conventional aminopropyl columns, Sugar-D exhibits slightly lower retention. When transferring methods from aminopropyl columns, increasing the organic solvent ratio by 5 to 10% should result in similar retention time.



Ordering Informations

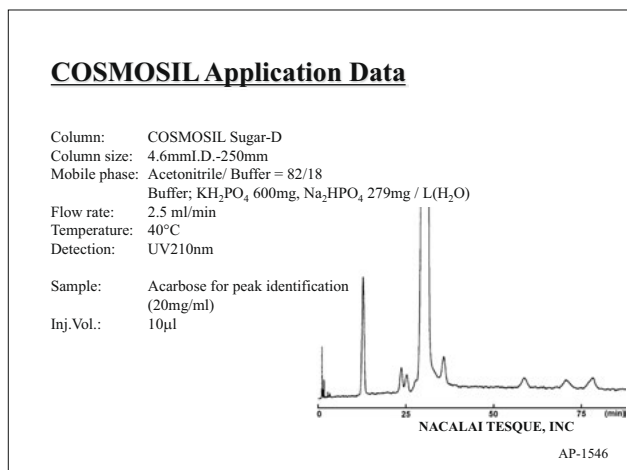
COSMOSIL Sugar-D Packed Column

Column Size I.D. x Length (mm)	Product Number
2.0 x 150	05688-41
2.0 x 250	05689-31
3.0 x 150	05690-91
3.0 x 250	05691-81

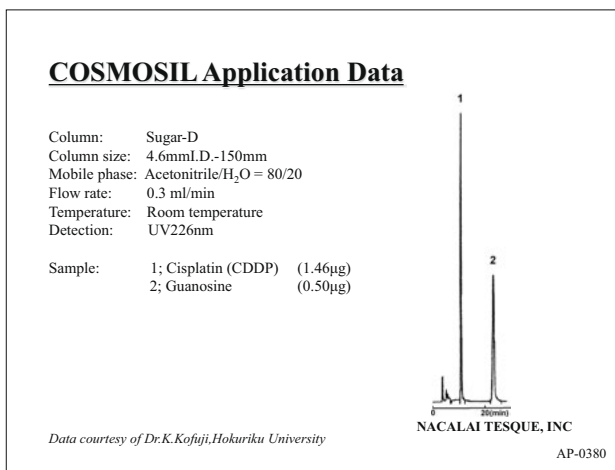
COSMOSIL Sugar-D Guard Column

Column Size I.D. x Length (mm)	Product Number
4.6 x 10	05394-81
10.0 x 20	05696-31
20.0 x 50	05694-51

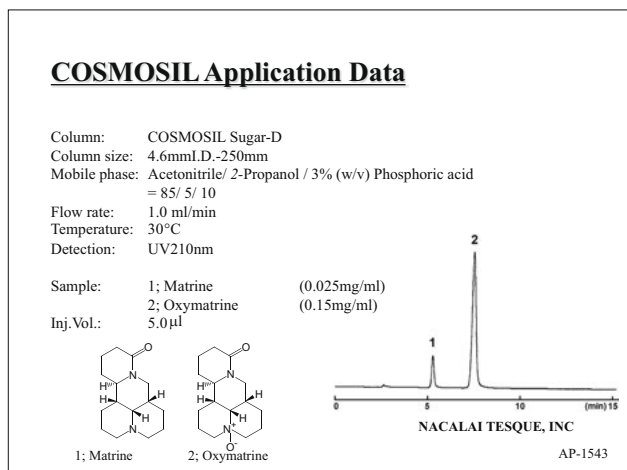
• Type 2 Diabetes Drug: Acarbose



• Anticancer Drugs



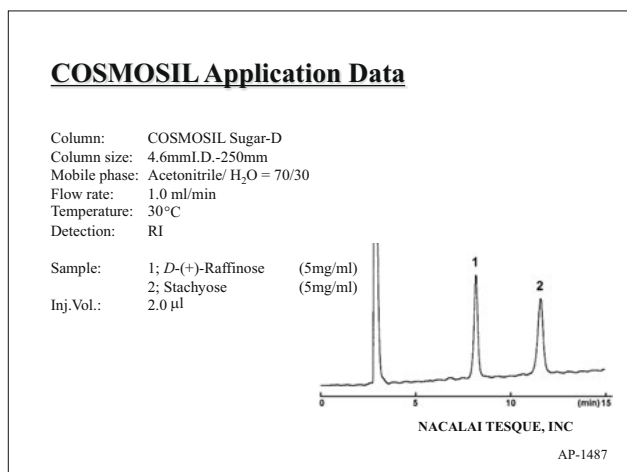
• Herbal Medicine Components (Matrine, Oxymatrine)



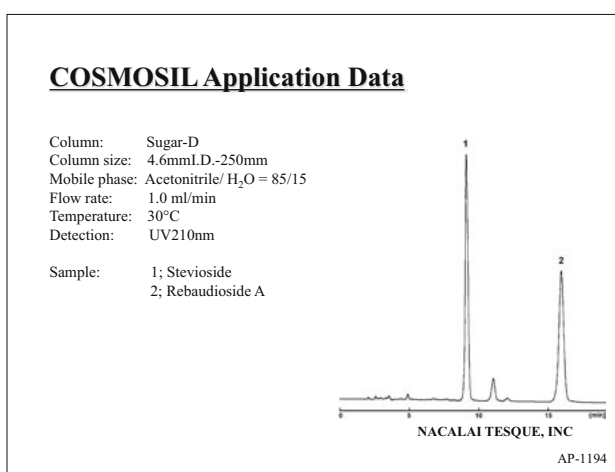
• Herbal Medicine Components (Matrine, Oxymatrine)

Active Ingredients in Health Food

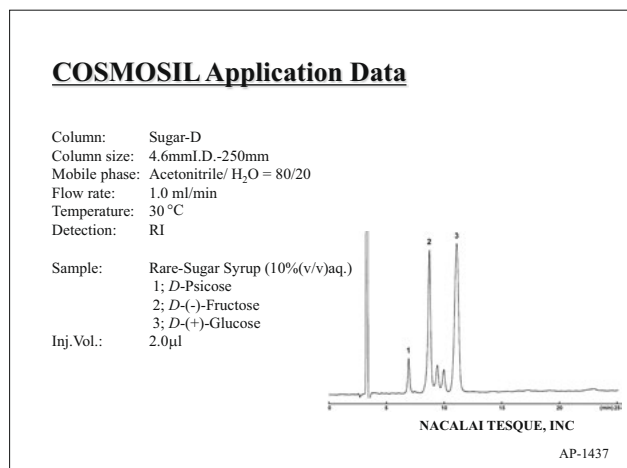
• Soy Oligosaccharides (Raffinose, Stachyose)



