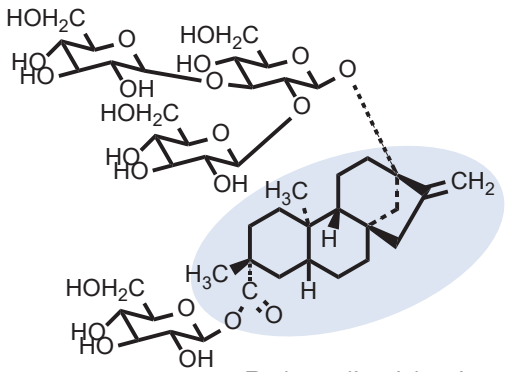
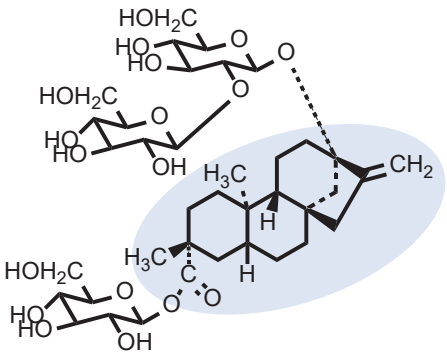
What Is Stevia Sweeteners?

- Stevia sweeteners are natural sweeteners those are presented in the leaves *Stevia rebaudiana* Bertoni.
- Steviosides, rebaudioside A, B, C, D, E and dulcoside A are representative compounds.
- These compounds are 60 –300 times sweeter than sugar and contain significantly fewer calories.



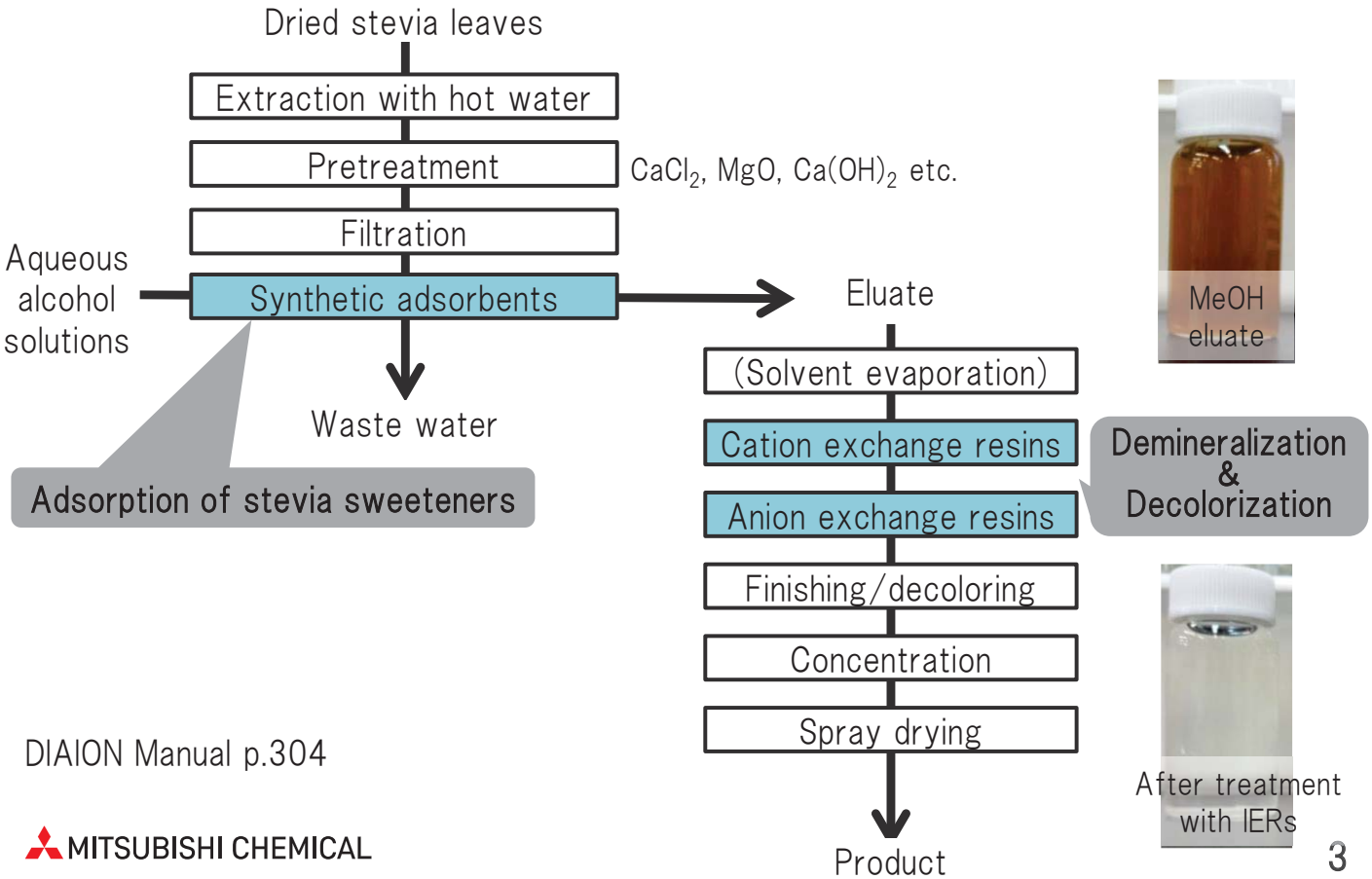
Rebaudioside A
$C_{44}H_{70}O_{23}$, m.w.=967



