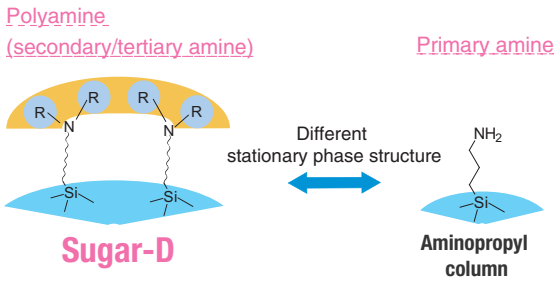
COSMOSIL

HPLC Column for Saccharide Analysis

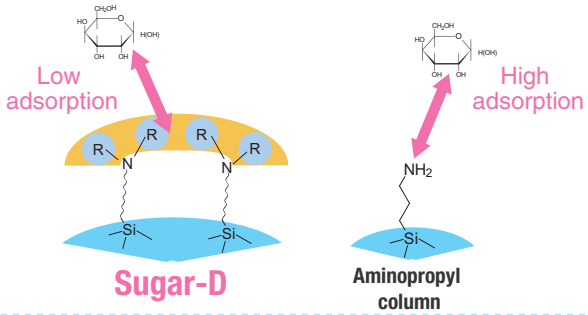
COSMOSIL Sugar-D

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

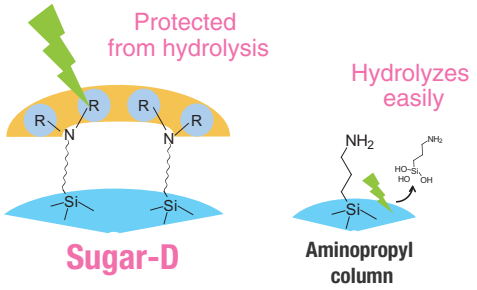
Different selectivity



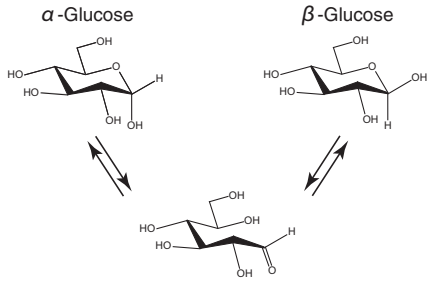
Superior quantitative results



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.

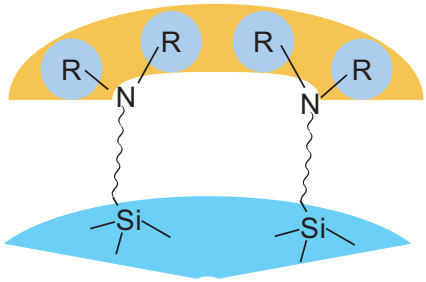
Product Name

Sugar - D

for Saccharide Analysis

Durability

Polyamine-Bonded Silica Gel



Sugar-D Stationary Phase

Different selectivity from aminopropyl columns

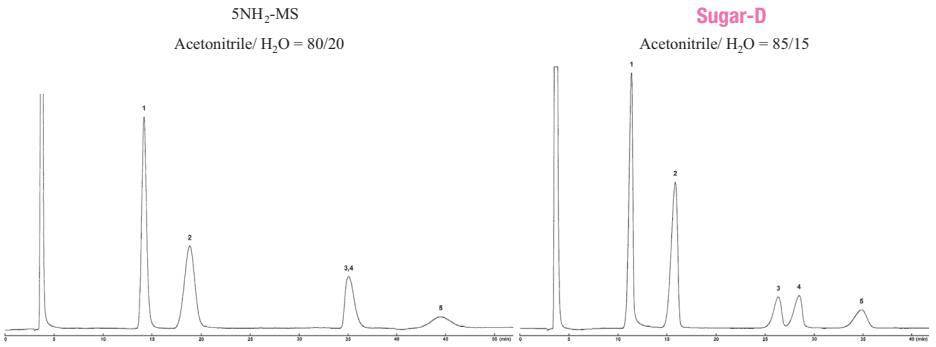
COSMOSIL Sugar-D has a polyamine-based stationary phase, which results in different selectivity from primary anime-based phases, such as aminopropyl.

Comparison to aminopropyl columns

- **Sucrose and Turanose**

Column: COSMOSIL **
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ H_2O = **/**
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: RI

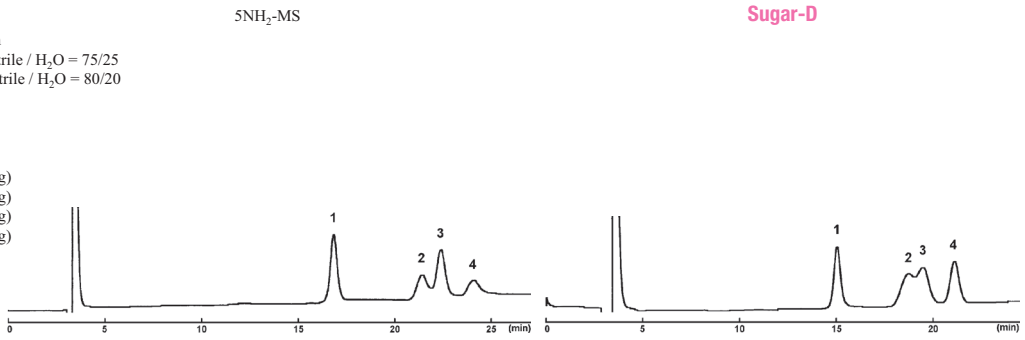
Sample: 1; Fructose (26.5mg/ml)
2; Glucose (21.2mg/ml)
3; Sucrose (5.3mg/ml)
4; Turanose (5.9mg/ml)
5: Maltose (5.3mg/ml)
Inj.Vol.: 17µl



- **Maltose and Lactose**

Column:
Column size: 4.6mmI.D.-250mm
Mobile phase: (NH_2-MS) Acetonitrile / H_2O = 75/25
(Sugar-D) Acetonitrile / H_2O = 80/20
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: RI

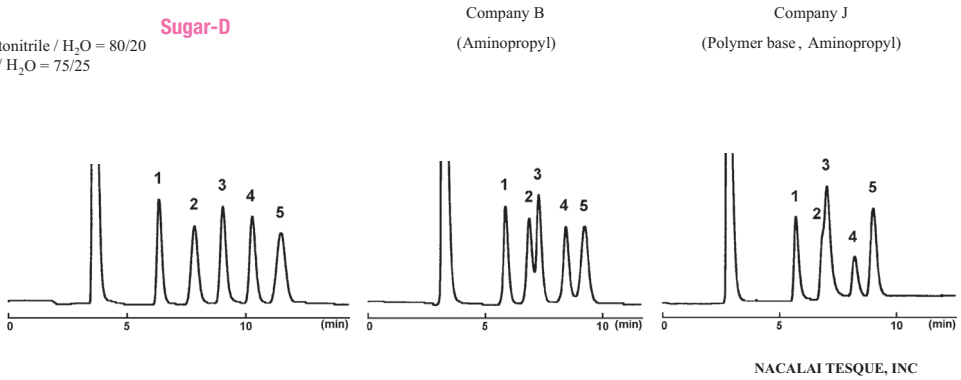
Sample: 1; Sucrose (10µg)
2; Maltose (10µg)
3; Lactose (10µg)
4; Trehalose (10µg)



Different selectivity compared to competitor aminopropyl column

Column:
Column size: 4.6mmI.D.-250mm
Mobile phase: (Sugar-D, Company B) Acetonitrile / H_2O = 80/20
(Company J) Acetonitrile / H_2O = 75/25
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: RI