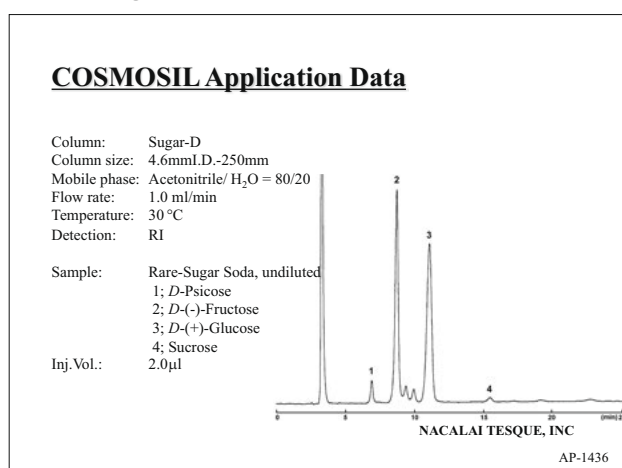
• Stevia Extract (Stevioside, Rebaudioside A)



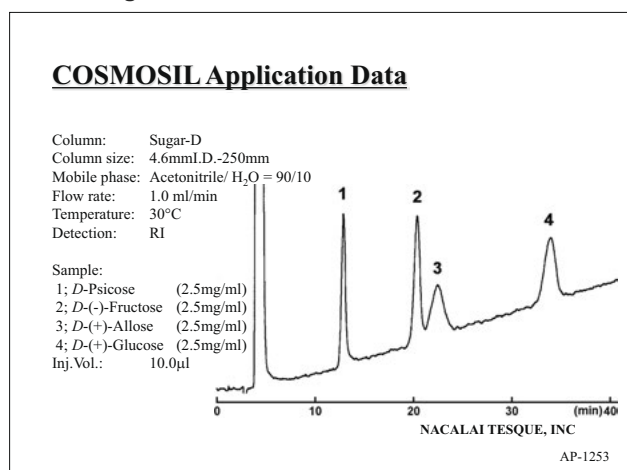
Rare Sugar Syrup



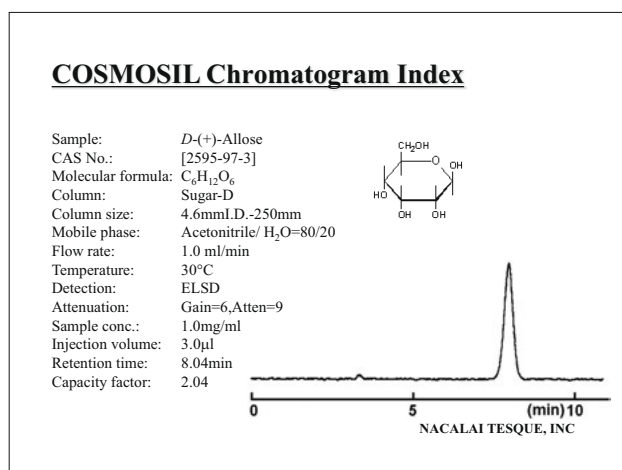
Rare Sugar Soda



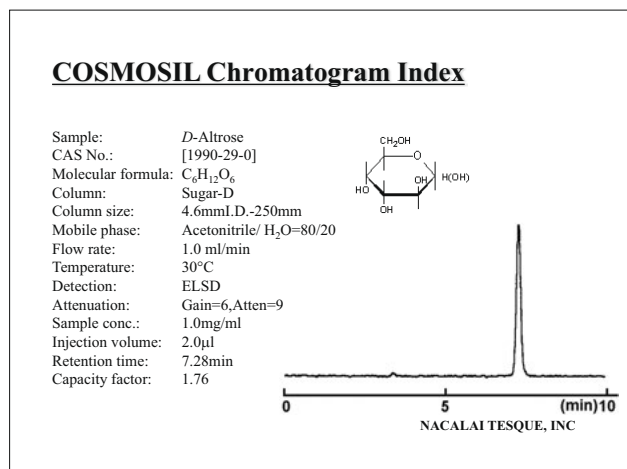
Rare Sugars



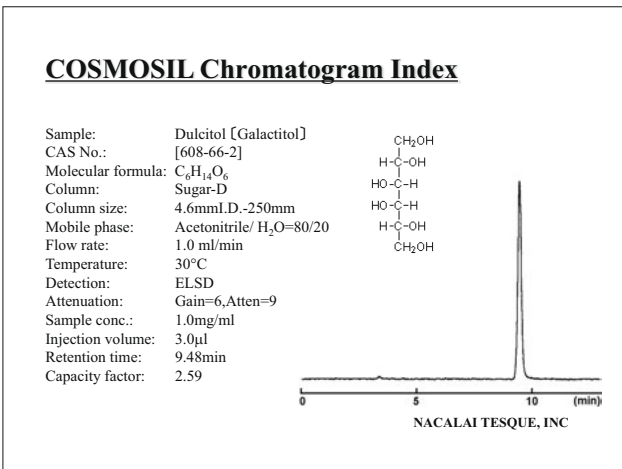
D-Allose



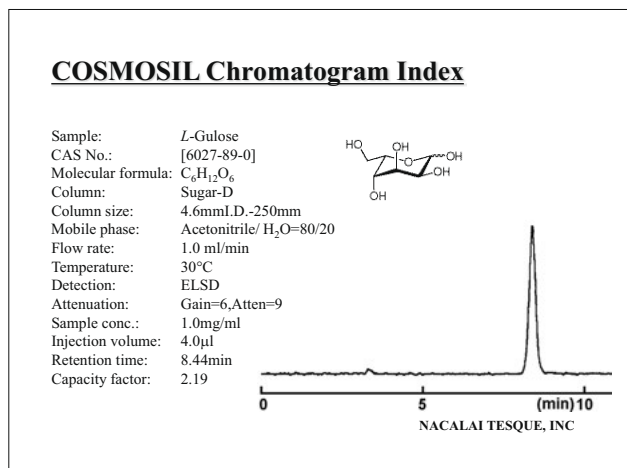
D-Altrose



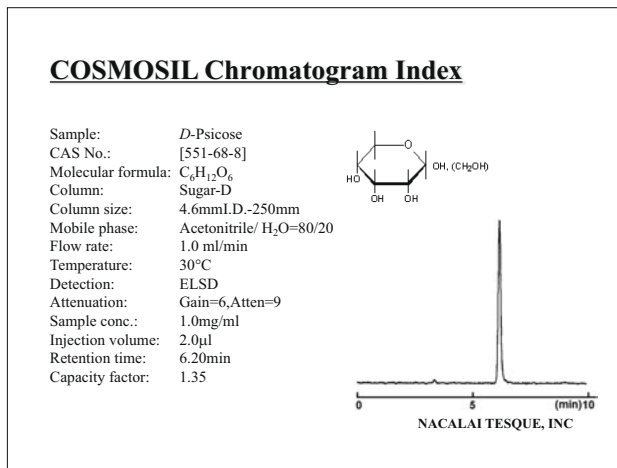
D-Dulcitol



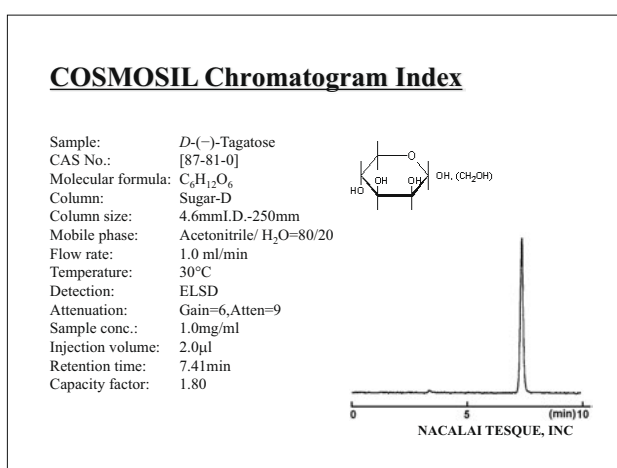
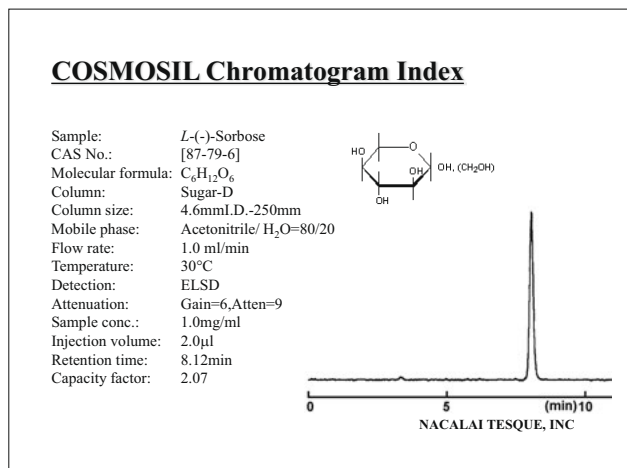
• L-Gulose



