

Column for reversed phase

## ODS-UG,HG,MG,SR columns

Develosil ODS-HG

Develosil ODS-UG

Develosil ODS-MG

Develosil ODS-SR

The 2nd generation of Develosil series, very standard column

This series is the column in which residual silanol by high-grade-size and double end cap treatment of the silica gel which is a base material was reduced compared with ODS. The peak tailing of a basic compound is suppressed and it has become very user-friendly specification.

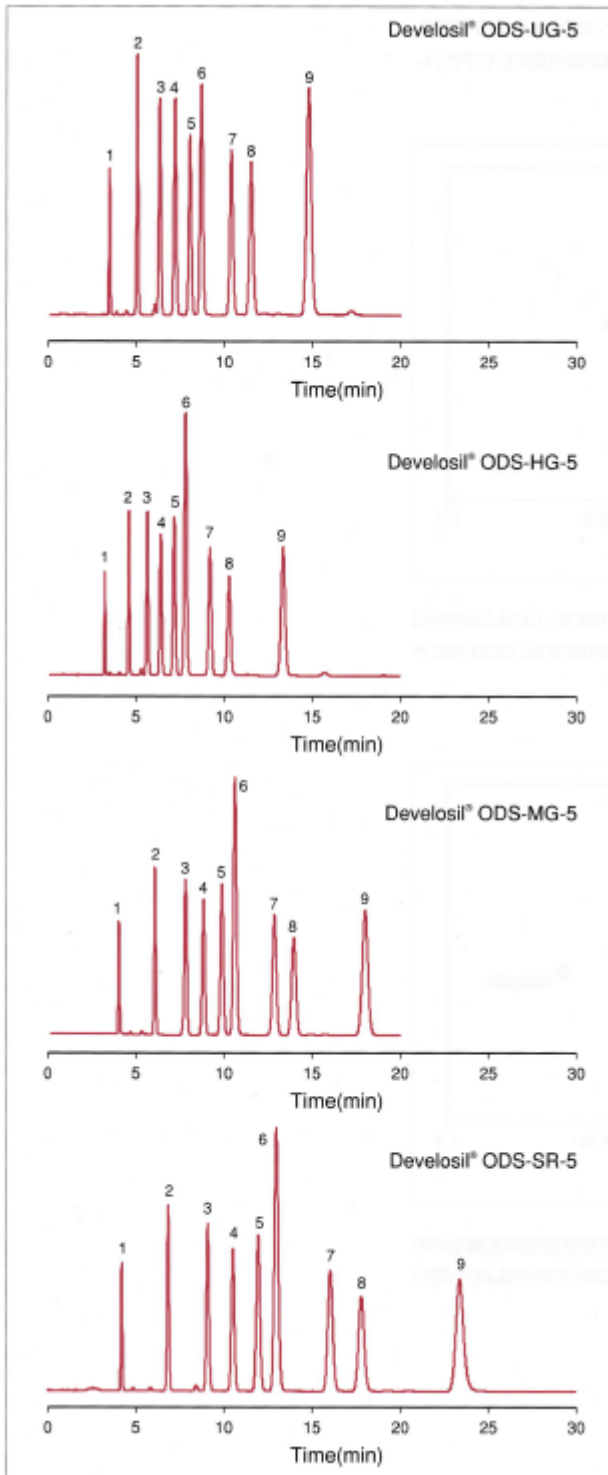
### Physical properties of Develosil ODS-HG, ODS-UG, ODS-MG, ODS-SR

Column name	Ligand	Carbon	End Capping	Surface area	Pore diameter	Pore volume	Range of pH
ODS-UG	Octadecyl (Monofunctional)	18%	Yes (Double)	300m <sup>2</sup> /g	14nm	1.05mL/ g	pH2-10
ODS-HG	Octadecyl (Trifunctional)	18%	Yes (Double)				pH1-9
ODS-MG	Octadecyl (Difunctional)	15%	Yes (Double)	400m <sup>2</sup> /g	10nm	1.15mL/ g	pH2-7.5
ODS-SR	Octadecyl (Difunctional)	18%	Yes (Double)	560m <sup>2</sup> /g	8nm		

### The combination and the theoretical plate number of a piping inside diameter

Column name	Use
ODS-UG	It is used when using an alkaline mobile phase. It ranks with ODS-HG and is a standard existence.
ODS-HG	It is used when using an acid mobile phase. Although separation almost equivalent to ODS-UG is shown, ODS-HG of solid recognition ability is higher.
ODS-MG	2 reaction type ODS. Compared with ODS-UG or HG, retention is a column for a separation improvement strongly. It can be used also for a mobile phase with much water composition.
ODS-SR	The column which is proud of the retention greatest in a Develosi column The optimal column for earning retention. Loading dose increase of preparative isolation can be aimed at.