Stevioside
$C_{38}H_{60}O_{18}$, m.w.=804

Stevia leaves

Flow Chart of Stevia Sweeteners purification



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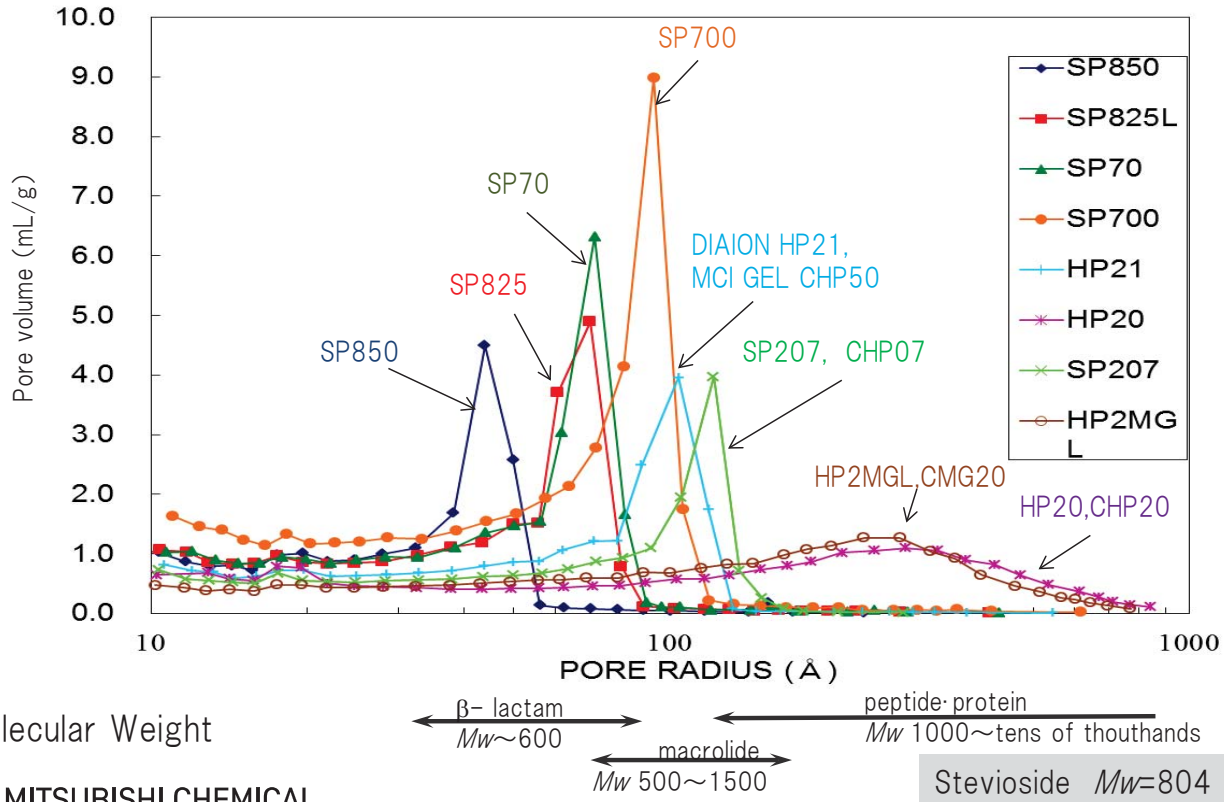
Our products - Synthetic Adsorbents -

We can provide synthetic adsorbents with various types of porosity.