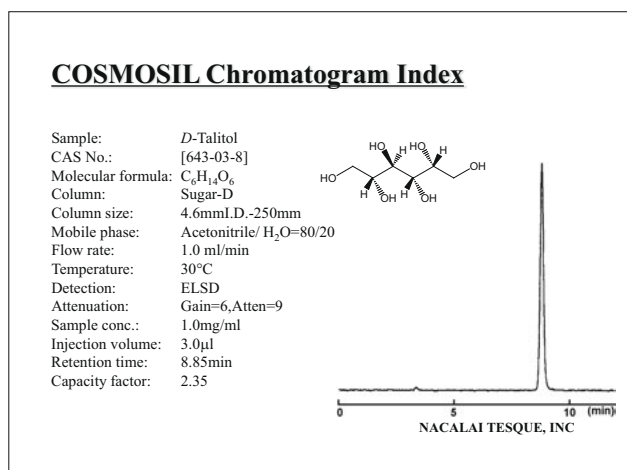
• D-Psicose



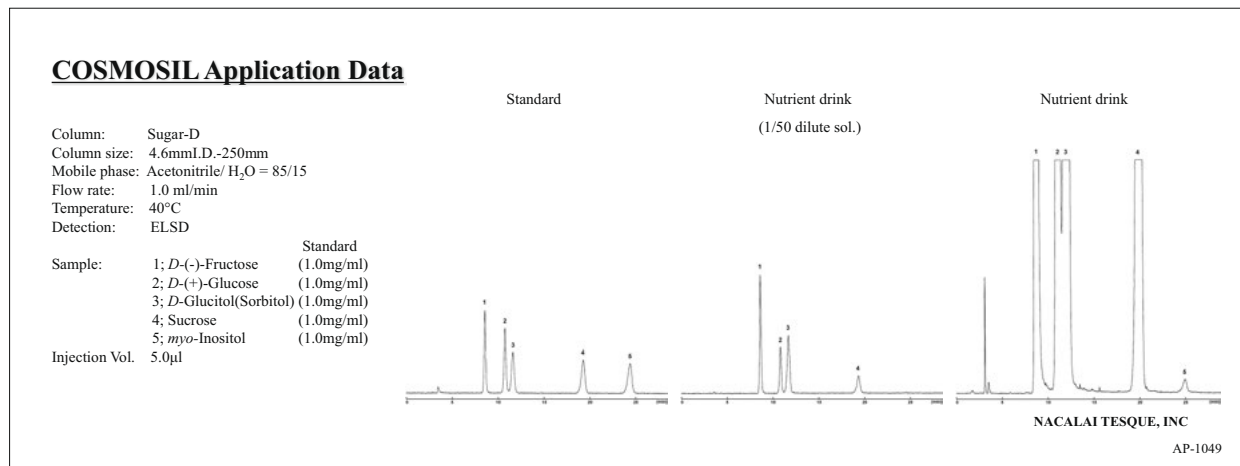
• L-Sorbose



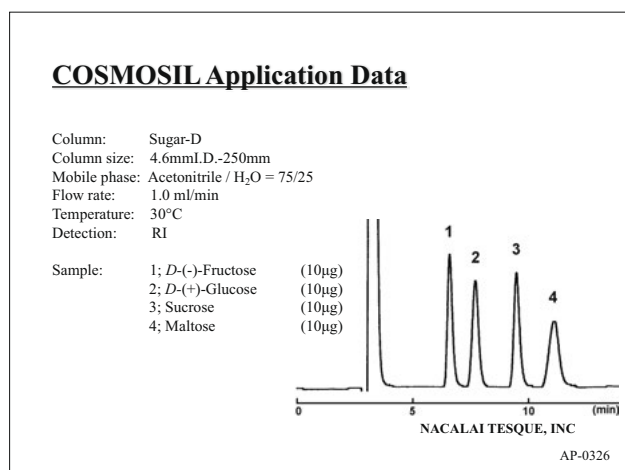
• D-Talitol



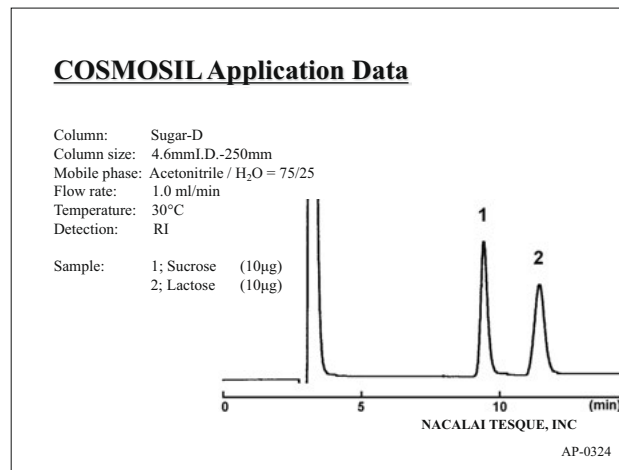
Sugars in Drinks



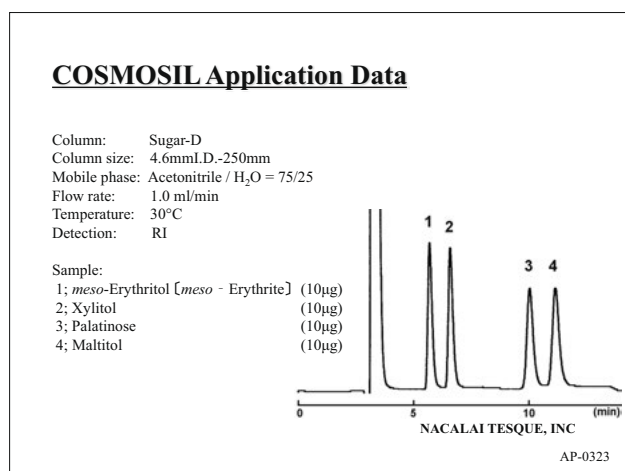
Sugars in Soft Drinks



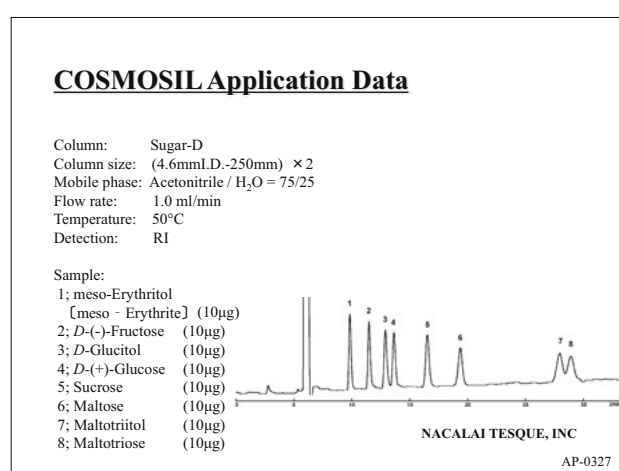
Sugars in Chocolate



Sugars and Sugar Alcohols in Gum

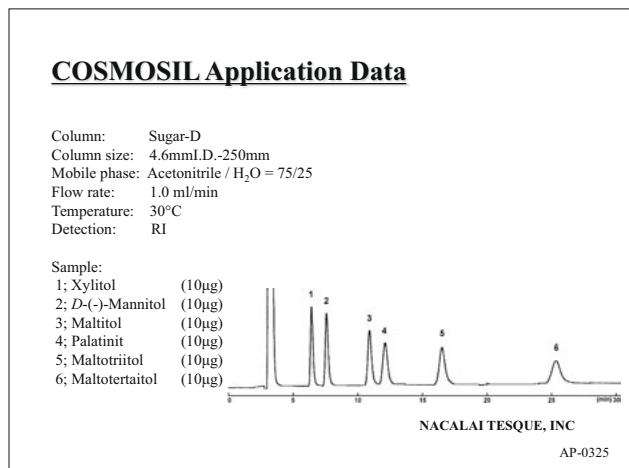


Sugars in Sports Drinks