## The example of analysis of an aromatic compound



### Conditions:

Column	: Develosil® ODS-UG-5 Develosil® ODS-HG-5 Develosil® ODS-MG-5 Develosil® ODS-SR-5
Size	: 4.6x150mm
Mobile phase	: Acetonitrile/Water=70/30
Flow rate	: 1.0ml/min
Temperature	: 30°C
Detection	: UV254nm
Sample	: 1. Benzene (0.31uL/ml) 2. Naphthalene (0.32mg/ml) 3. Biphenyl (0.08mg/ml) 4. Fluorene (0.08mg/ml) 5. Phenanthrene (0.04mg/ml) 6. Anthracene (0.04mg/ml) 7. Fluoranthene (0.16mg/ml) 8. Pyrene (0.16mg/ml) 9. Chrysene (0.16mg/ml)
Injection volume	: 2.0uL

Nine kinds of aromatic compounds are measured on the terms.

Although there is a difference of time in ODS-UG and HG, the almost same separation is shown.

Because ODS-MG and SR can obtain quite strong retention compared with this, it becomes the means of a separation improvement.

### About an improvement of separation

〈For improving separation〉

- The length of a column is changed.
- It changes into the strong column of retention.
- Particle diameter is made small.
- Composition is changed.

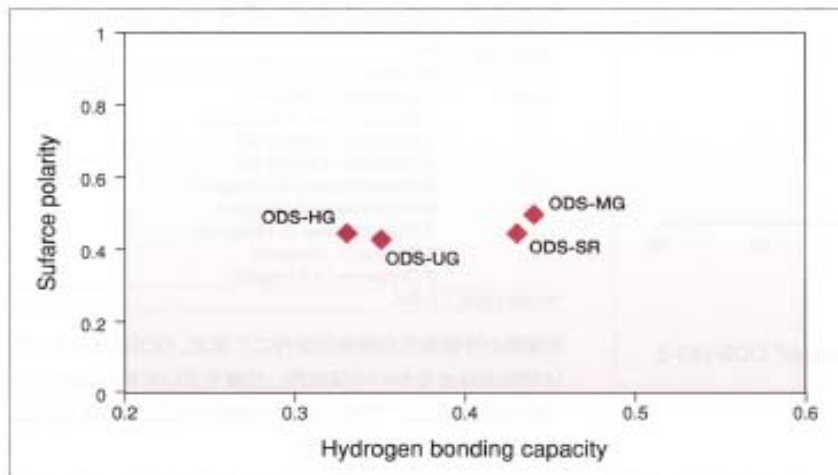
etc.

It is necessary to choose the column appropriate for the purposes, such as solubility, analytical time, etc. of a sample.

## The means at the time of choosing a column

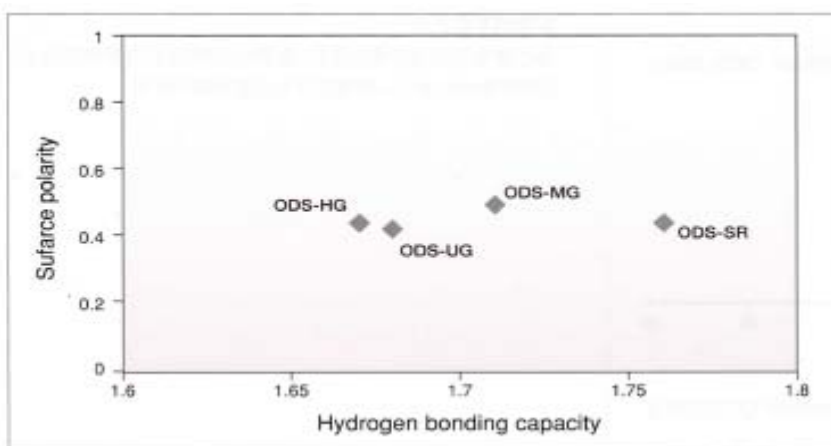
The data in which hydrogen bond property and hydrophobic surface polarity were shown is in below. It has respectively different performance in ODS-UG, HG, and ODS-MG and ODS-SR. Please follow it as the guide of column selection.