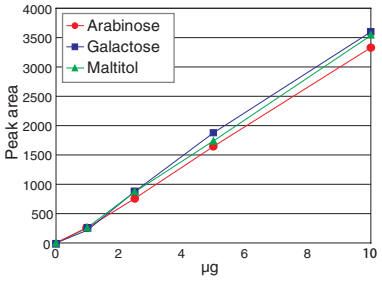
Sample: 1; Rhamnose (10µg)
2; Xylose (10µg)
3; Fructose (10µg)
4; Mannose (10µg)
5; Glucose (10µg)



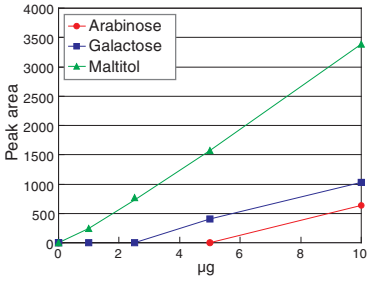
Superior quantitative results

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



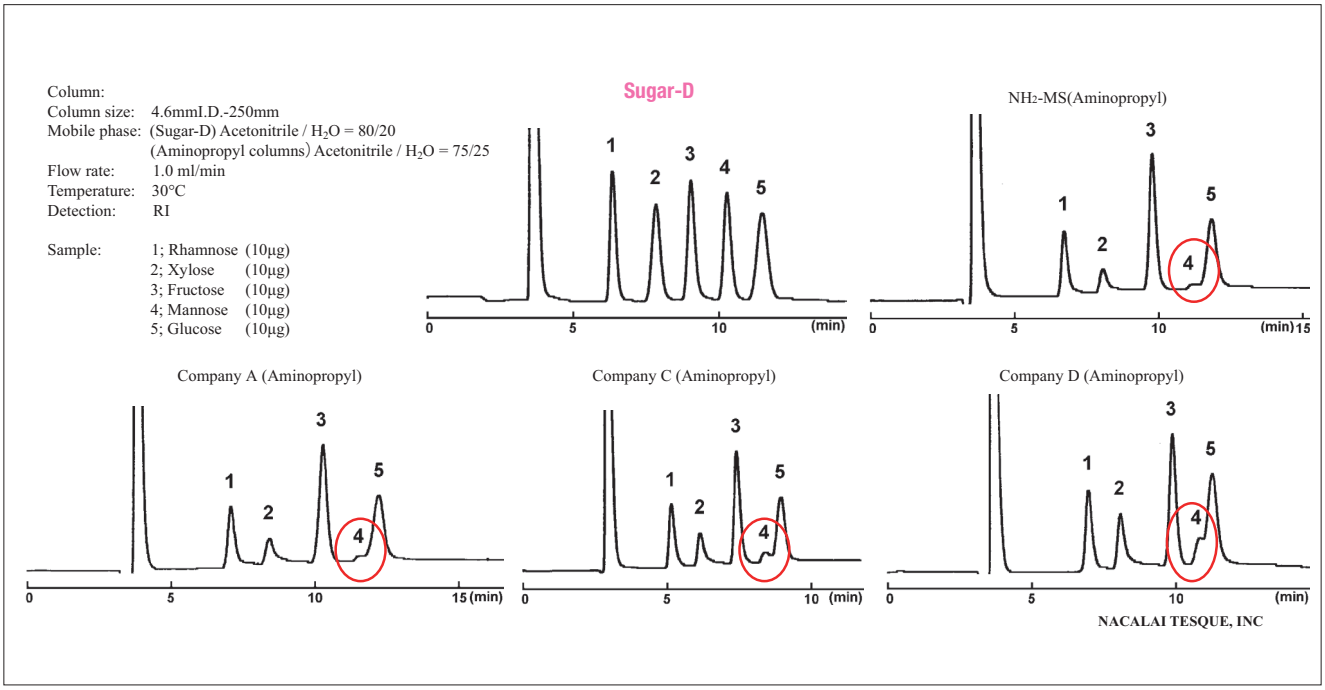
COSMOSIL Sugar-D



Aminopropyl type (COSMOSIL NH_2-MS)

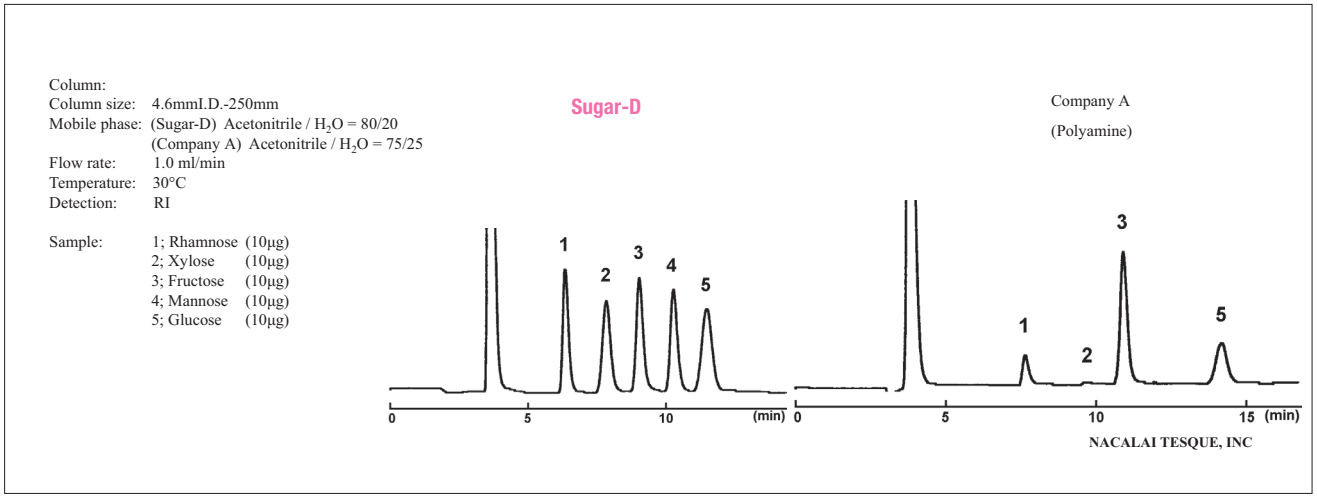
Comparison to competitor aminopropyl columns

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.