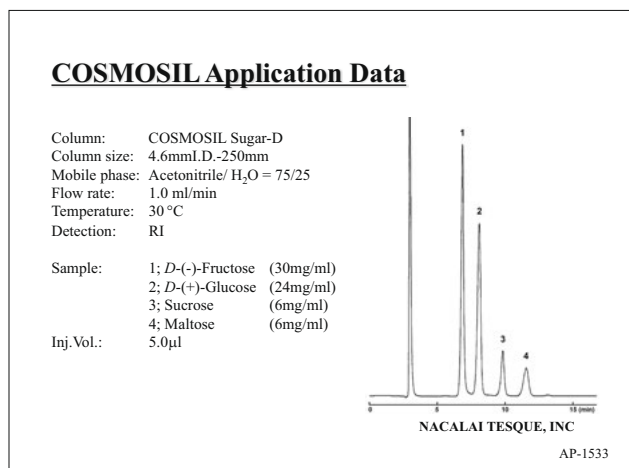
Sugars in Drinks and Candies

Sugar Alcohols in Gum

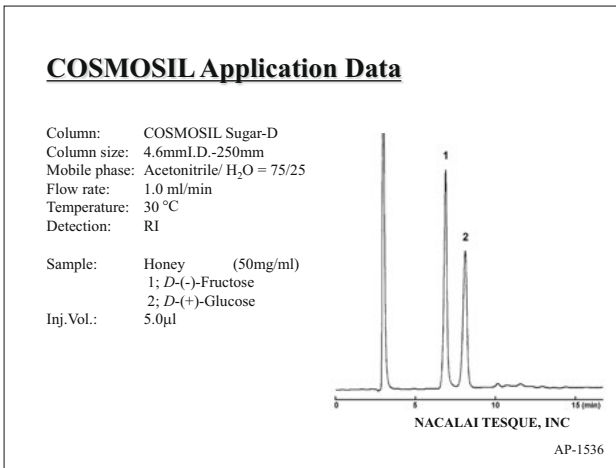


Sugars in Honey and Syrup

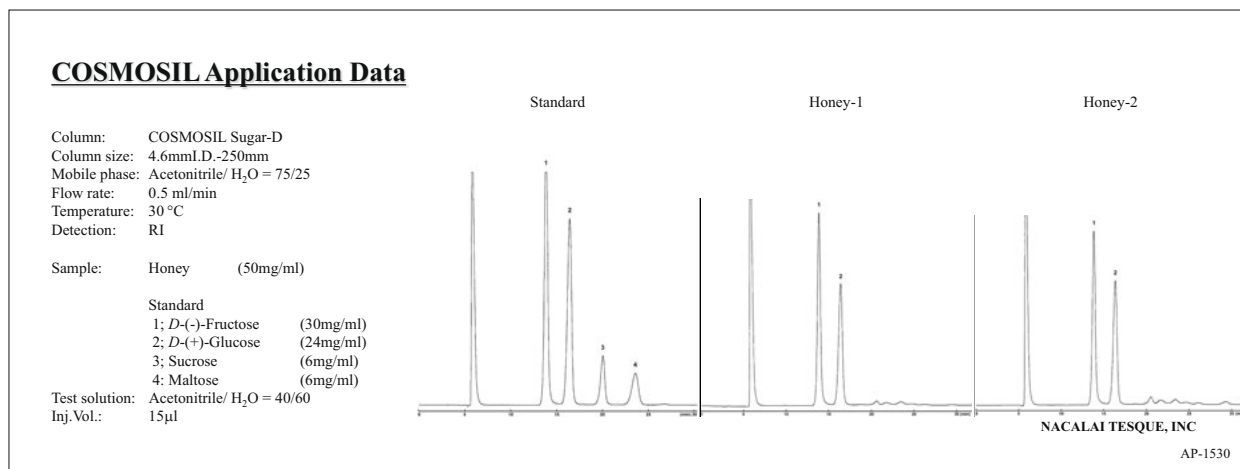
Standard



Honey

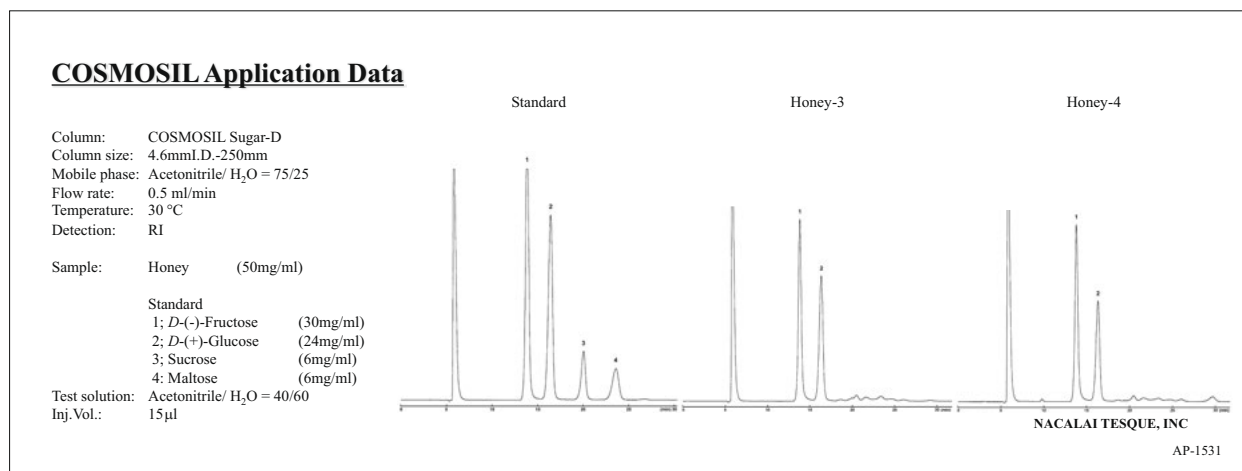


Honey

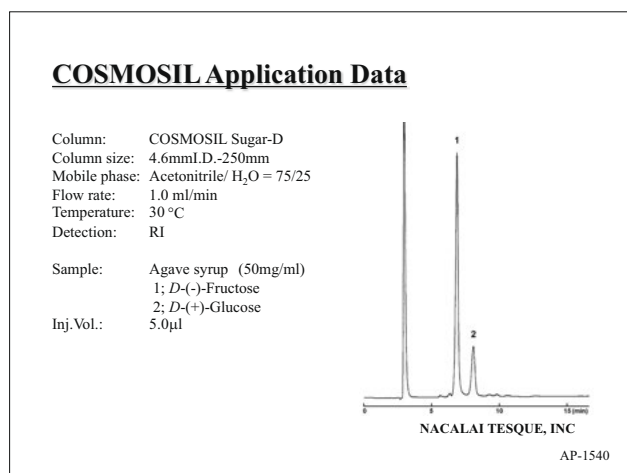


Sugars in Honey and Syrup

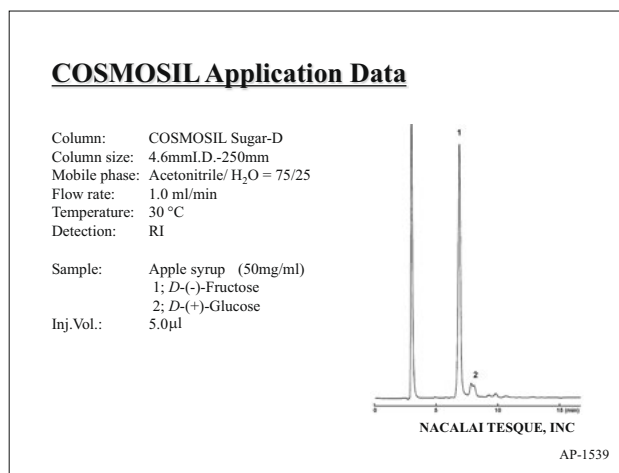
• Honey



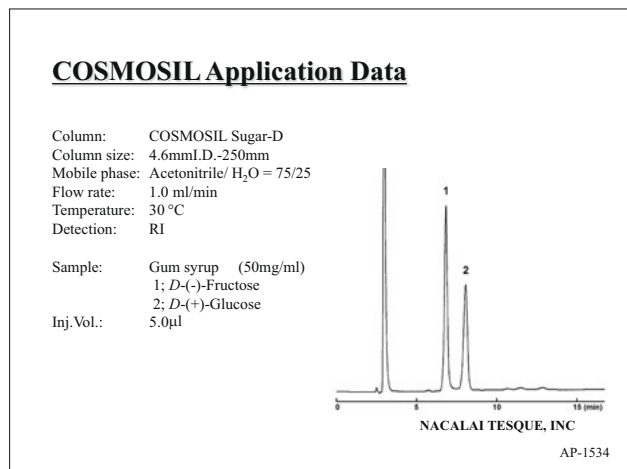
• Agave Syrup



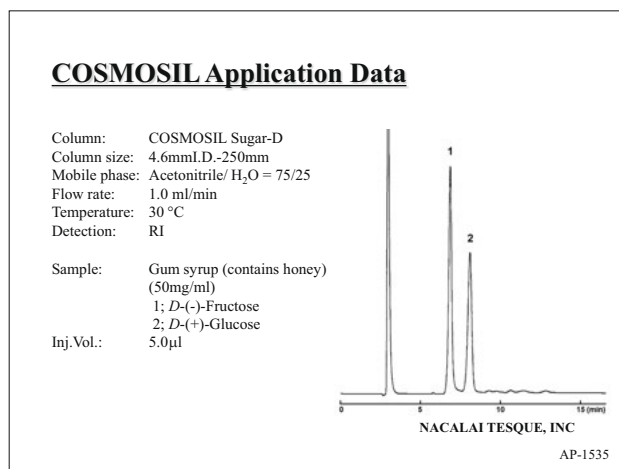