### Hydrogen associativity



Hydrogen associativity becomes a parameter for seeing the influence of residual silanol. Compared with ODS-UG or HG, ODS-MG and SR tend to be subject to the influence of residual silanol. But there is also much analysis which is possible only in ODS-MG or SR, and there is.

### Hydrophobicity

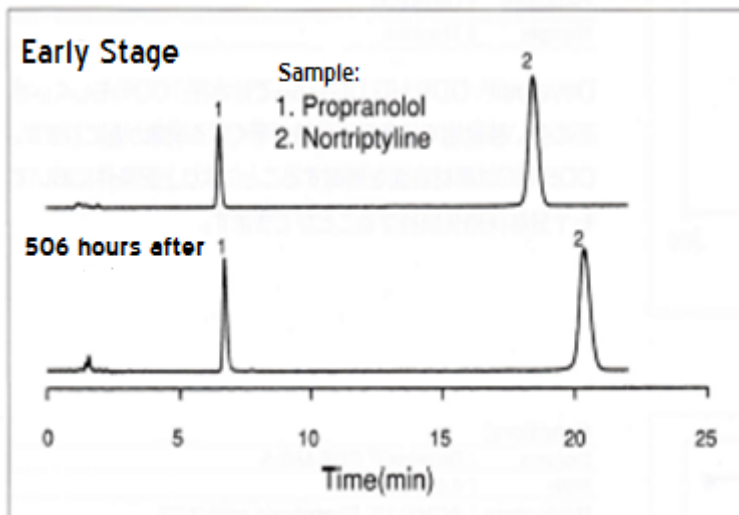


Hydrophobicity is a parameter influenced by the carbon content. ODS-MG which has influence of the base material physical properties to be used, and has 15% of carbon content shows hydrophobicity higher than ODS-UG and HG from the size of the surface area.

## Durability of a column

ODS-UG, HG, MG, and SR as which the new end cap method is adopted are the column excellent also in the durability of liquefaction.

### Alkali durability of Develosil ODS-UG

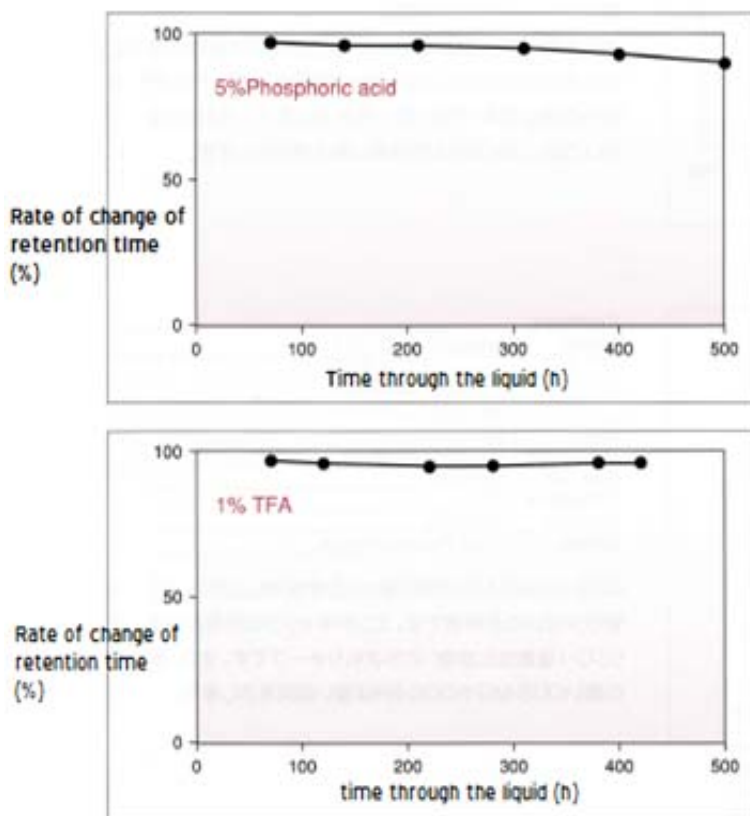


Conditions;

Column	: Develosil® ODS-UG-5 (4.6x150mm) + Guard Column (4.0x20mm)
Mobile phase	: acetonitrile/0.05M Hydrochloric acid pyrrolidine (pH 11.5) =50/50
Flow rate	: 1.0ml/min
Temperature	: 30°C
Detection	: UV215nm
Sample	: 1.Propranolol 2.Nortriptyline
Injection volume	: 2.0uL

Peak add up is maintained also 506 hours after setting on the above terms. If the terms from which deterioration does not arise easily are constructed, sufficient durability is shown also on a high pH condition.

