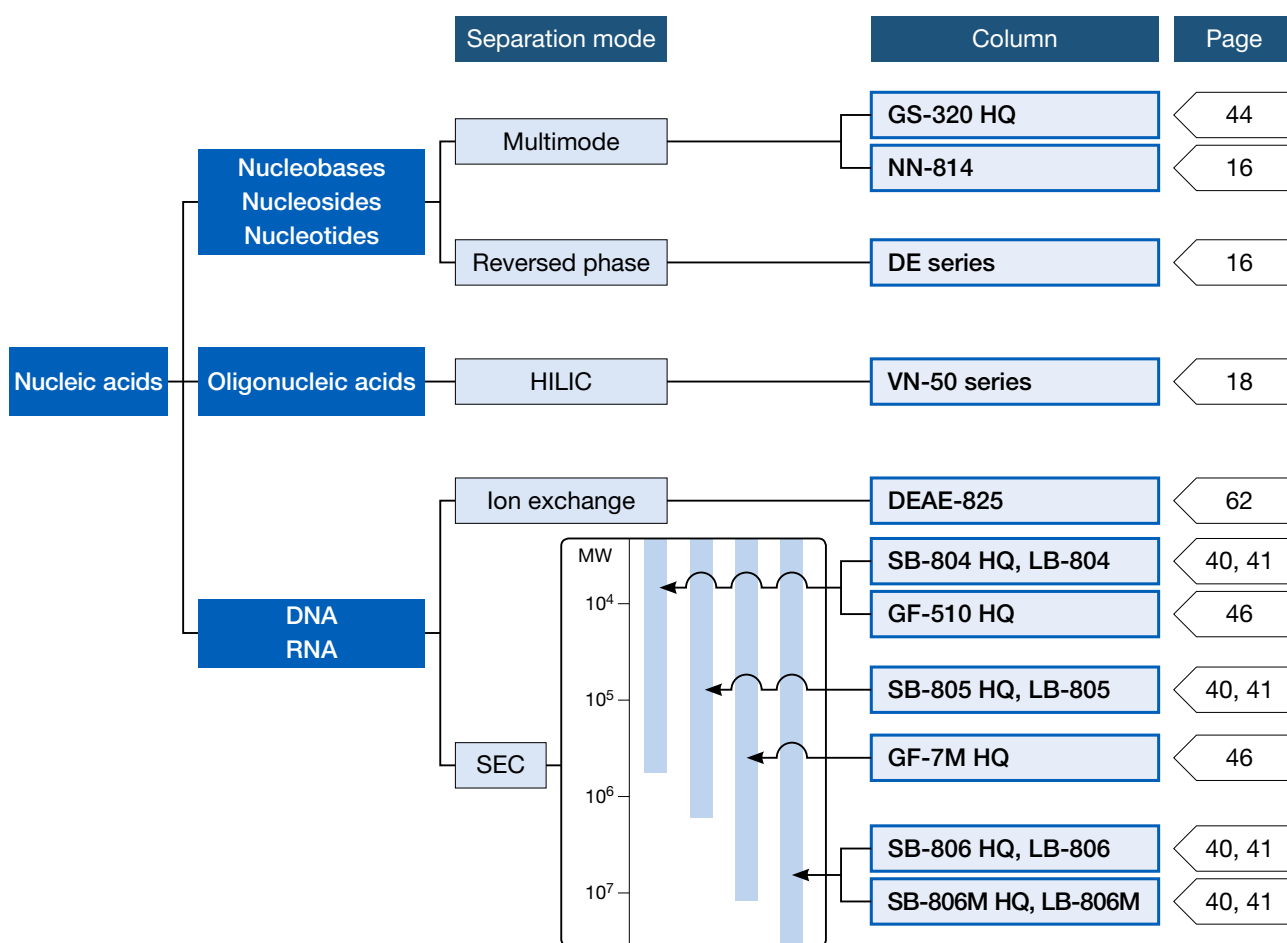
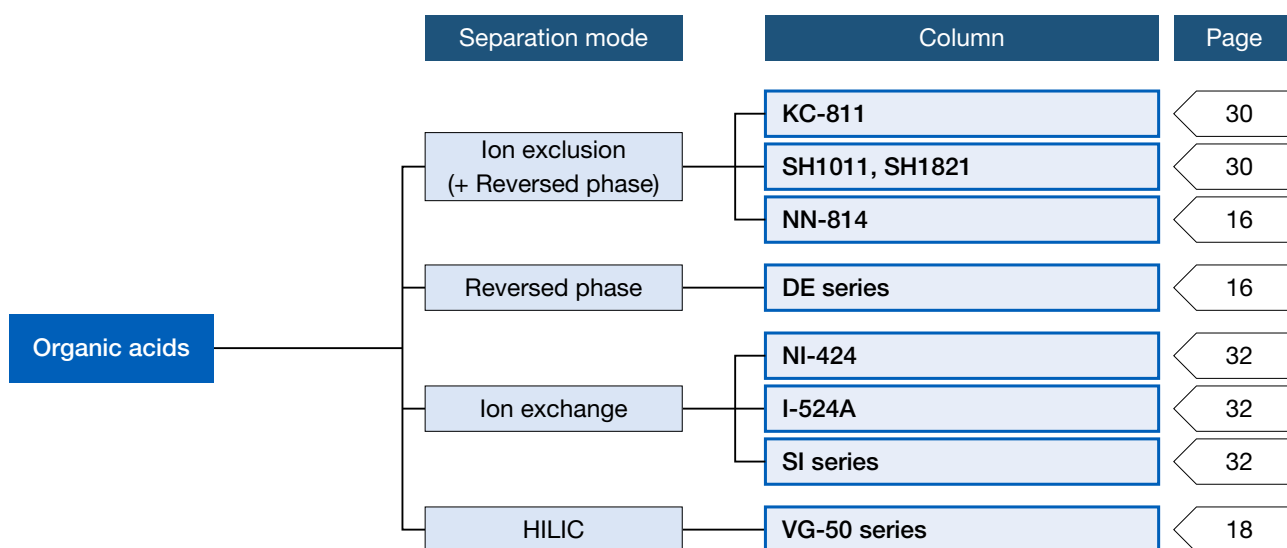