• Apple Syrup



• Gum Syrup

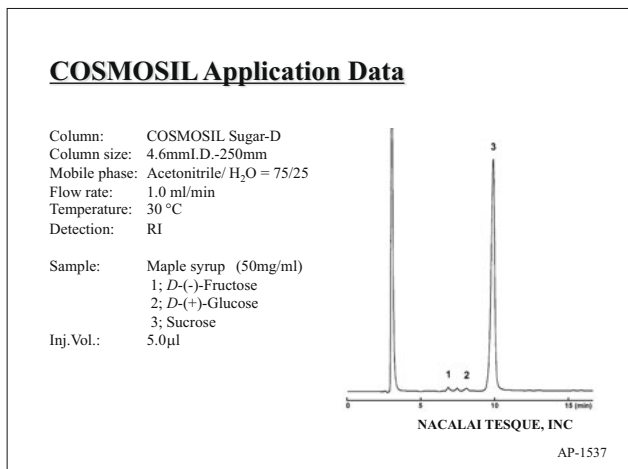


• Gum Syrup with Honey

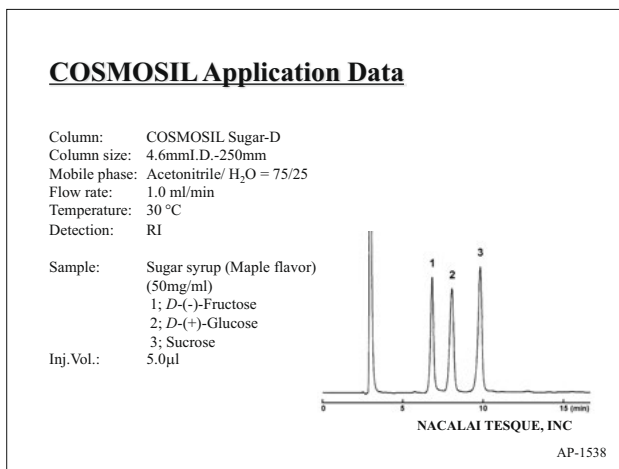


Sugars in Honey and Syrup

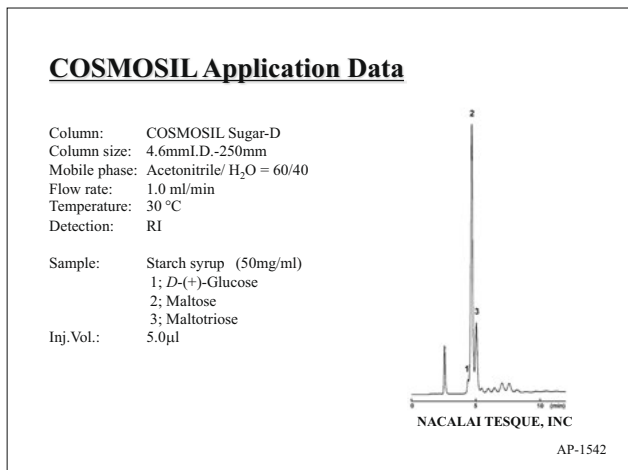
• Maple Syrup



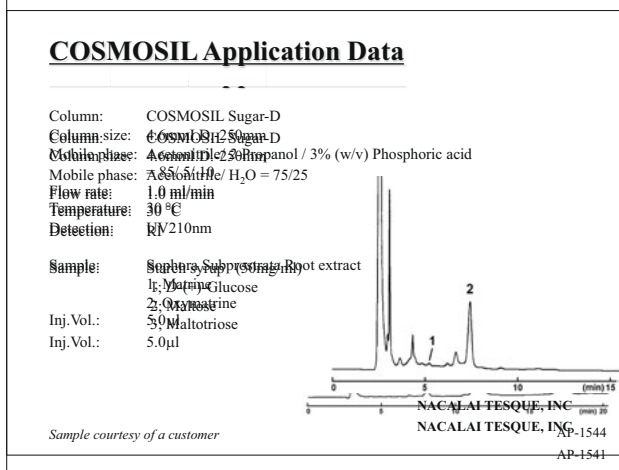
• Maple-Flavored Sugar Syrup



• Starch Syrup

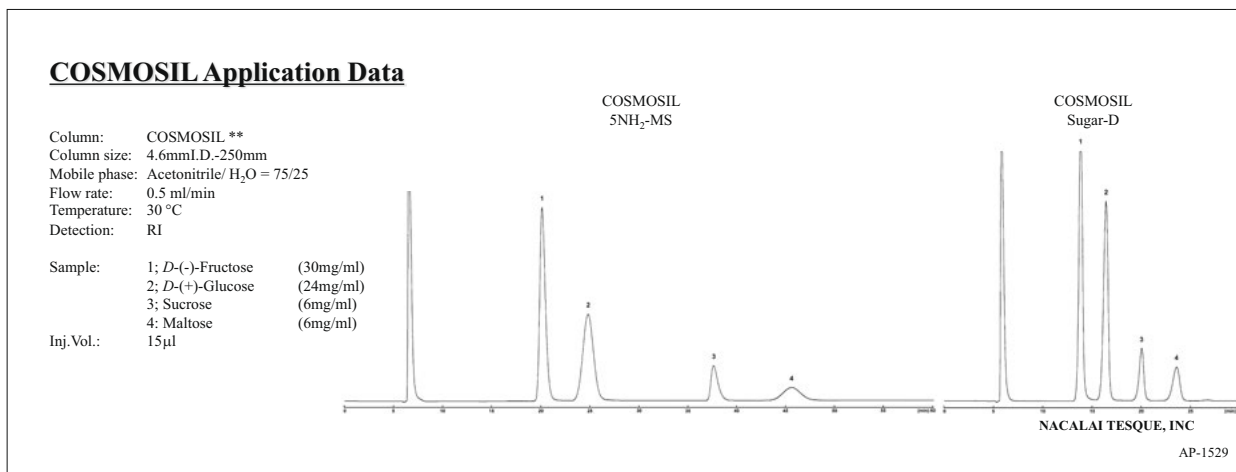


• Starch Syrup

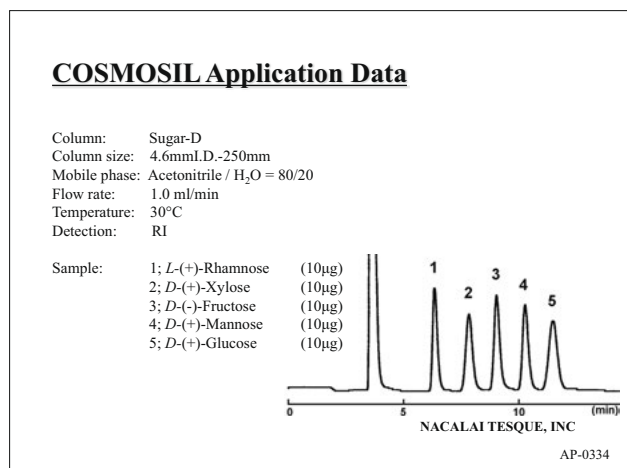


Mono-, Di-, and Oligosaccharides