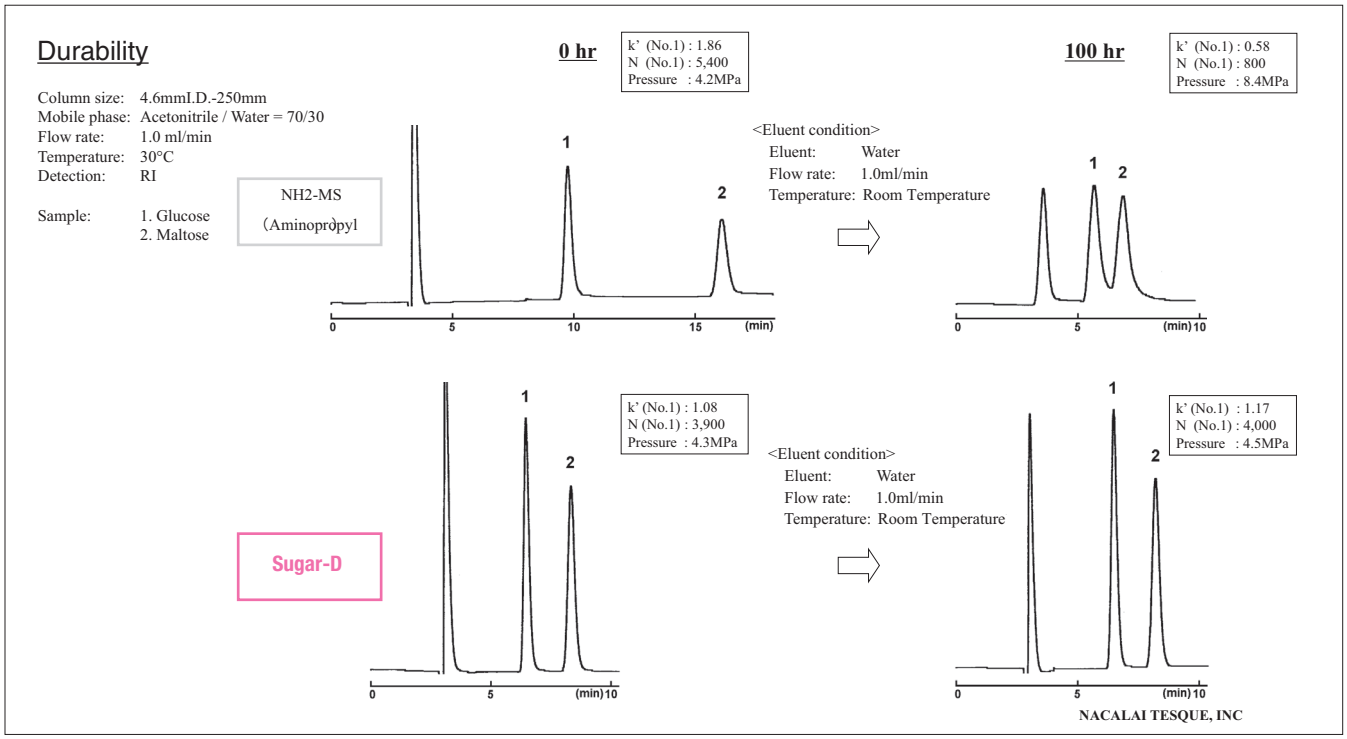


Superior durability

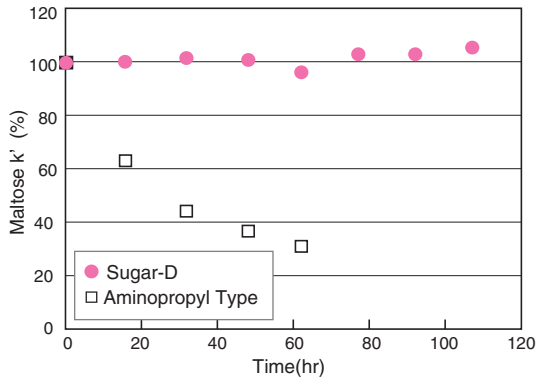
The stationary phase of COSMOSIL Sugar-D is not easily hydrolyzed, so even using water as the mobile phase does not affect it much.

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

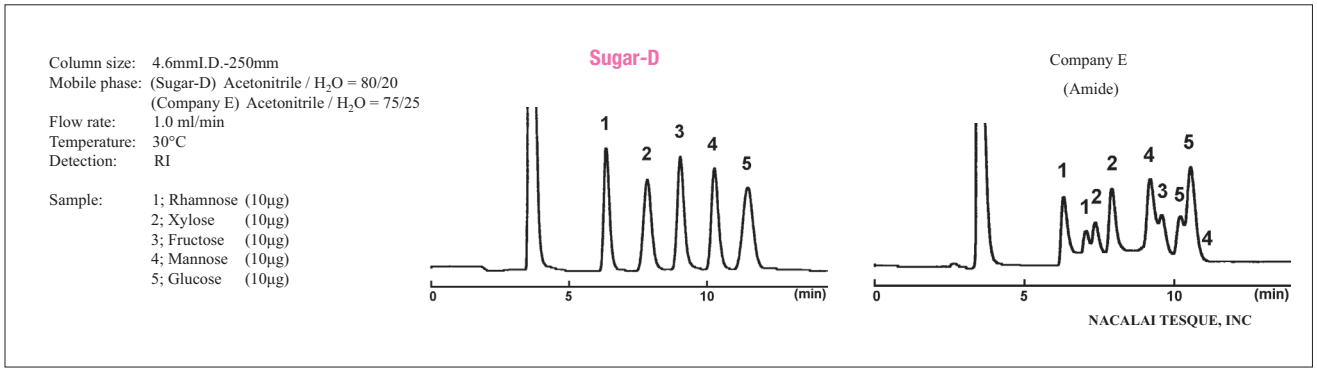
[Test Condition]

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

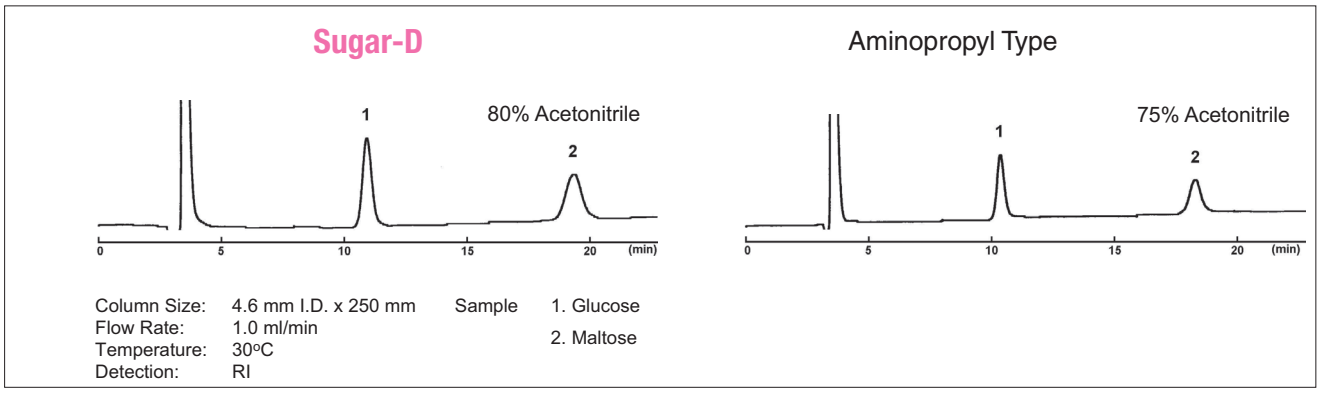


FAQ

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 um 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

Column Size I.D. x Length (mm)	Product Number
4.6 x 150	05395-71
4.6 x 250	05397-51
10.0 x 250	05692-71
20.0 x 250	05693-61

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

Application data

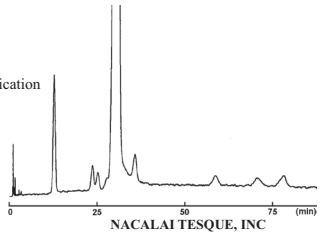
Drugs

- **Type 2 Diabetes Drug: Acarbose**

COSMOSIL Application Data

Column: COSMOSIL Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ Buffer = 82/18
Buffer; KH_2PO_4 600mg, Na_2HPO_4 279mg / L(H_2O)
Flow rate: 2.5 ml/min
Temperature: 40°C
Detection: UV210nm

Sample: Acarbose for peak identification (20mg/ml)
Inj.Vol.: 10µl



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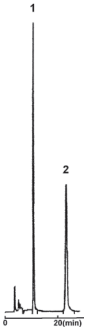
AP-1546

- **Anticancer Drugs**

COSMOSIL Application Data

Column: Sugar-D
Column size: 4.6mmI.D.-150mm
Mobile phase: Acetonitrile/H_2O = 80/20
Flow rate: 0.3 ml/min
Temperature: Room temperature
Detection: UV226nm