### Acid durability of Develosil ODS-HG



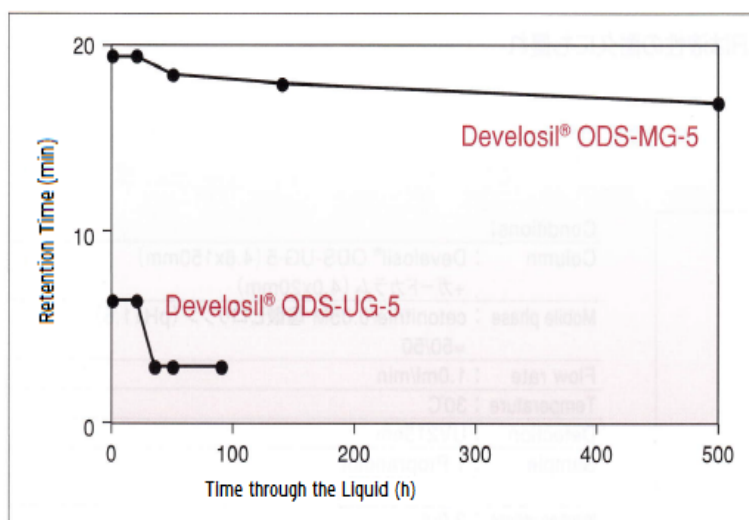
Conditions;

Column	: Develosil® ODS-HG-5
Size	: 4.6x150mm
Mobile phase	: MeOH/5% Phosphoric acid (pH1.1) =70/30 MeOH/1% TFA (pH1.3) =70/30
Flow rate	: 1.0ml/min
Temperature	: 30°C
Detection	: UV254nm
Sample	: Napthalene

When the case where phosphoric acid is used on the above terms, and TFA are used. The change of the later maintenance through the liquid is held in check for 500 hours by several percent of decrease. Therefore, sufficient durability is shown also to an acid mobile phase.

## Develosil ODS-MG

### Maintenance of the retention in many mobile phases in water



#### Conditions;

Column : Develosil® ODS-MG-5

Size : 4.6x150mm

Mobile phase : Water

Flow rate : 1.0ml/min

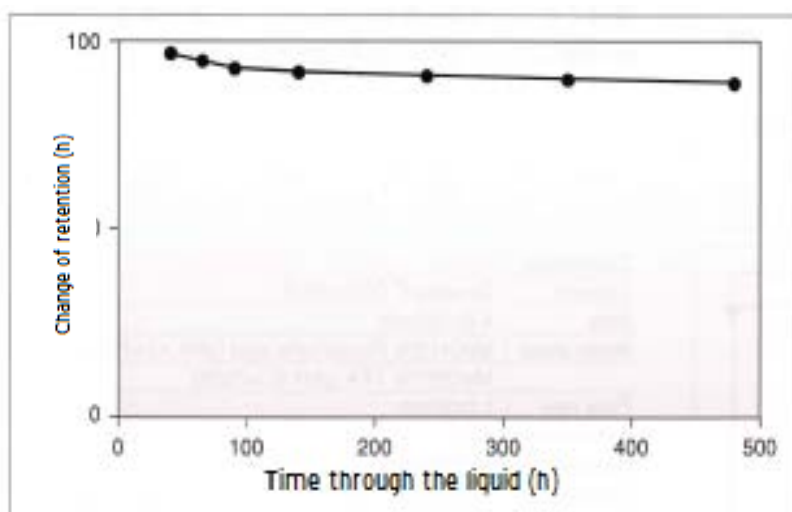
Temperature : 40°C

Detection : UV254nm

Sample : Thymine

The phenomenon that maintenance becomes suddenly early is generated in Develosil ODS-HG, UG and the SR in the mobile phase with many 100% of water systems or water systems. ODS-MG can maintain enough maintenance in the above agreement by controlling the matrix surface.