Column Selection (Nucleic Acids)

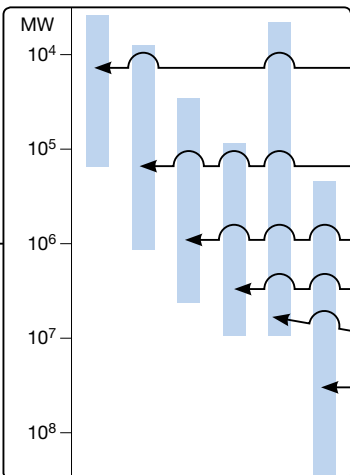
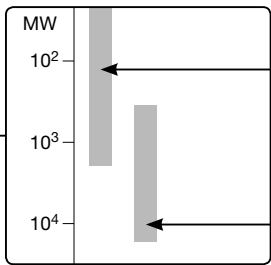


Column Selection (Organic Acids)



Column Selection (Saccharides)

	Separation mode	Column	Page
Mono-, di-saccharides, and sugar alcohols Saccharides and sugar alcohols	Ligand exchange + SEC	SP0810 (Pb ²⁺)	26
		SC1011 (Ca ²⁺)	26
		KS-801 (Na ⁺)	26
	Ligand exchange + HILIC	SZ5532 (Zn ²⁺)	26
		DC-613 (Na ⁺)	26
	HILIC	VG-50 series	18
		NH2P series	22
Sugar alcohols	Ligand exchange + HILIC	SC1211 (Ca ²⁺)	26
Oligosaccharides and sugar alcohols	Ligand exchange + SEC	KS-801 (Na ⁺) + KS-802 (Na ⁺)	26
Amino sugars	HILIC	VG-50 series	18
		NH2P series	22
	Ion exchange	SC1011 (Ca ²⁺)	26
Acidic sugars	Ion exclusion	SH1011 (H ⁺)	30
		KC-811	30
	Ion exchange	VT-50 2D	18
		NH2P series	22
Saccharides and organic acids	Ion exclusion + SEC	SH1011 (H ⁺), SH1821 (H ⁺)	30
Oligosaccharides	SEC	KS-801 (Na ⁺)	26
		SB-802 HQ	40
		GS-220 HQ	44
		KS-802 (Na ⁺)	26
		SB-802.5 HQ, LB-802.5	40, 41
	HILIC	GS-320 HQ	44
		VN-50 series	18
		NH2P series	22
		KS-803 (Na ⁺)	26
		SB-803 HQ, LB-803	40, 41
Polysaccharides	SEC	KS-804 (Na ⁺)	26
		SB-804 HQ, LB-804	40, 41
		SB-805 HQ, LB-805	40, 41
		SB-806 HQ, LB-806	40, 41
		SB-806M HQ, LB-806M	40, 41
		SB-807 HQ	40