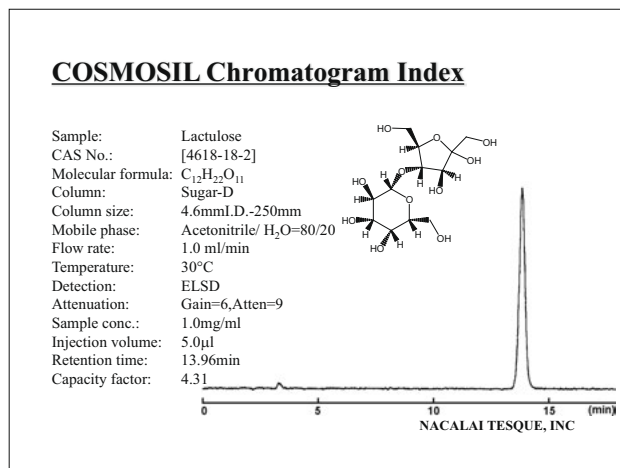
• Mono- and Disaccharides



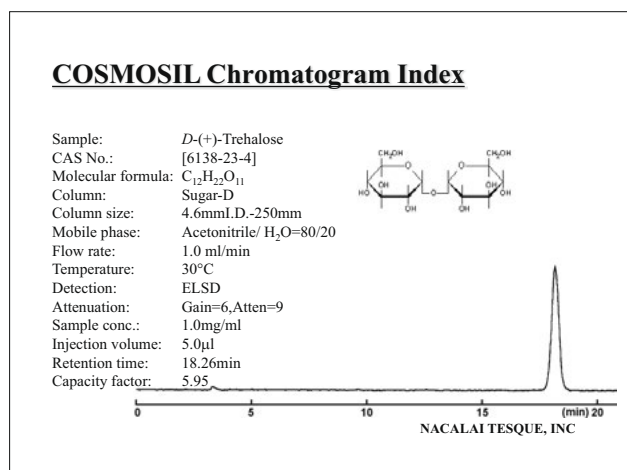
• Mono- and Disaccharides



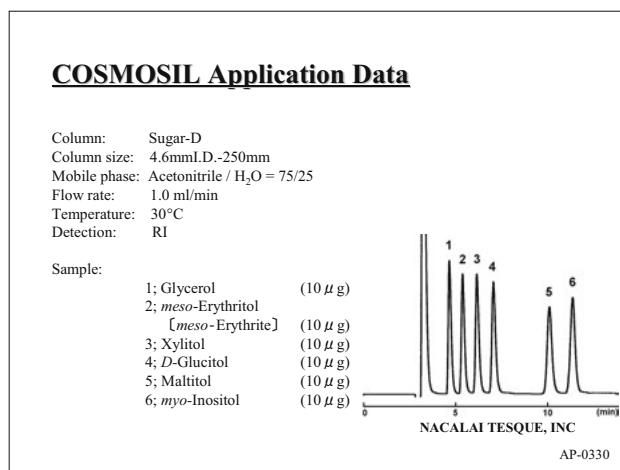
• Lactulose



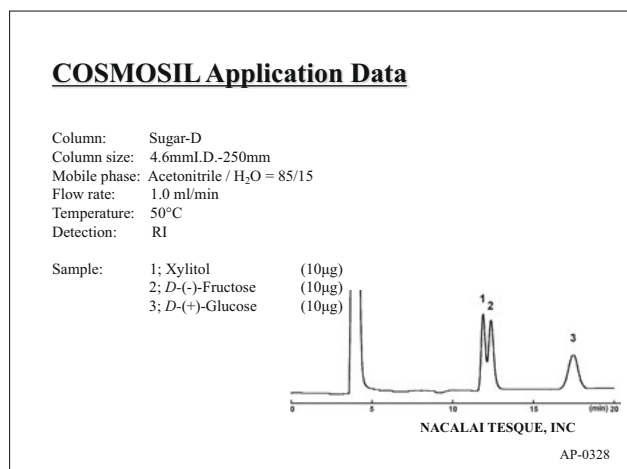
• D-Trehalose



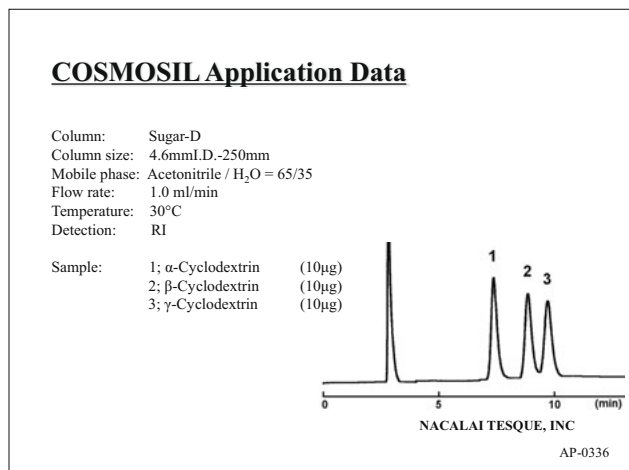
• Sugar Alcohols



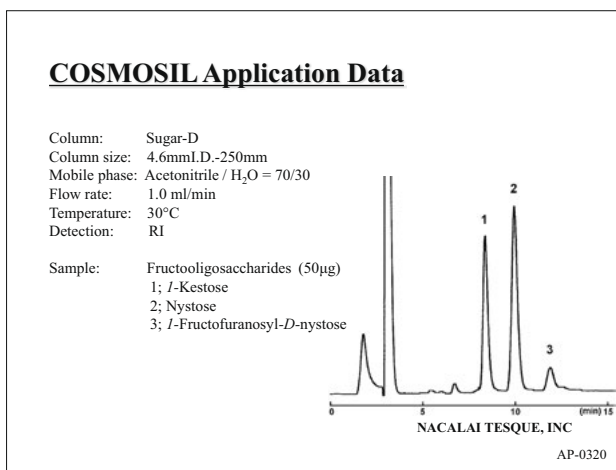
• Monosaccharides and Sugar Alcohols



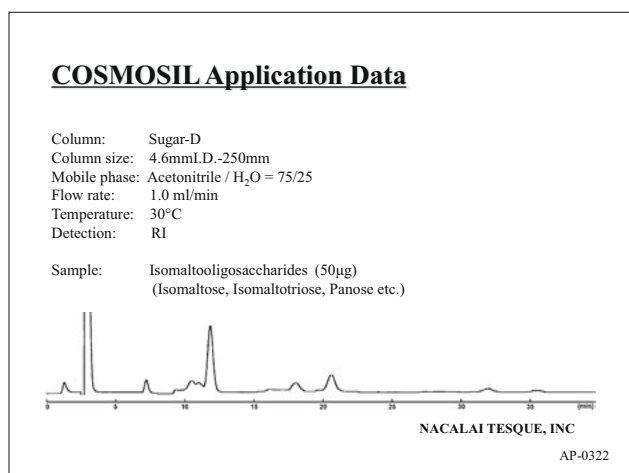
• Cyclodextrin



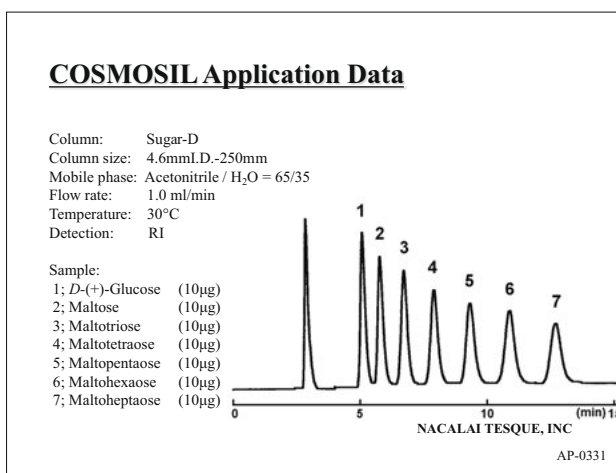
