

SAMYANG

TRILITE
삼양 트리라이트
Ion Exchange Resin

TRILITE Ion Exchange Resins for Starch sugar & Sweeteners



(주)삼양사 워터솔루션즈

서울 종로구 종로33길 31
TEL) 02-740-7732~7, FAX) 02-740-7790
E-mail) trilite@samyang.co.kr



Samyang Group Overview



Established in
1924



Employees
3,500



Sales (2023)
4.1 Bn.



Chemical Business

- Polycarbonate Engineering plastics
- Ion exchange resins, EDI & Reverse Osmosis Membrane
- Bisphenol A
- Terephthalic acid
- Electronic Materials
- Cosmetic ingredients

- Samyang Corp.
- Samnam Petrochem
- Samyang Kasei
- Samyang Innochem
- Samyang Fine Technology



Food Businesses

- Sugar
- Starch sugar
- Sweeteners
- Flour
- Cooking oil
- Modified fats
- Pre-mixes
- Nutritional supplements



Pharmaceutical Business

- Surgical sutures
- Antibiotics
- Patches



Packaging

- Pet bottles
- Aseptic Business



Other Business

- Data system
- Beauty business

TRILITE Water Solutions

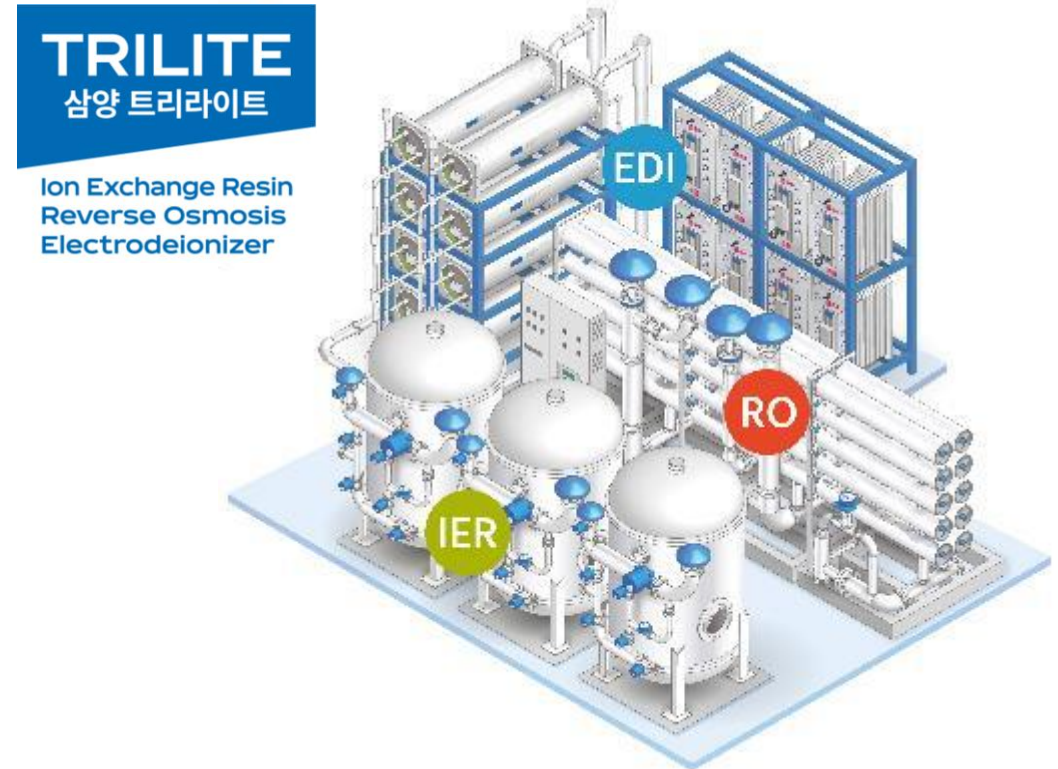
삼양은 대한민국 이온교환수지의 역사입니다.