Column Selection (Anions and Cations)

Separation mode		Column	Page	
Anions	IC	Inorganic anions analysis (Suppressor method: Sodium carbonate eluent)	SI-90 4E	32
			SI-35 2B	33
		Inorganic anions and organic acids analysis (Suppressor method: Sodium carbonate eluent)	SI-50 4E	32
		Inorganic anions and oxyhalides analysis (Suppressor method: Sodium carbonate eluent)	SI-52 4E	32
			SI-35 4D	32
		Inorganic anions analysis (Suppressor method: Potassium hydroxide eluent)	SI-36 4D	33
	SI-37 4D		33	
	Inorganic anions analysis (Non-suppressor method)	NI-424	32	
		I-524A	32	
	Ion exclusion	Cyanide ions and cyanogen chloride analysis (Post column method)	KC-811	30
Cations	IC	Simultaneous analysis of monovalent and divalent cations (Non-suppressor / Suppressor method) Analysis of alkylamines and/or transition metals	YS-50	33
		Simultaneous analysis of monovalent and divalent cations (Non-suppressor method) Analysis of ethanolamines and/or alkylamines	YK-421	33

Ion Exclusion Chromatography Columns

<https://www.shodex.de/organic-acid-columns-ion-exclusion>

Features

SH1011 SH1821

- Columns for simultaneous analysis of saccharides and organic acids (counter ion: H⁺)
- Separates neutral sugars by size exclusion mode and organic acids by ion exclusion mode
- Suitable for the analysis of uronic and aldonic acids
- Fulfill USP-NF L17 and L22 requirements

KC-811

- Columns suitable for the analysis of organic acids
- Separates compounds by ion exclusion mode and reversed phase mode
- Highly selective when used with post column method
- KC-811 6E is suitable for cyanide ions and cyanogen chloride analysis in accordance with the Japanese Water Supply Act
- Fulfills USP-NF L17 and L22 requirements

For simultaneous analysis of saccharides and organic acids

• Standard columns

Product Code	Product Name	Plate Number (TP/column)	Functional Group	Exclusion Limit (Pullulan)	Particle Size (µm)	Column Size (mm) I.D. x Length	Shipping Solvent
F6378100	SUGAR SH1011	≥ 17,000	Sulfo	1,000	6	8.0 x 300	H ₂ O
F6378101	SUGAR SH1821	≥ 17,000	Sulfo	10,000	6	8.0 x 300	H ₂ O
F6700080	SUGAR SH-G	(guard column)	Sulfo	—	10	6.0 x 50	H ₂ O
F6378104	SUGAR SH1011 8C	≥ 5,000	Sulfo	1,000	6	8.0 x 100	H ₂ O

Base Material: Styrene divinylbenzene copolymer

For organic acids, cyanide ions and cyanogen chloride

• Standard columns

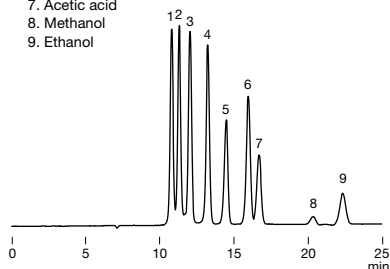
Product Code	Product Name	Plate Number (TP/column)	Functional Group	Particle Size (µm)	Column Size (mm) I.D. x Length	Shipping Solvent
F6378030	RSpak KC-811	≥ 17,000	Sulfo	6	8.0 x 300	0.1 % H ₃ PO ₄ aq.
F6700030	RSpak KC-G 6B	(guard column)	Sulfo	10	6.0 x 50	0.1 % H ₃ PO ₄ aq.