Molecular Weight

β- lactam *Mw*~600

macrolide *Mw* 500~1500

peptide·protein *Mw* 1000~tens of thouthands

Stevioside *Mw*=804
RebaudiosideA *Mw*=967

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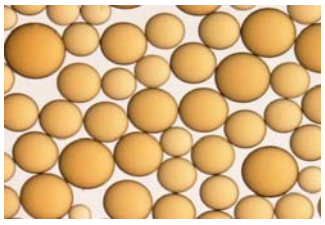
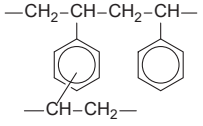
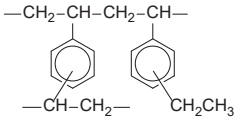
Characteristic of SP700

	HP20	SP700
SP700 **•High specific surface area** **•High stevia sweetener adsorption**		
Chemical Structure		
Pore Volume(mL/g)	1.3	2.1
Specific Surface Area(m2/g)	590	1,200
Pore Radius(Å)	290	90
RebA Amount of adsorption (mg/mL-R)	92	149
ST Amount of adsorption (mg/mL-R)	98	146

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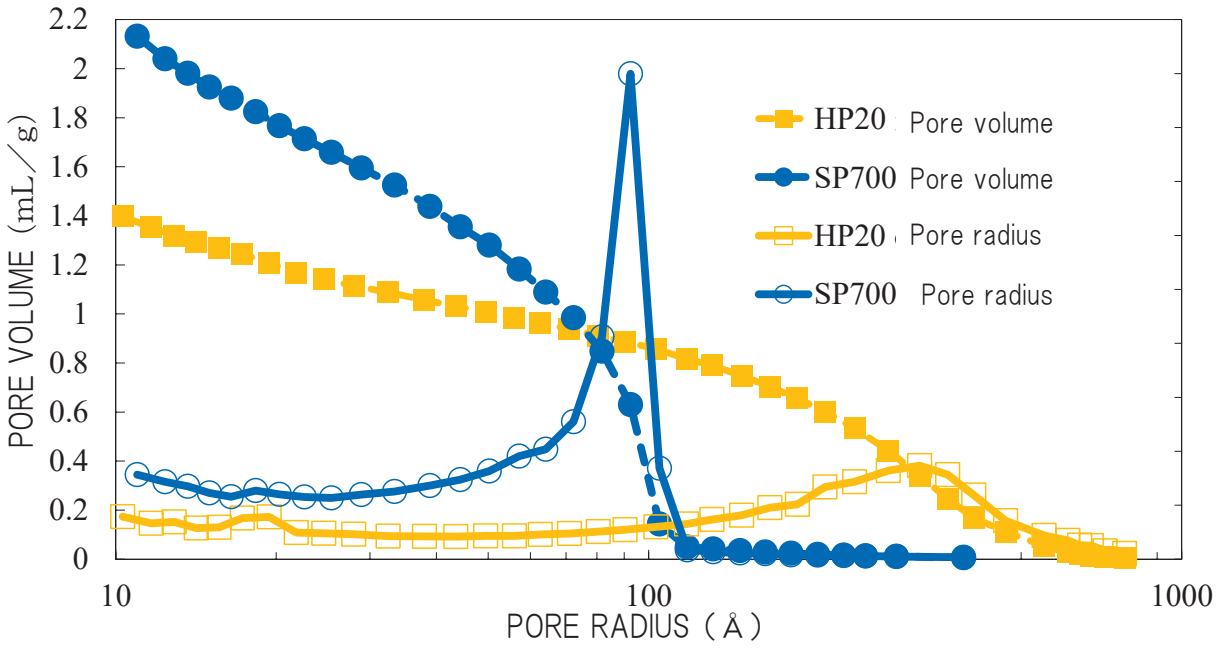
Pore size distribution of synthetic adsorbents

SP700 has narrower pore size distribution and large surface area than HP20.