삼양은 1976년부터 이온교환수지를 생산하고 있으며,
2011년부터 초순수용(Ultrapure water grade) 이온교환수지를
개발하여 반도체/디스플레이 산업 경쟁력 향상에 기여하고 있습니다.

또한, 아시아 최대규모의 균일계(Uniform Particle sized)
이온교환수지 전용공장을 군산에 신설하여 원자력발전소용,
반도체용, 크로마토그래피 등 글로벌 프리미엄 이온교환수지 시장을
선도하고 있습니다.

다양한 수처리 니즈에 대응하기 위하여 2021년 친환경 수처리
시스템인 EDI(Electrodeionizer) 사업에 진출하였으며, 2023년
역삼투막(Reverse Osmosis Membrane) 사업을 추가하여
수처리 토탈 솔루션을 제공하고 있습니다.

삼양 트리라이트 역삼투막은 이온교환수지 및 EDI로 축적된
삼양의 철저한 품질관리를 통하여 생산되며 다양한 기술 서비스
(시스템 설계 및 트러블슈팅 등)를 제공받으실 수 있습니다.



숫자로 보는 TRILITE

1



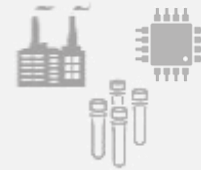
대한민국 유일의
이온교환수지
메이커입니다

+2



한국 울산, 군산에
자체 공장,
해외 OEM공장

+200



발전소, 초순수,
식품, 의약, 촉매 등