Sample: 1; Cisplatin (CDDP) (1.46µg)
2; Guanosine (0.50µg)



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Data courtesy of Dr.K.Kofuji,Hokuriku University

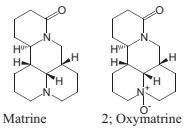
AP-0380

- **Herbal Medicine Components (Matrine, Oxymatrine)**

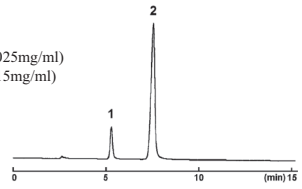
COSMOSIL Application Data

Column: COSMOSIL Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 2-Propanol / 3% (w/v) Phosphoric acid = 85/ 5/ 10
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210nm

Sample: 1; Matrine (0.025mg/ml)
2; Oxymatrine (0.15mg/ml)
Inj.Vol.: 5.0µl



1; Matrine 2; Oxymatrine



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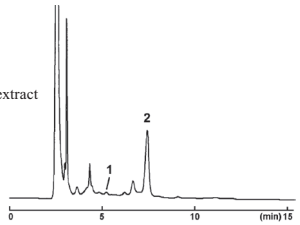
AP-1543

- **Herbal Medicine Components (Matrine, Oxymatrine)**

COSMOSIL Application Data

Column: COSMOSIL Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 2-Propanol / 3% (w/v) Phosphoric acid = 85/ 5/ 10
Flow rate: 1.0 ml/min
Temperature: 30 °C
Detection: UV210nm

Sample: Sophora Subprostrata Root extract
1; Matrine
2; Oxymatrine
Inj.Vol.: 5.0µl



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Sample courtesy of a customer

AP-1544

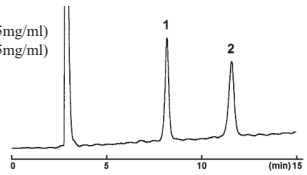
Active Ingredients in Health Food

- **Soy Oligosaccharides (Raffinose, Stachyose)**

COSMOSIL Application Data

Column: COSMOSIL Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ H_2O = 70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: RI

Sample: 1; *D*-(+)-Raffinose (5mg/ml)
2; Stachyose (5mg/ml)
Inj.Vol.: 2.0 µl



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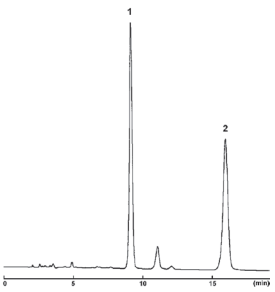
AP-1487

- **Stevia Extract (Stevioside, Rebaudioside A)**

COSMOSIL Application Data

Column: Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ H_2O = 85/15
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210nm

Sample: 1; Stevioside
2; Rebaudioside A



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AP-1194

Application data

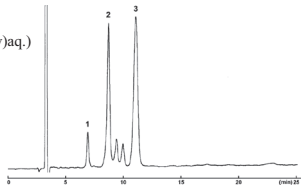
Rare Sugars

- **Rare Sugar Syrup**

COSMOSIL Application Data

Column: Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ H_2O = 80/20
Flow rate: 1.0 ml/min
Temperature: 30 °C
Detection: RI

Sample: Rare-Sugar Syrup (10%(v/v)aq.)
1; *D*-Psicose
2; *D*-(-)-Fructose
3; *D*-(+)-Glucose
Inj.Vol.: 2.0µl



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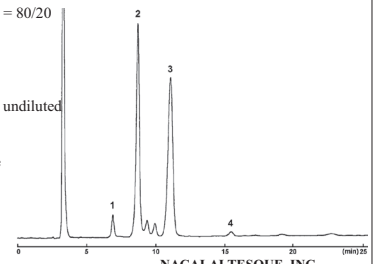
AP-1437

- **Rare Sugar Soda**

COSMOSIL Application Data

Column: Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ H_2O = 80/20
Flow rate: 1.0 ml/min
Temperature: 30 °C
Detection: RI

Sample: Rare-Sugar Soda, undiluted
1; *D*-Psicose
2; *D*-(-)-Fructose
3; *D*-(+)-Glucose
4; Sucrose
Inj.Vol.: 2.0µl



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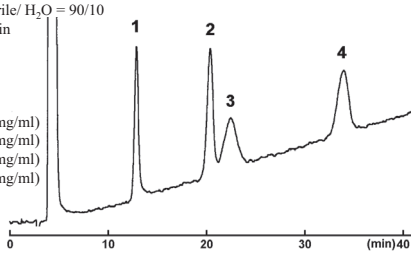
AP-1436

- **Rare Sugars**

COSMOSIL Application Data

Column: Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ H_2O = 90/10
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: RI

Sample:
1; *D*-Psicose (2.5mg/ml)
2; *D*-(-)-Fructose (2.5mg/ml)
3; *D*-(+)-Allose (2.5mg/ml)
4; *D*-(+)-Glucose (2.5mg/ml)
Inj.Vol.: 10.0µl



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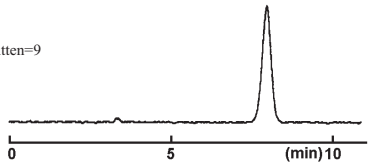
AP-1253

- ***D*-Allose**

COSMOSIL Chromatogram Index

Sample: *D*-(+)-Allose
CAS No.: [2595-97-3]
Molecular formula: $C_6H_{12}O_6$
Column: Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ H_2O=80/20
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: ELSD
Attenuation: Gain=6,Atten=9
Sample conc.: 1.0mg/ml
Injection volume: 3.0µl
Retention time: 8.04min
Capacity factor: 2.04



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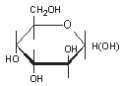
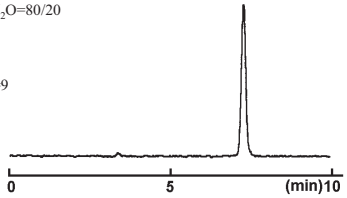
- ***D*-Altrose**

COSMOSIL Chromatogram Index

Sample: *D*-Altrose
CAS No.: [1990-29-0]
Molecular formula: $C_6H_{12}O_6$
Column: Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ H_2O=80/20
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: ELSD
Attenuation: Gain=6,Atten=9
Sample conc.: 1.0mg/ml
Injection volume: 2.0µl
Retention time: 7.28min
Capacity factor: 1.76





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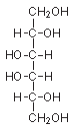
- ***D*-Dulcitol**

COSMOSIL Chromatogram Index

Sample: Dulcitol [Galactitol]
CAS No.: [608-66-2]
Molecular formula: $C_6H_{14}O_6$
Column: Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ H_2O=80/20
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: ELSD
Attenuation: Gain=6,Atten=9
Sample conc.: 1.0mg/ml
Injection volume: 3.0µl
Retention time: 9.48min
Capacity factor: 2.59



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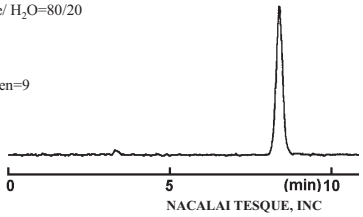
Application data

Rare Sugars

- ***L*-Gulose**

COSMOSIL Chromatogram Index

Sample:	*L*-Gulose
CAS No.:	[6027-89-0]
Molecular formula:	$C_6H_{12}O_6$
Column:	Sugar-D
Column size:	4.6mmI.D.-250mm
Mobile phase:	Acetonitrile/ H_2O=80/20
Flow rate:	1.0 ml/min
Temperature:	30°C
Detection:	ELSD
Attenuation:	Gain=6,Atten=9
Sample conc.:	1.0mg/ml
Injection volume:	4.0µl
Retention time:	8.44min
Capacity factor:	2.19