Base Material: Styrene divinylbenzene copolymer

Maltooligosaccharides, organic acids and ethanol

 Sample : 0.05 % each, 20 μ L

1. Maltotetraose
2. Maltotriose
3. Maltose
4. Glucose
5. Lactic acid
6. Glycerin
7. Acetic acid
8. Methanol
9. Ethanol

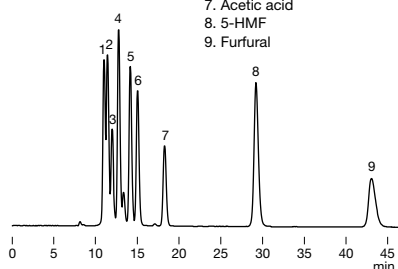


Column : Shodex SUGAR SH1821
Eluent : 0.5 mM H₂SO₄ aq.
Flow rate : 0.6 mL/min
Detector : RI
Column temp. : 75 °C

Cello-oligosaccharides and furfurals

 Sample : 0.1 % each, 10 μ L

1. Cellopentaose
2. Cellotetraose
3. Cellotriose
4. Cellobiose
5. Glucose
6. Glyceric acid
7. Acetic acid
8. 5-HMF
9. Furfural

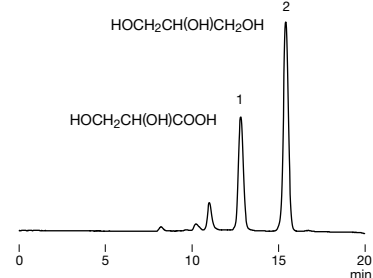


Column : Shodex SUGAR SH1821
Eluent : 2 mM H₂SO₄ aq.
Flow rate : 0.6 mL/min
Detector : RI
Column temp. : 60 °C

Glycerin and glyceric acid

 Sample : 0.1 % each, 10 μ L

1. Glyceric acid
2. Glycerin

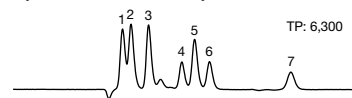
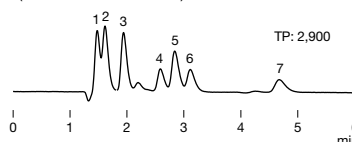


Column : Shodex SUGAR SH1011
Eluent : 2 mM H₂SO₄ aq.
Flow rate : 0.6 mL/min
Detector : RI
Column temp. : 60 °C

Rapid analysis of maltooligosaccharides, organic acids and ethanol

 Sample : 0.1 % each, 5 μ L

1. Maltotriose
2. Maltose
3. Glucose
4. Lactic acid
5. Acetic acid
6. Glycerin
7. Ethanol

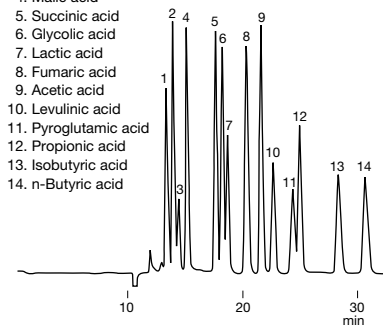
(1) Shodex SUGAR SH1011 8C (8.0 mm I.D. x 100 mm)

(2) Ion exclusion column from other manufacturer (7.8 mm I.D. x 100 mm)


Column : (1) Shodex SUGAR SH1011 8C
 (2) Ion exclusion column from other manufacturer
Eluent : 1 mM H₂SO₄ aq.
Flow rate : (1) 1.0 mL/min
 (2) 0.95 mL/min
Detector : RI
Column temp. : 65 °C

Common organic acids

Sample :