제품 200종

+400



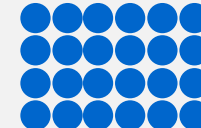
전세계 400개
파트너사와
함께 합니다

+50



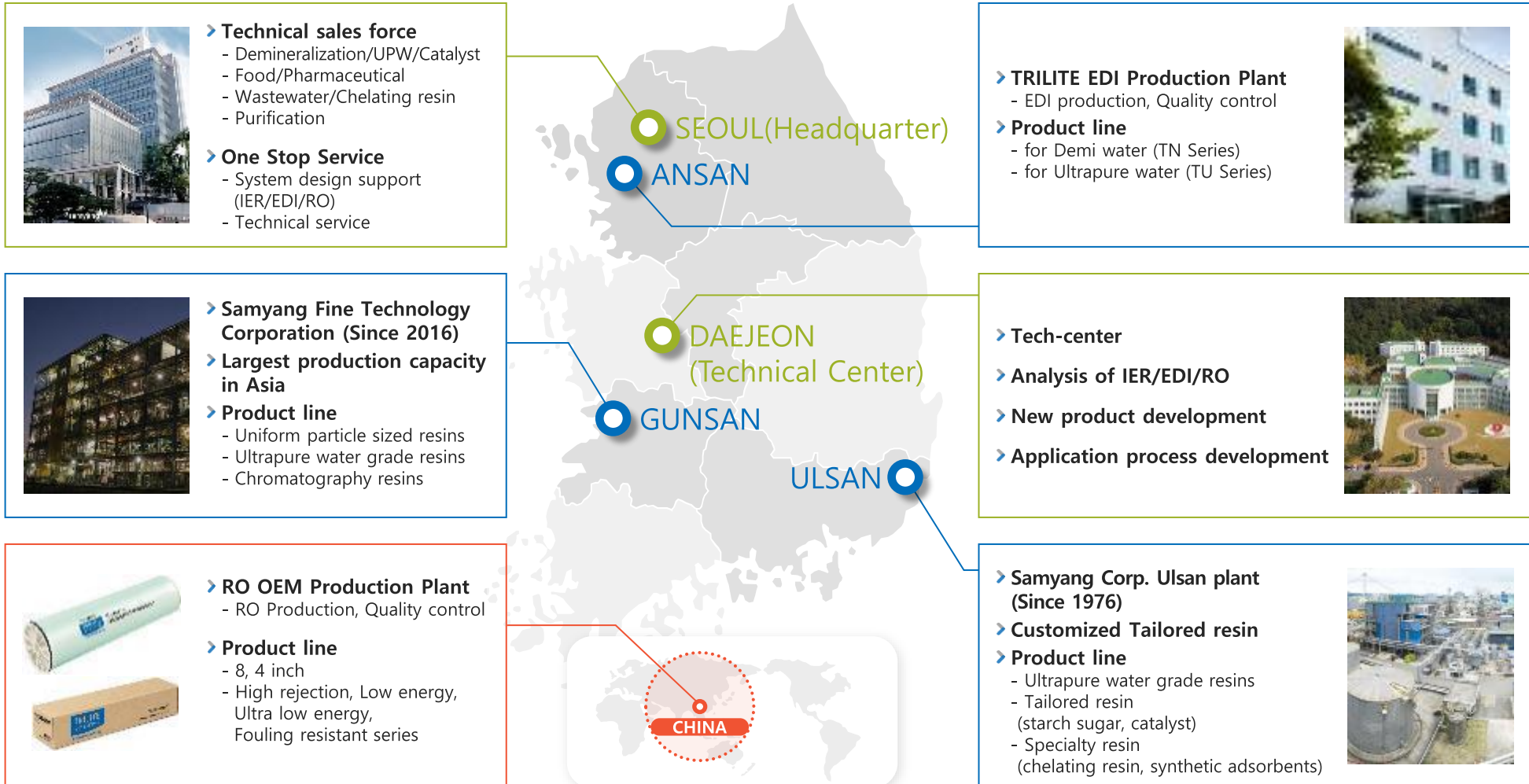
전세계 50개국에
판매하고
있습니다

1.1 ↓



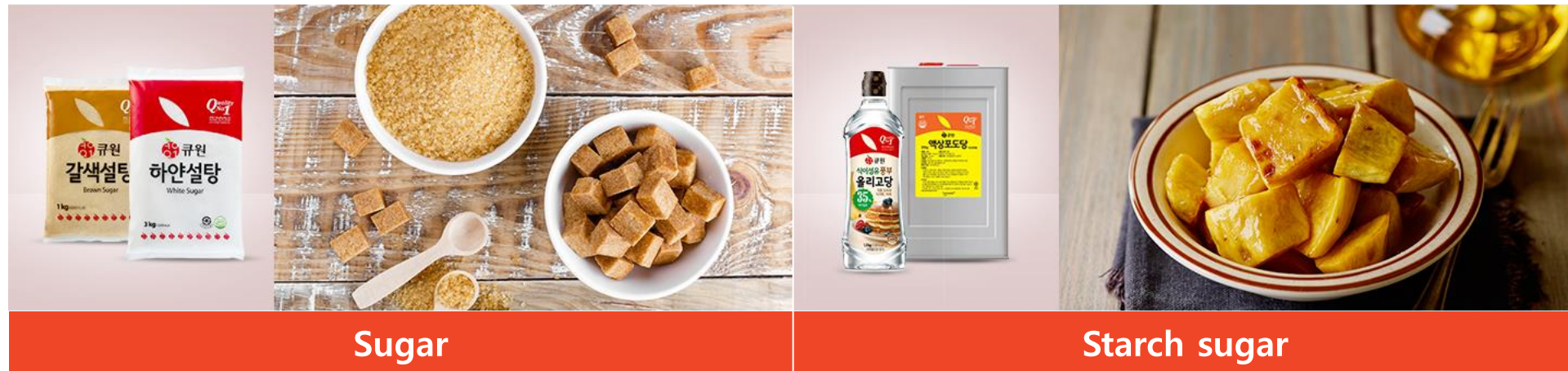
균일계수 1.1 이하
고품질 균일계
이온교환수지

주요 사업장 (본사, 공장, 테크센터)



Samyang's Sugar & Starch sugar products

Samyang makes Sugar/starch sugar products of **various types and excellent quality** using its own **TRILITE ion exchange resins**



- White sugar: 99% sugar content
- Brown sugar: Unique raw sugar taste
- Dark brown sugar: Contains minerals, Draws out unique taste
- Sugar mixtures: Xylose, sugar fiber (containing dietary fiber)