## Acid durability of Develosil ODS-MG



#### Conditions;

Column : Develosil® ODS-MG-5

Size : 4.6x150mm

Mobile phase : ACN/0.1% Phosphoric acid=2/98

Flow rate : 1.0ml/min

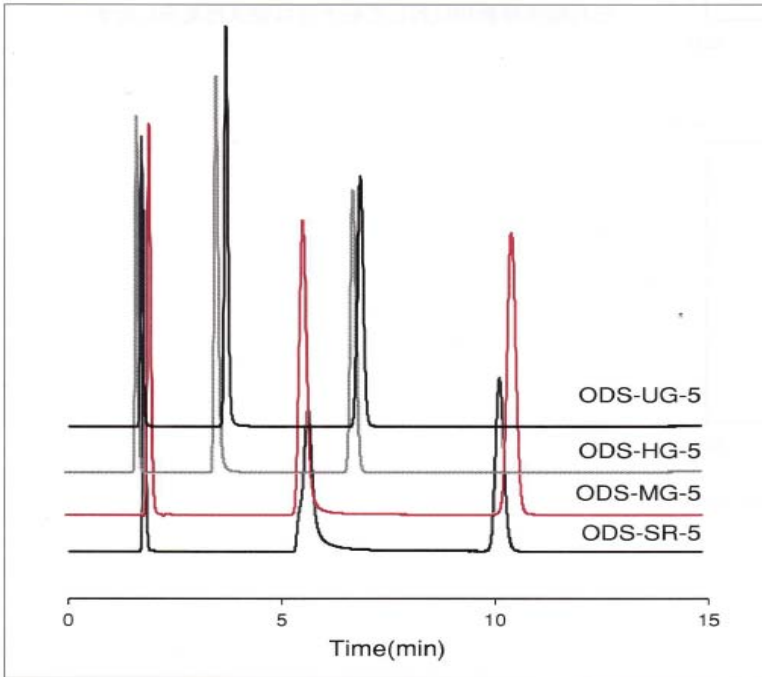
Temperature : 40°C

Detection : UV210nm

Sample : Propionic acid

The durability on the acid terms of Develosil ODS-MG on terms is shown. Even if 500 hours pass, retention shows high durability only by reduction of several percent. In operating pH range, ODS-MG shows high durability.

## Separation comparison — Hydrochloric acid compound —



### Conditions:

Column : Develosil® ODS-UG-5

Develosil® ODS-HG-5

Develosil® ODS-MG-5

Develosil® ODS-SR-5

Size : 4.6x150mm

Mobile phase : MeOH/Water=30/70

Flow rate : 1.0ml/min

Temperature : 40°C

Detection : UV254nm

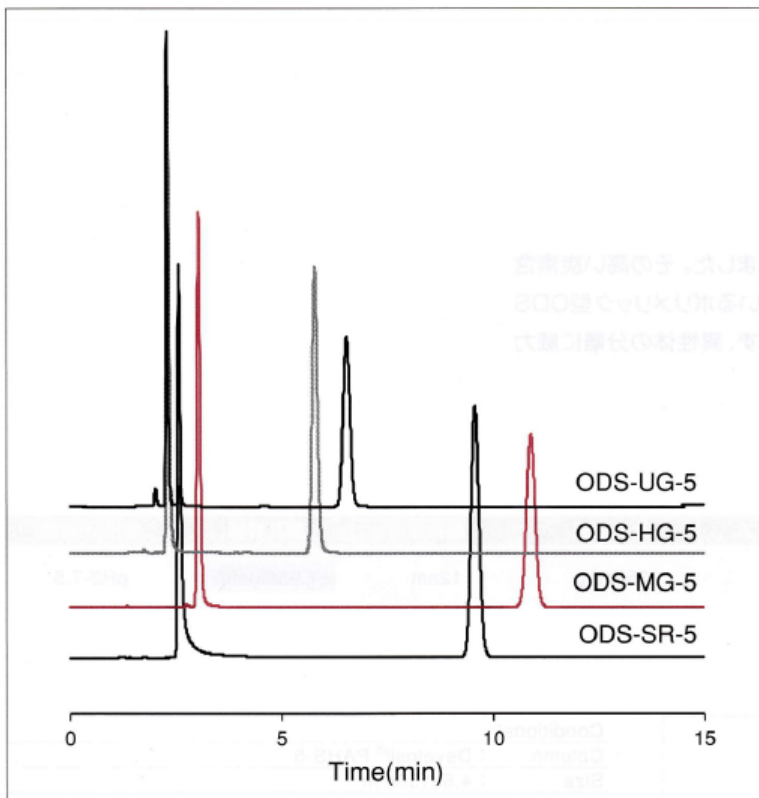
Sample : Uraci, Pyridine, Phenol

As for ODS-UG, HG, and MG, the thing with few impurities which has adopted high purity silica is the feature.