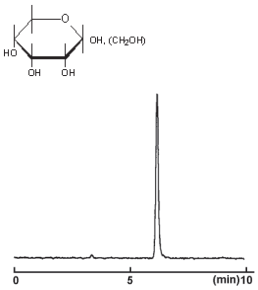


NACALAI TESQUE, INC

- **D-Psicose**

COSMOSIL Chromatogram Index

Sample:	*D*-Psicose
CAS No.:	[551-68-8]
Molecular formula:	$C_6H_{12}O_6$
Column:	Sugar-D
Column size:	4.6mmI.D.-250mm
Mobile phase:	Acetonitrile/ H_2O=80/20
Flow rate:	1.0 ml/min
Temperature:	30°C
Detection:	ELSD
Attenuation:	Gain=6,Atten=9
Sample conc.:	1.0mg/ml
Injection volume:	2.0µl
Retention time:	6.20min
Capacity factor:	1.35

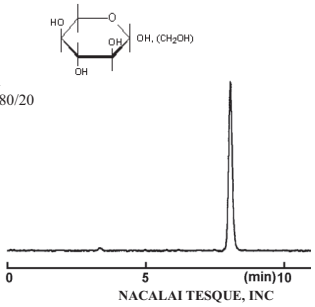


NACALAI TESQUE, INC

- ***L*-Sorbose**

COSMOSIL Chromatogram Index

Sample:	*L*-(-)-Sorbose
CAS No.:	[87-79-6]
Molecular formula:	$C_6H_{12}O_6$
Column:	Sugar-D
Column size:	4.6mmI.D.-250mm
Mobile phase:	Acetonitrile/ H_2O=80/20
Flow rate:	1.0 ml/min
Temperature:	30°C
Detection:	ELSD
Attenuation:	Gain=6,Atten=9
Sample conc.:	1.0mg/ml
Injection volume:	2.0µl
Retention time:	8.12min
Capacity factor:	2.07

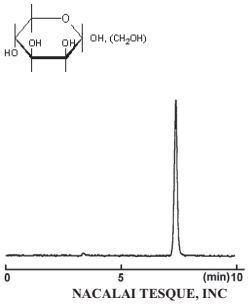


NACALAI TESQUE, INC

- **D-Tagatose**

COSMOSIL Chromatogram Index

Sample:	*D*-(−)-Tagatose
CAS No.:	[87-81-0]
Molecular formula:	$C_6H_{12}O_6$
Column:	Sugar-D
Column size:	4.6mmI.D.-250mm
Mobile phase:	Acetonitrile/ H_2O=80/20
Flow rate:	1.0 ml/min
Temperature:	30°C
Detection:	ELSD
Attenuation:	Gain=6,Atten=9
Sample conc.:	1.0mg/ml
Injection volume:	2.0µl
Retention time:	7.41min
Capacity factor:	1.80

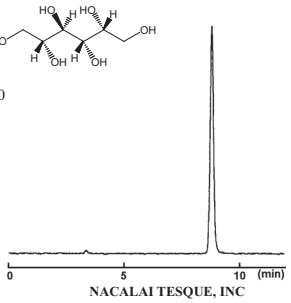


NACALAI TESQUE, INC

- ***D*-Talitol**

COSMOSIL Chromatogram Index

Sample:	*D*-Talitol
CAS No.:	[643-03-8]
Molecular formula:	$C_6H_{14}O_6$
Column:	Sugar-D
Column size:	4.6mmI.D.-250mm
Mobile phase:	Acetonitrile/ H_2O=80/20
Flow rate:	1.0 ml/min
Temperature:	30°C
Detection:	ELSD
Attenuation:	Gain=6,Atten=9
Sample conc.:	1.0mg/ml
Injection volume:	3.0µl
Retention time:	8.85min
Capacity factor:	2.35



NACALAI TESQUE, INC

Application data

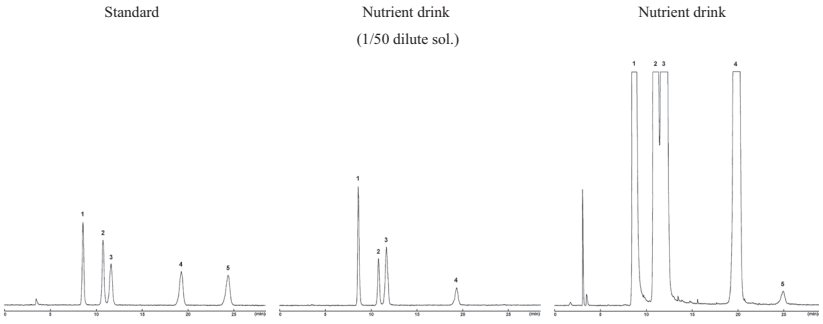
Sugars in Drinks and Candies

• Sugars in Drinks

COSMOSIL Application Data

Column: Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ H_2O = 85/15
Flow rate: 1.0 ml/min
Temperature: 40°C
Detection: ELSD

		Standard
Sample:	1; *D*-(-)-Fructose	(1.0mg/ml)
	2; *D*-(+)-Glucose	(1.0mg/ml)
	3; *D*-Glucitol(Sorbitol)	(1.0mg/ml)
	4; Sucrose	(1.0mg/ml)
	5; *myo*-Inositol	(1.0mg/ml)
Injection Vol.	5.0µl	



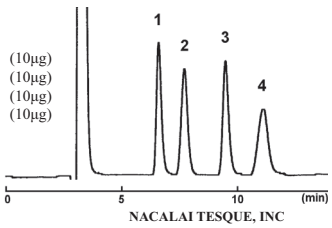
AP-1049

• Sugars in Soft Drinks

COSMOSIL Application Data

Column: Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile / H_2O = 75/25
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: RI

Sample:	1; *D*-(-)-Fructose	(10µg)
	2; *D*-(+)-Glucose	(10µg)
	3; Sucrose	(10µg)
	4; Maltose	(10µg)



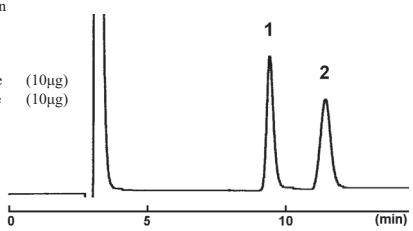
AP-0326

• Sugars in Chocolate

COSMOSIL Application Data

Column: Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile / H_2O = 75/25
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: RI

Sample:	1; Sucrose	(10µg)
	2; Lactose	(10µg)



AP-0324

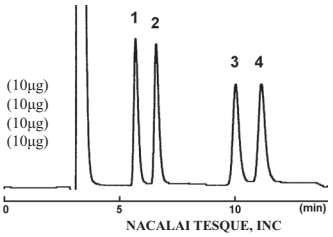
• Sugars and Sugar Alcohols in Gum

COSMOSIL Application Data

Column: Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile / H_2O = 75/25
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: RI

Sample:

1; *meso*-Erythritol〔*meso* - Erythrite〕	(10µg)
2; Xylitol	(10µg)
3; Palatinose	(10µg)
4; Maltitol	(10µg)



AP-0323

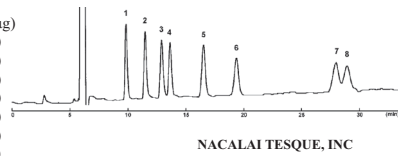
• Sugars in Sports Drinks

COSMOSIL Application Data

Column: Sugar-D
Column size: (4.6mmI.D.-250mm) ×2
Mobile phase: Acetonitrile / H_2O = 75/25
Flow rate: 1.0 ml/min
Temperature: 50°C
Detection: RI

Sample:

1; meso-Erythritol〔meso - Erythrite〕	(10µg)
2; *D*-(-)-Fructose	(10µg)
3; *D*-Glucitol	(10µg)
4; *D*-(+)-Glucose	(10µg)
5; Sucrose	(10µg)
6; Maltose	(10µg)
7; Maltotriitol	(10µg)
8; Maltotriose	(10µg)



AP-0327

Application data

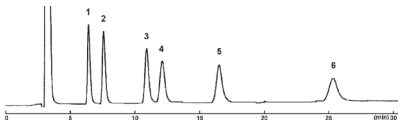
Sugars in Drinks and Candies

- **Sugar Alcohols in Gum**

COSMOSIL Application Data

Column: Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile / H_2O = 75/25
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: RI

Sample:
1; Xylitol (10µg)
2; *D*-(-)-Mannitol (10µg)
3; Maltitol (10µg)
4; Palatinit (10µg)
5; Maltotriitol (10µg)
6; Maltotertaitol (10µg)



NACALAI TESQUE, INC

AP-0325

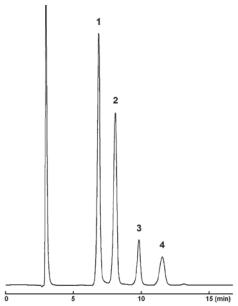
Sugars in Honey and Syrup

- **Standard**

COSMOSIL Application Data

Column: COSMOSIL Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ H_2O = 75/25
Flow rate: 1.0 ml/min
Temperature: 30 °C
Detection: RI

Sample: 1; *D*-(-)-Fructose (30mg/ml)
2; *D*-(+)-Glucose (24mg/ml)
3; Sucrose (6mg/ml)
4; Maltose (6mg/ml)
Inj.Vol.: 5.0µl



NACALAI TESQUE, INC

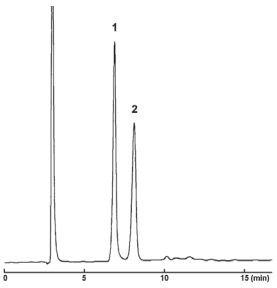
AP-1533

- **Honey**

COSMOSIL Application Data

Column: COSMOSIL Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ H_2O = 75/25
Flow rate: 1.0 ml/min
Temperature: 30 °C
Detection: RI

Sample: Honey (50mg/ml)
1; *D*-(-)-Fructose
2; *D*-(+)-Glucose
Inj.Vol.: 5.0µl



NACALAI TESQUE, INC

AP-1536

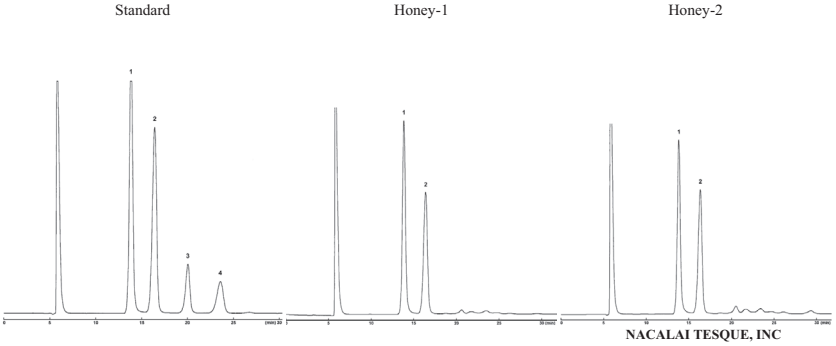
- **Honey**

COSMOSIL Application Data

Column: COSMOSIL Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ H_2O = 75/25
Flow rate: 0.5 ml/min
Temperature: 30 °C
Detection: RI

Sample: Honey (50mg/ml)

Standard
1; *D*-(-)-Fructose (30mg/ml)
2; *D*-(+)-Glucose (24mg/ml)
3; Sucrose (6mg/ml)
4: Maltose (6mg/ml)
Test solution: Acetonitrile/ H_2O = 40/60
Inj.Vol.: 15µl



NACALAI TESQUE, INC

AP-1530

Application data

Sugars in Honey and Syrup

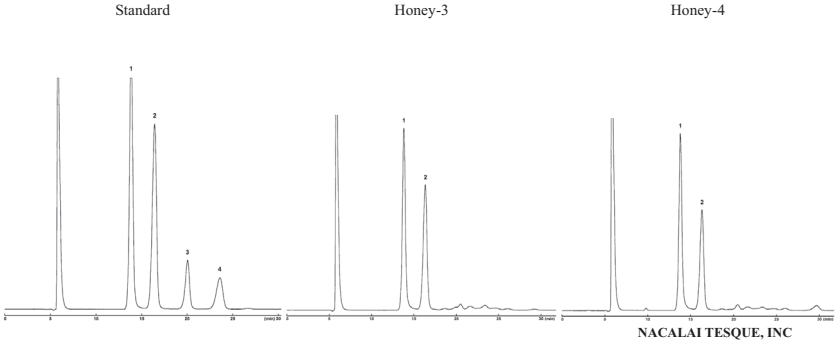
- **Honey**

COSMOSIL Application Data

Column: COSMOSIL Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ H_2O = 75/25
Flow rate: 0.5 ml/min
Temperature: 30 °C
Detection: RI

Sample: Honey (50mg/ml)

Standard
1; *D*-(-)-Fructose (30mg/ml)
2; *D*-(+)-Glucose (24mg/ml)
3; Sucrose (6mg/ml)
4: Maltose (6mg/ml)
Test solution: Acetonitrile/ H_2O = 40/60
Inj.Vol.: 15µl



NACALAI TESQUE, INC

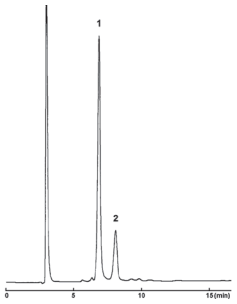
AP-1531

- **Agave Syrup**

COSMOSIL Application Data

Column: COSMOSIL Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ H_2O = 75/25
Flow rate: 1.0 ml/min
Temperature: 30 °C
Detection: RI

Sample: Agave syrup (50mg/ml)
1; *D*-(-)-Fructose
2; *D*-(+)-Glucose
Inj.Vol.: 5.0µl



NACALAI TESQUE, INC

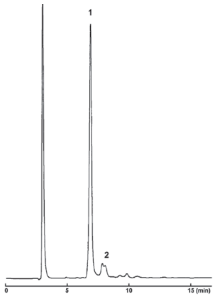
AP-1540

- **Apple Syrup**

COSMOSIL Application Data

Column: COSMOSIL Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ H_2O = 75/25
Flow rate: 1.0 ml/min
Temperature: 30 °C
Detection: RI

Sample: Apple syrup (50mg/ml)
1; *D*-(-)-Fructose
2; *D*-(+)-Glucose
Inj.Vol.: 5.0µl



NACALAI TESQUE, INC

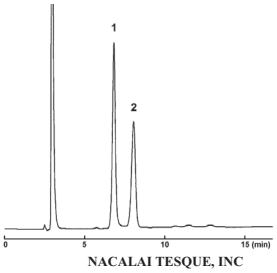
AP-1539

- **Gum Syrup**

COSMOSIL Application Data

Column: COSMOSIL Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ H_2O = 75/25
Flow rate: 1.0 ml/min
Temperature: 30 °C
Detection: RI

Sample: Gum syrup (50mg/ml)
1; *D*-(-)-Fructose
2; *D*-(+)-Glucose
Inj.Vol.: 5.0µl