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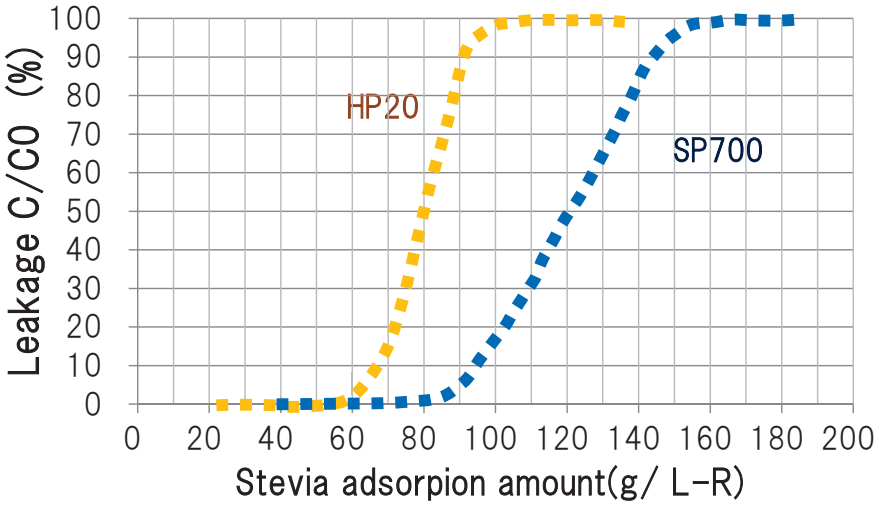
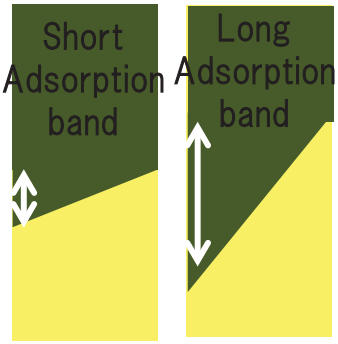