- Glucose: 70% of sugar's degree of sweetness
- Fructose: manufactured with glucose isomerase
- Oligosaccharide: contains 2–10 monosaccharides and can be used as a probiotic material
- Dietary fiber: can be used as soluble fiber
- Sugar alcohol: refreshing sweetener with less calories
- Allulose: zero-calorie sugar produced from fructose

Food Medicine

Drink Baking

Dairy *HFF

Drink HFF

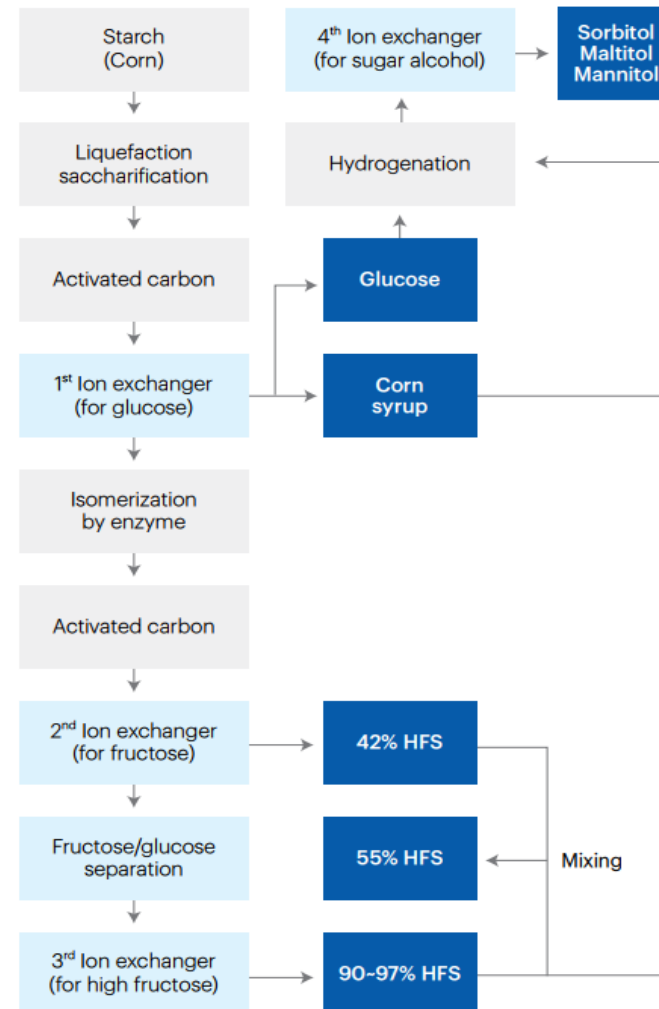
Candy/Gum

Drink Baking

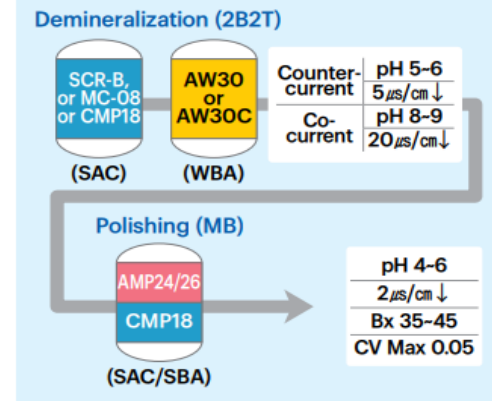
Starch sugar

Refining process

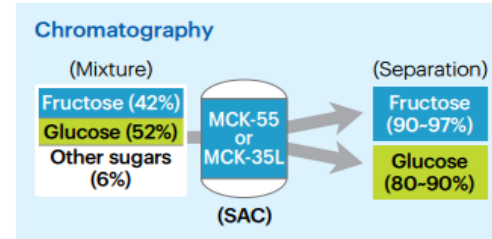
Typical starch sugar refining process and ion exchange resin recommendation