NACALAI TESQUE, INC

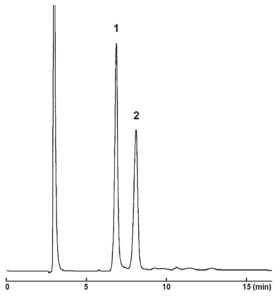
AP-1534

- **Gum Syrup with Honey**

COSMOSIL Application Data

Column: COSMOSIL Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ H_2O = 75/25
Flow rate: 1.0 ml/min
Temperature: 30 °C
Detection: RI

Sample: Gum syrup (contains honey)
(50mg/ml)
1; *D*-(-)-Fructose
2; *D*-(+)-Glucose
Inj.Vol.: 5.0µl



NACALAI TESQUE, INC

AP-1535

Application data

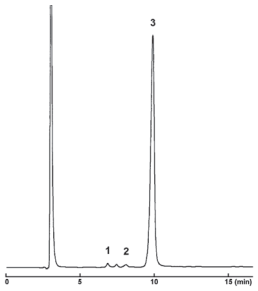
Sugars in Honey and Syrup

- **Maple Syrup**

COSMOSIL Application Data

Column: COSMOSIL Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ H_2O = 75/25
Flow rate: 1.0 ml/min
Temperature: 30 °C
Detection: RI

Sample: Maple syrup (50mg/ml)
1; *D*-(-)-Fructose
2; *D*-(+)-Glucose
3; Sucrose
Inj.Vol.: 5.0µl



NACALAI TESQUE, INC

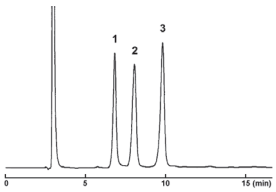
AP-1537

- **Maple-Flavored Sugar Syrup**

COSMOSIL Application Data

Column: COSMOSIL Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ H_2O = 75/25
Flow rate: 1.0 ml/min
Temperature: 30 °C
Detection: RI

Sample: Sugar syrup (Maple flavor)
(50mg/ml)
1; *D*-(-)-Fructose
2; *D*-(+)-Glucose
3; Sucrose
Inj.Vol.: 5.0µl



NACALAI TESQUE, INC

AP-1538

- **Starch Syrup**

COSMOSIL Application Data

Column: COSMOSIL Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ H_2O = 60/40
Flow rate: 1.0 ml/min
Temperature: 30 °C
Detection: RI

Sample: Starch syrup (50mg/ml)
1; *D*-(+)-Glucose
2; Maltose
3; Maltotriose
Inj.Vol.: 5.0µl

NACALAI TESQUE, INC

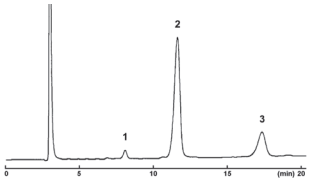
AP-1542

- **Starch Syrup**

COSMOSIL Application Data

Column: COSMOSIL Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ H_2O = 75/25
Flow rate: 1.0 ml/min
Temperature: 30 °C
Detection: RI

Sample: Starch syrup (50mg/ml)
1; *D*-(+)-Glucose
2; Maltose
3; Maltotriose
Inj.Vol.: 5.0µl



NACALAI TESQUE, INC

AP-1541

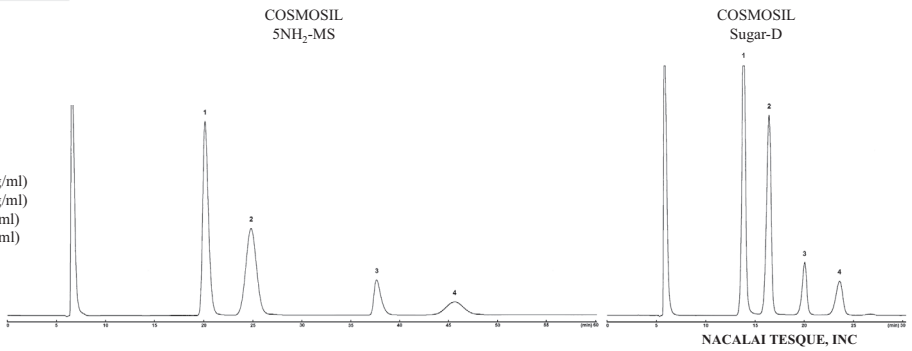
Mono-, Di-, and Oligosaccharides

- **Mono- and Disaccharides**

COSMOSIL Application Data

Column: COSMOSIL **
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ H_2O = 75/25
Flow rate: 0.5 ml/min
Temperature: 30 °C
Detection: RI

Sample: 1; *D*-(-)-Fructose (30mg/ml)
2; *D*-(+)-Glucose (24mg/ml)
3; Sucrose (6mg/ml)
4: Maltose (6mg/ml)
Inj.Vol.: 15µl



NACALAI TESQUE, INC

AP-1529

Application data

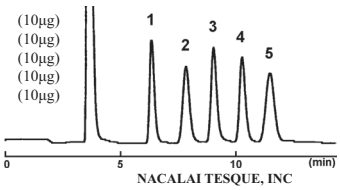
Mono-, Di-, and Oligosaccharides

- **Mono- and Disaccharides**

COSMOSIL Application Data

Column: Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile / H_2O = 80/20
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: RI

Sample:
1; *L*-(+)-Rhamnose (10µg)
2; *D*-(+)-Xylose (10µg)
3; *D*-(-)-Fructose (10µg)
4; *D*-(+)-Mannose (10µg)
5; *D*-(+)-Glucose (10µg)



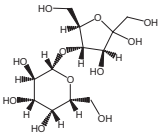
NACALAI TESQUE, INC

AP-0334

- **Lactulose**

COSMOSIL Chromatogram Index

Sample: Lactulose
CAS No.: [4618-18-2]
Molecular formula: $C_{12}H_{22}O_{11}$
Column: Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ H_2O=80/20
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: ELSD
Attenuation: Gain=6,Atten=9
Sample conc.: 1.0mg/ml
Injection volume: 5.0µl
Retention time: 13.96min
Capacity factor: 4.31

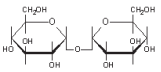


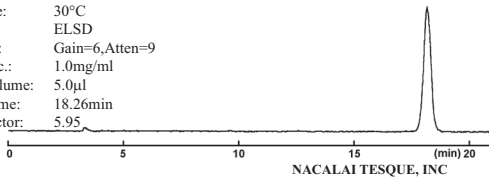
NACALAI TESQUE, INC

- ***D*-Trehalose**

COSMOSIL Chromatogram Index

Sample: *D*-(+)-Trehalose
CAS No.: [6138-23-4]
Molecular formula: $C_{12}H_{22}O_{11}$
Column: Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ H_2O=80/20
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: ELSD
Attenuation: Gain=6,Atten=9
Sample conc.: 1.0mg/ml
Injection volume: 5.0µl
Retention time: 18.26min
Capacity factor: 5.95





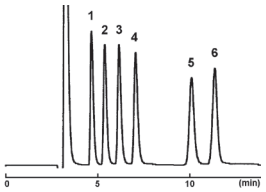
NACALAI TESQUE, INC

- **Sugar Alcohols**

COSMOSIL Application Data

Column: Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile / H_2O = 75/25
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: RI

Sample:
1; Glycerol (10 µg)
2; *meso*-Erythritol
〔*meso*-Erythrite〕 (10 µg)
3; Xylitol (10 µg)
4; *D*-Glucitol (10 µg)
5; Maltitol (10 µg)
6; *myo*-Inositol (10 µg)



NACALAI TESQUE, INC

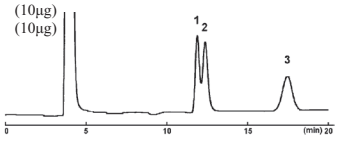
AP-0330

- **Monosaccharides and Sugar Alcohols**

COSMOSIL Application Data

Column: Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile / H_2O = 85/15
Flow rate: 1.0 ml/min
Temperature: 50°C
Detection: RI