Condition
column:ϕ30mm x L1000mm
Resins 400mL
Room temperature
Flow rate SV4

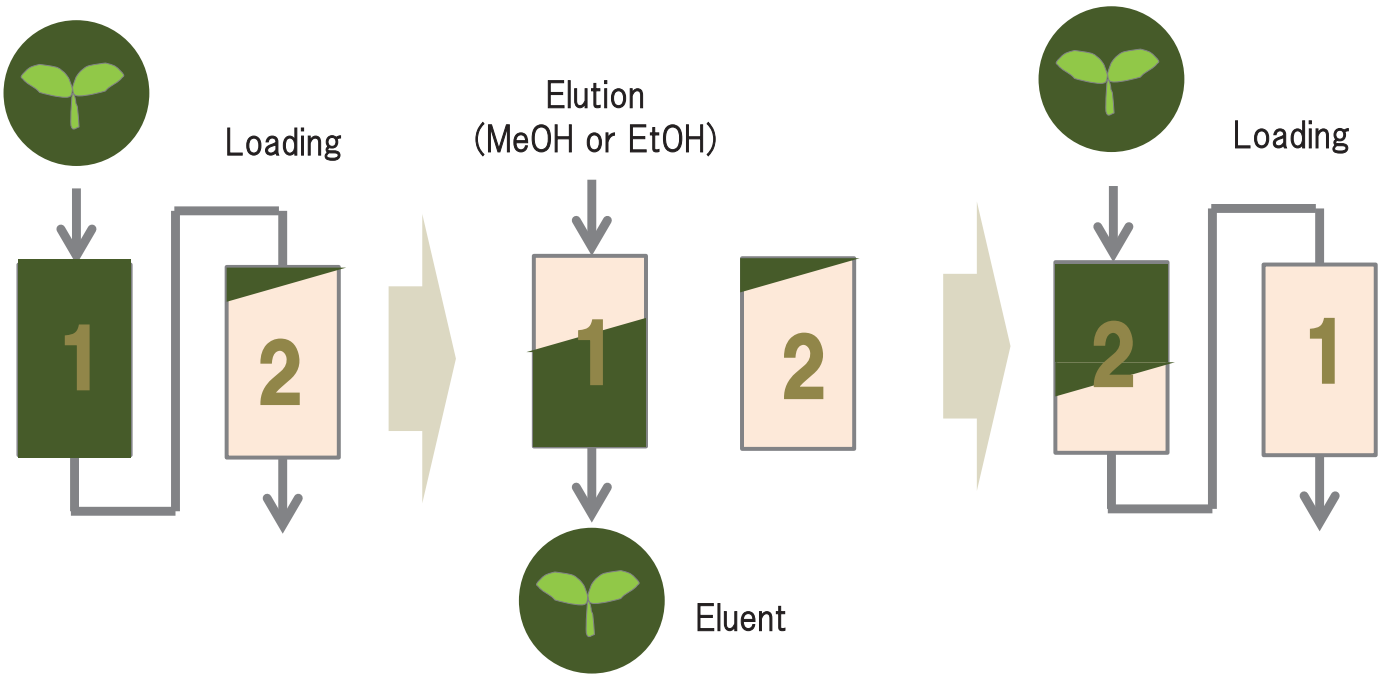


SP700

- high capacity for stevia sweeteners adsorption
- long adsorption band

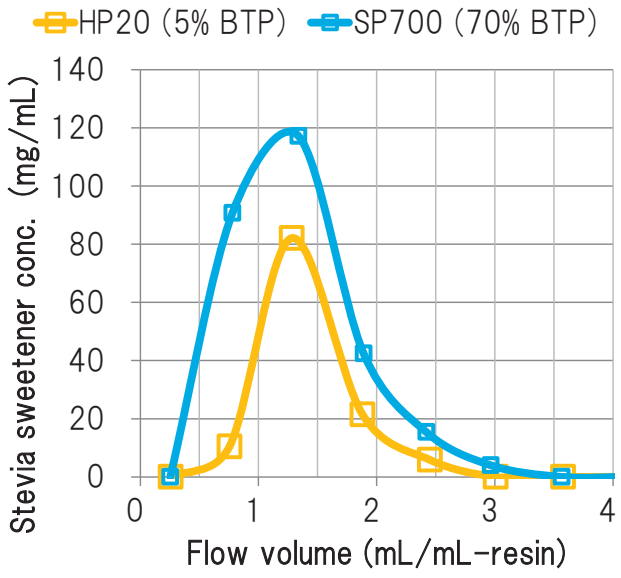
→Multi column system is suitable for SP700.

Multi column system operation



It is possible to effectively utilize the adsorption capacity of SP 700 with long adsorption zone.

Elution profile

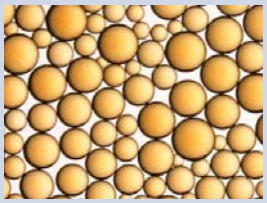


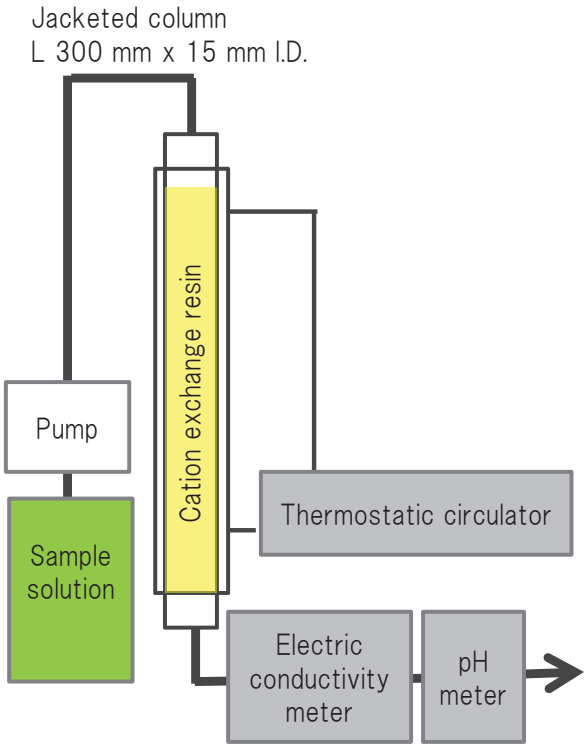
Condition
Column:ϕ30mm x L1000mm
Resins 400mL
Room temperature
85% MeOH SV2 2BV
Sweet off water SV2 2BV

	HP20 elution (5% BTP)	SP700 elution (70% BTP)
Brix	8.7	9.7
RA(mg/mL)	1.8	2.2
ST(mg/mL)	20.0	32.1
RA+ST recovery	100 %	100%

SP700 can concentrate higher stevia sweeteners than HP20.
SP700 shows small tailing.