• Fructooligosaccharides



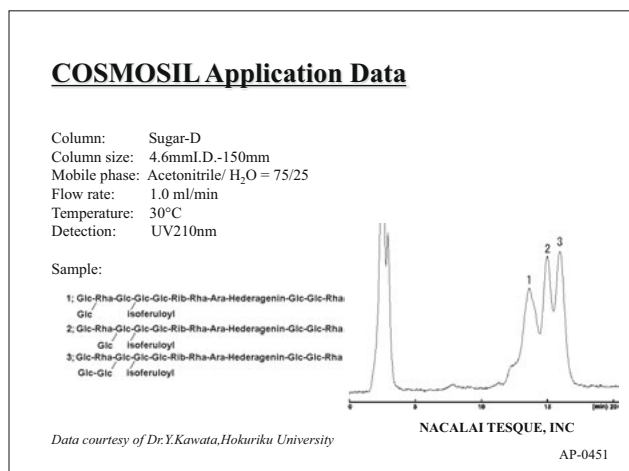
• Isomaltooligosaccharides



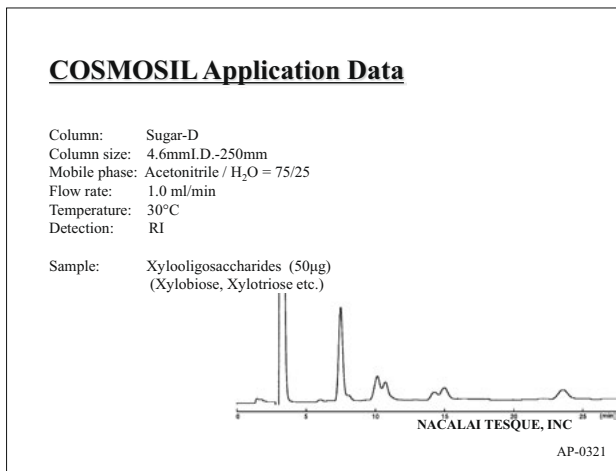
• Maltoligosaccharides



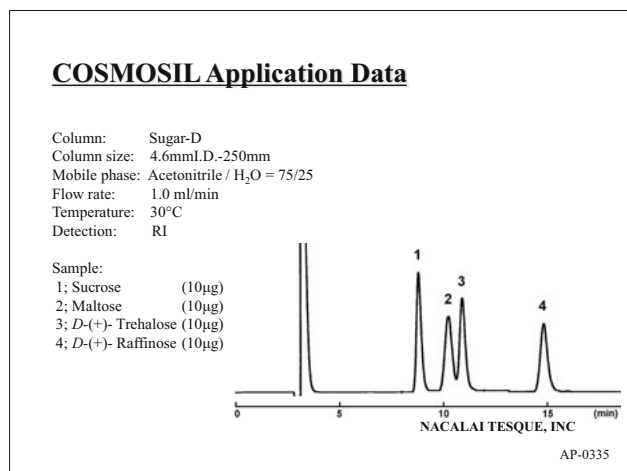
• Saponin



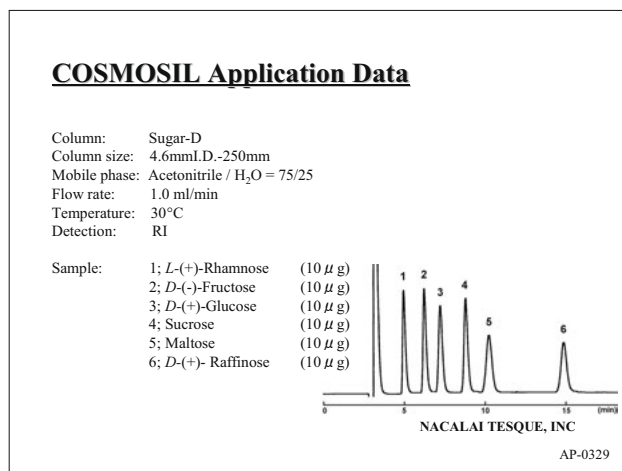
• Xylooligosaccharides



• Oligosaccharides



• Oligosaccharides



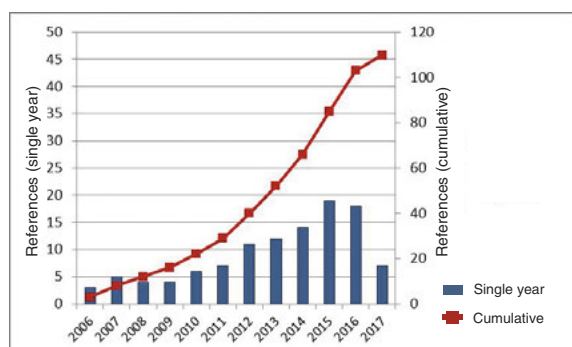
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	Sample Name	Page
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	D-(+)-Xylose	13

Literature References

Since its introduction in 2004, Sugar-D has become the column of choice for many researchers in sugar analysis. As of February 2017, there are over 100 references for Sugar-D (searched using Google Scholar).



Some recent references are listed below. Please note that we cannot distribute copies of these due to copyright.

TITLE	AUTHOR	JOURNAL	ISSUE	PAGE	YEAR
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