Sample:
1; Xylitol (10µg)
2; *D*-(-)-Fructose (10µg)
3; *D*-(+)-Glucose (10µg)



NACALAI TESQUE, INC

AP-0328

Application data

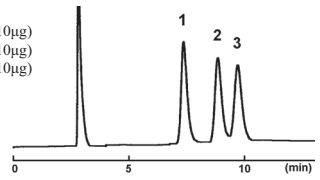
Oligosaccharides

- **Cyclodextrin**

COSMOSIL Application Data

Column: Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile / H_2O = 65/35
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: RI

Sample: 1; α-Cyclodextrin (10μg)
2; β-Cyclodextrin (10μg)
3; γ-Cyclodextrin (10μg)



NACALAI TESQUE, INC

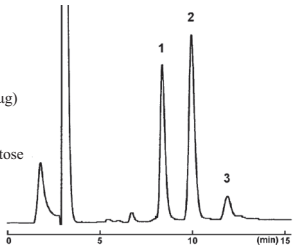
AP-0336

- **Fructooligosaccharides**

COSMOSIL Application Data

Column: Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile / H_2O = 70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: RI

Sample: Fructooligosaccharides (50μg)
1; *1*-Kestose
2; Nystose
3; *1*-Fructofuranosyl-*D*-nystose



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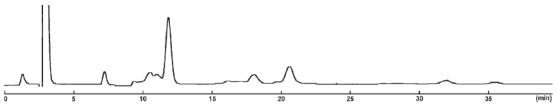
AP-0320

- **Isomaltooligosaccharides**

COSMOSIL Application Data

Column: Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile / H_2O = 75/25
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: RI

Sample: Isomaltooligosaccharides (50μg)
(Isomaltose, Isomaltotriose, Panose etc.)



NACALAI TESQUE, INC

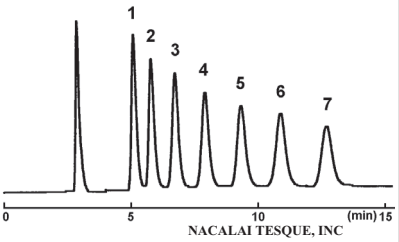
AP-0322

- **Maltooligosaccharides**

COSMOSIL Application Data

Column: Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile / H_2O = 65/35
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: RI

Sample:
1; *D*-(+)-Glucose (10μg)
2; Maltose (10μg)
3; Maltotriose (10μg)
4; Maltotetraose (10μg)
5; Maltopentaose (10μg)
6; Maltohexaose (10μg)
7; Maltoheptaose (10μg)



NACALAI TESQUE, INC

AP-0331

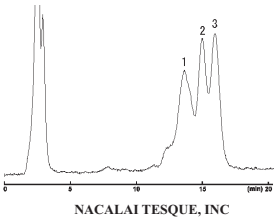
- **Saponin**

COSMOSIL Application Data

Column: Sugar-D
Column size: 4.6mmI.D.-150mm
Mobile phase: Acetonitrile/ H_2O = 75/25
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210nm

Sample:

1; Glc-Rha-Glc-Glc-Glc-Rib-Rha-Ara-Hederagenin-Glc-Glc-Rha
Glc isoferuloyl
2; Glc-Rha-Glc-Glc-Glc-Rib-Rha-Ara-Hederagenin-Glc-Glc-Rha
Glc isoferuloyl
3; Glc-Rha-Glc-Glc-Glc-Rib-Rha-Ara-Hederagenin-Glc-Glc-Rha
Glc-Glc isoferuloyl



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Data courtesy of Dr.Y.Kawata,Hokuriku University

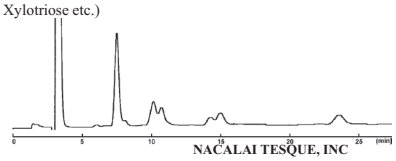
AP-0451

- **Xylooligosaccharides**

COSMOSIL Application Data

Column: Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile / H_2O = 75/25
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: RI

Sample: Xylooligosaccharides (50μg)
(Xylobiose, Xylotriose etc.)



NACALAI TESQUE, INC

AP-0321

Application data

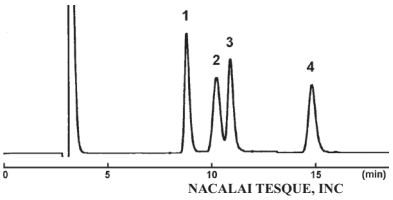
Oligosaccharides

- **Oligosaccharides**

COSMOSIL Application Data

Column: Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile / H_2O = 75/25
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: RI

Sample:
1; Sucrose (10μg)
2; Maltose (10μg)
3; *D*-(+)- Trehalose (10μg)
4; *D*-(+)- Raffinose (10μg)



NACALAI TESQUE, INC

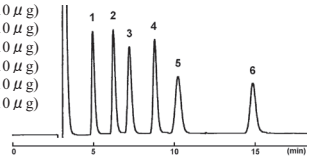
AP-0335

- **Oligosaccharides**

COSMOSIL Application Data

Column: Sugar-D
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile / H_2O = 75/25
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: RI

Sample:
1; *L*-(+)-Rhamnose (10 μg)
2; *D*-(-)-Fructose (10 μg)
3; *D*-(+)-Glucose (10 μg)
4; Sucrose (10 μg)
5; Maltose (10 μg)
6; *D*-(+)- Raffinose (10 μg)



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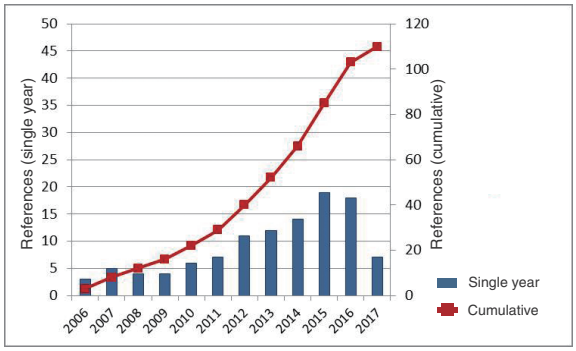
AP-0329

INDEX

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).



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TITLE	AUTHOR	JOURNAL	ISSUE	PAGE	YEAR
Effects of ciceritol from chickpeas on human colonic microflora and the production of short chain fatty acids by in vitro fermentation	Yun Zhang, Di Su, Jinyan He, Zhuqing Dai, Riaz Asad, Shiyi Ou, Xiaoxiong Zeng	LWT - Food Science and Technology	79	294–299	2017
Effects of pyruvate kinase on the growth of Corynebacterium glutamicum and L-serine accumulation	Xiaomei Zhang, Lianhe Lai, Guoqiang Xu, Xiaojuan Zhang, Jinsong Shi, Zhenghong Xu	Process Biochemistry	55	32-40	2017
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Evaluation of the chemical quality of Sekkoku (石斛) in current Japanese commercial crude drugs: constituents of Flickingeria xantholeuca (Rchb. f.) A.D. Hawkes	Mei Muto, Haruka Asahina, Tatsufumi Yoshioka, Kazuo Ozaki, Makio Shibano	Journal of Natural Medicines	71 (1)	238–248	2017
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Investigation of the transglycosylation potential of β-Galactosidase from Aspergillus oryzae in the presence of the ionic liquid [Bmim][PF6]	Regina Brakowski, Katrin Pontius, Matthias Franzreb	Journal of Molecular Catalysis B: Enzymatic	130	48–57	2016
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