CER & Equipment

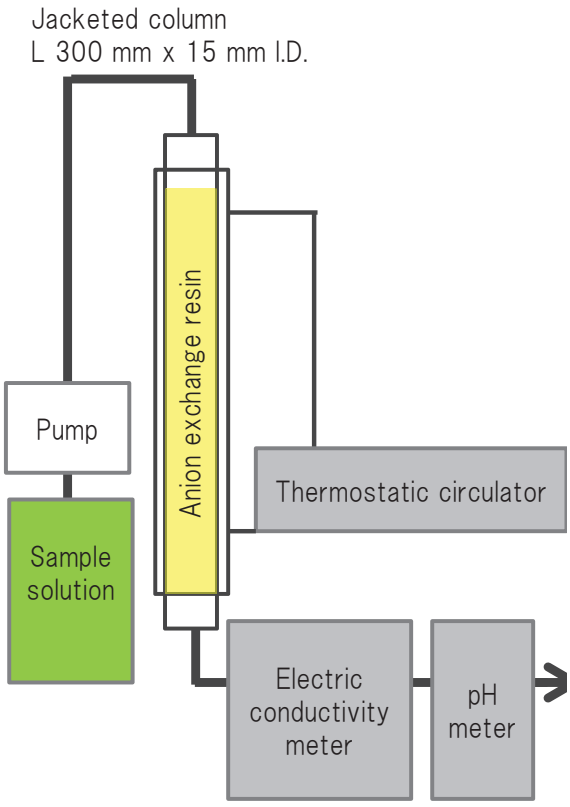
	SK1B
Appearance	
Type	Strongly acidic cation (Gel)
Salt splitting capacity (meq/mL)	2.0 min.
Water content (%)	43-50
Shipping density* (g/L)	830
Effective size (mm)	0.40 min.
Maximum operating temperature (°C)	120 (H^+, Na^+)



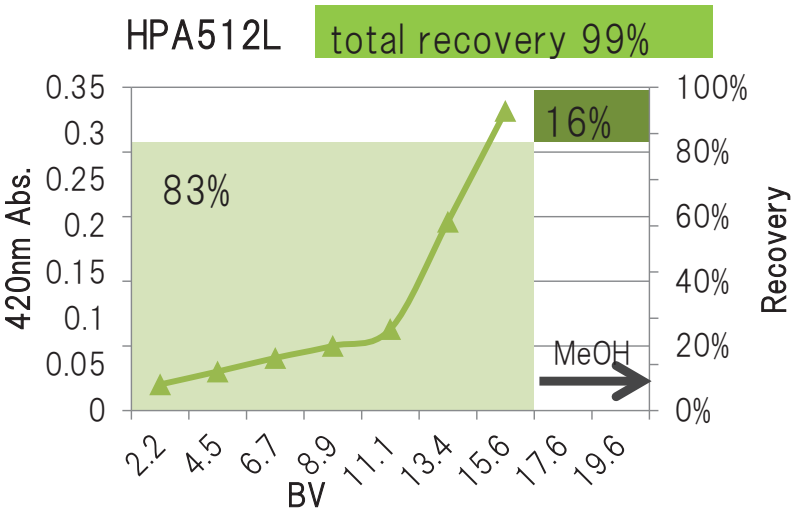
AER and Equipment

	HPA512L
Appearance	
Type	Strongly basic anion Type I (trimethylammonium groups)
Salt splitting capacity (meq/mL)	0.7 min.
Water content (%)	63-73
Shipping density* (g/L)	670
Effective size (mm)	0.45 min.
Maximum operating temperature (°C)	80 (Cl^-), 60 (OH^-)
Specific surface area* (m^2/g)	9
Pore volume* (mL/g)	0.11
Pore radius* (Å)	191

Note: properties with a mark '*' are reference data



Decolorization and Recovery



HPA512L shows good performance for decolorization .
Stevia sweeteners were Recovered in good yield.

	MeOH eluate	After treatment with SK1B	After treatment with HPA512L
MeOH concentration	40%	40%	40%
Absorbance (420 nm)	5.22	4.55	≤ 0.3
Rebaudioside A recovery	-	100%	83%
Stevioside recovery	-	98%	77%

Running Cost Simulation

For 1000kg stevia sweetener production

	Stevia adsorption (g/L-R)	resin (m3)	85% MeOH (m3)	waste (m3)	Process water (m3)
HP20 (single column)	65(5%BTP)	15	30	375	180
SP700 (single column)	90(5%BTP)	11	22	330	132
SP700 (multi column)	130(95%BTP)	7.5	15	285	90

MeOH consumption is key factor for total cost, rather than resin cost.

SP700 is High capacity
→ Less resins
→ Less MeOH
Cost reduction