1. Citric acid
2. Tartaric acid
3. Pyruvic acid
4. Malic acid
5. Succinic acid
6. Glycolic acid
7. Lactic acid
8. Fumaric acid
9. Acetic acid
10. Levulinic acid
11. Pyroglutamic acid
12. Propionic acid
13. Isobutyric acid
14. n-Butyric acid

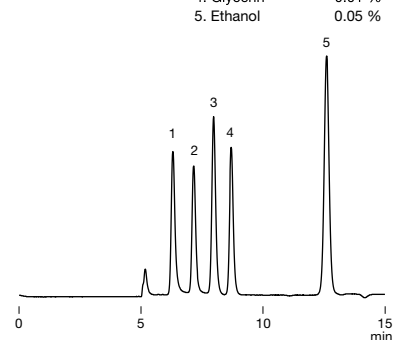


Column : Shodex RSPak KC-811 x 2
Eluent : 6 mM HClO₄ aq.
Flow rate : 1.0 mL/min
Detector : VIS (430 nm)
 post column method
Column temp. : 50 °C

Glucuronolactone and organic acids

 Sample : 20 μ L

- | | |
|---------------------|--------|
| 1. Citric acid | 0.01 % |
| 2. Malic acid | 0.01 % |
| 3. Glucuronolactone | 0.01 % |
| 4. Glycerin | 0.01 % |
| 5. Ethanol | 0.05 % |

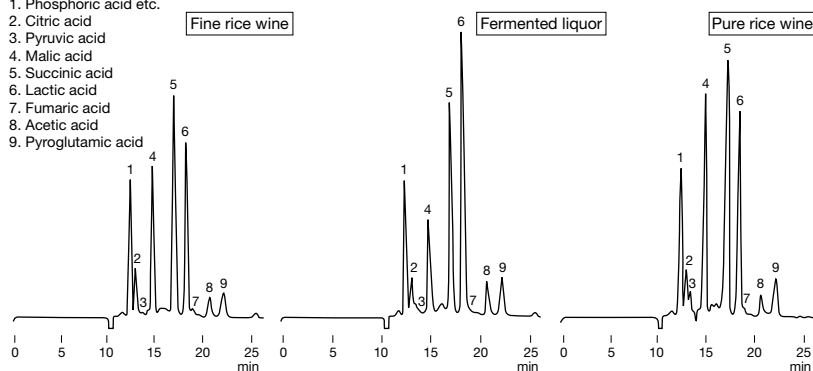


Column : Shodex RSPak KC-811
Eluent : 3 mM HClO₄ aq.
Flow rate : 1.0 mL/min
Detector : RI
Column temp. : 40 °C

Organic acids in sake

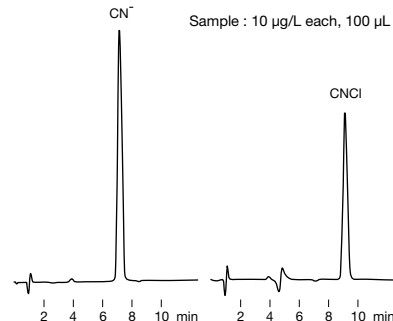
 Sample : 100 μ L

1. Phosphoric acid etc.
2. Citric acid
3. Pyruvic acid
4. Malic acid
5. Succinic acid
6. Lactic acid
7. Fumaric acid
8. Acetic acid
9. Pyroglutamic acid



Column : Shodex RSPak KC-G 8B + KC-811 x 2
Eluent : 4.8 mM HClO₄ aq.
Flow rate : 1.0 mL/min
Detector : VIS (430 nm)
 post column method
Column temp. : 63 °C

Analysis of cyanide ion and cyanogen chloride with post column method

 Sample : 10 μ g/L each, 100 μ L


Column : Shodex RSPak KC-811 6E
Eluent : 1 mM H₂SO₄ aq.
Reagent A : Chloramine T solution
Reagent B : 4-Pyridinecarboxylic acid-Pyrazolone solution
Flow rate : (Eluent) 1.0 mL/min
 (Reagent) 0.5 mL/min each
Detector : VIS (638 nm)
Column temp. : 40 °C
Reaction temp. : (Reagent A) 40 °C
 (Reagent B) 80 °C