It combines with the effect of an end cap and the form of pyridine (basic compound) is also sharp.

And, ODS-MG and SR with high surface area show strong retention.

## Separation comparison — Metallic compound —



### Conditions:

Column : Develosil® ODS-UG-5

Develosil® ODS-HG-5

Develosil® ODS-MG-5

Develosil® ODS-SR-5

Size : 4.6x150mm

Mobile phase : ACN/0.2%Phosphoric acid=10/90

Flow rate : 1.0ml/min

Temperature : 40°C

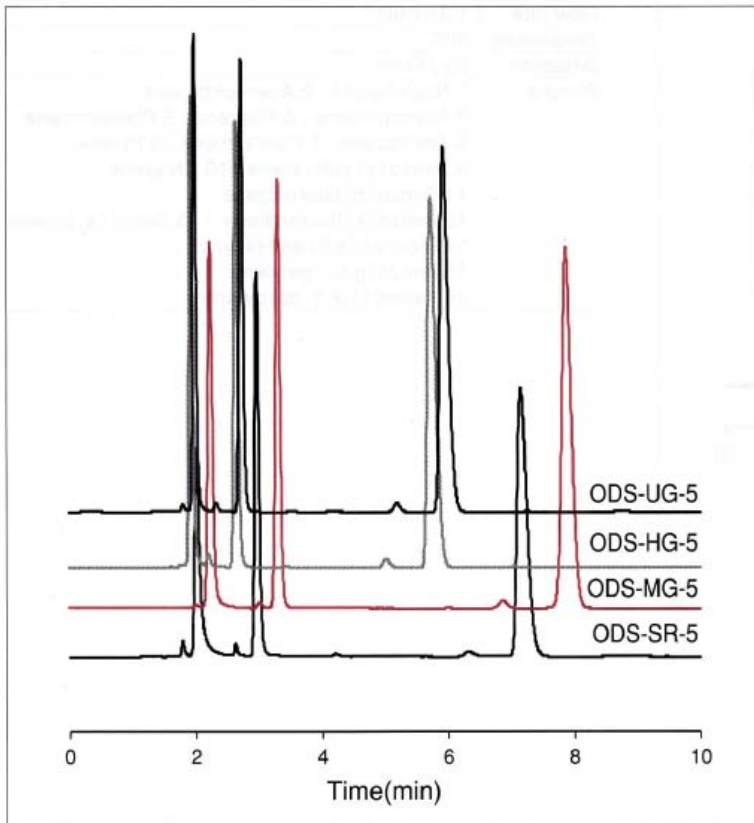
Detection : UV254nm

Sample : Oxine-copper, Caffeine

Metal compounds as well as a basic compound are subject to the effect of a silica gel statement, and ODS-UG, HG, and MG show good peak shape. In particular, ODS-MG has controlled the joint density in low proportion compared with other three sorts. When separation is insufficient in ODS-UG or HG, the width examined since it has reproducibility sufficient also by a mobile phase with much water composition used as the means of a separation improvement can be expanded.



## Separation comparison — Acidic compound —



### Conditions;

Column	: Develosil® ODS-UG-5
	Develosil® ODS-HG-5
	Develosil® ODS-MG-5
	Develosil® ODS-SR-5
Size	: 4.6x150mm
Mobile phase	: ACN/0.2%Phosphoric acid=2/98
Flow rate	: 1.0ml/min
Temperature	: 40°C
Detection	: UV210nm
Sample	: Acetic acid, Formic acid, Propionic acid

It has set to comparison of the organic acid and, in a gap, good form is shown. When ODS-HG and UG are made into a standard, ODS-MG and SR have retention in a strong tendency. Thus, ODS differs in a result greatly in the column to be used.