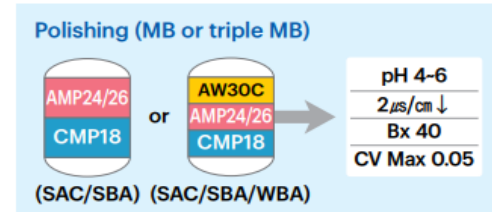
1st / 2nd / 4th Ion exchanger



F/G Separation



3rd Ion exchanger



Starch sugar

Product Recommendation (Demineralization)

TRILITE 삼양 트리아이트 Ion Exchange Resin	Type	Grade name	TEC (eq/ℓ)	Strong Base Ratio(%)	Particle distribution	Uniformity Coefficient	Features
WBA (Weak base anion resin)	Porous	AW30	1.6 ↑	10~15	0.425~1.180mm	1.6 ↓	<ul style="list-style-type: none"> Standard & basic performance Produces low-conductivity syrup
		AW30C	1.6 ↑	5 ↓			<ul style="list-style-type: none"> High capacity → High throughput Excellent resistance to high temp.(100℃ ↓) Very low strong base ratio → Low isomerization in high purity glucose or fructose process
		AW30M	1.6 ↑	10~15	0.500~0.700mm	1.1 ↓	<ul style="list-style-type: none"> Enhanced performance Uniform size → High efficiency, strength ↑ Recommended for packed bed & up-flow system

TRILITE 삼양 트리아이트 Ion Exchange Resin	Type	Grade name	TEC (eq/ℓ)	Particle distribution	Uniformity Coefficient	Features
SAC (Strong acid cation resin)	Porous	CMP18	1.8 ↑	(General type) 0.3~1.18mm (L-type) 0.425~1.2mm	1.6 ↓	<ul style="list-style-type: none"> Best performance for both deashing & polishing MB High resistance to organic fouling & osmotic shock → long life time
	Gel	SCR-B	2.0 ↑		1.4 ↓	
	Gel	MC-08	2.0 ↑	0.55~0.65mm	1.1 ↓	<ul style="list-style-type: none"> Standard & basic performance Economically produces low-conductivity syrup
SBA (Strong base anion resin)	Porous	AMP24	1.0 ↑	(General type) 0.3~1.2mm (L-type) 0.425~1.2mm	1.6 ↓	<ul style="list-style-type: none"> Uniform size → High efficiency, strength ↑ Recommended for packed bed & up-flow system
		AMP26	1.2 ↑		1.4 ↓	

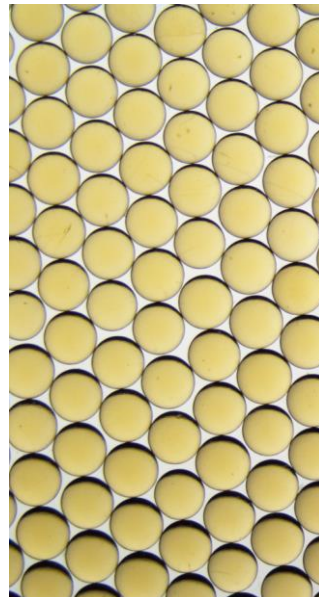
Starch sugar

Product Recommendation (Chromatographic Separation)

TRILITE MCK Series is a chromatographic separation resin with a uniform particle size distribution of fine particles. Major application is high purity sugar separation such as Fructose/Glucose separation and sugar recovery from molasses, acid recovery, etc.

The main principle of chromatographic separation is as follows.

- ① Ligand exchange chromatography : Separation using the interaction of specificity of several components.
Example) Fructose/Glucose separation using MCK-55 (Ca-form)
- ② Size exclusion chromatography : Separation according to the size of the molecular weight
Example) Separation of oligosaccharides using MCK-30 (Na-form)
- ③ Ion exclusion chromatography : Separation through repulsion between ions of the same sign
Example) Sucrose collection from molasses using MCK-22M (K-form)



Cross-linkage	Ionic form	Particle distribution			
		210~220 μ m	283~295 μ m	305~328 μ m	340~350 μ m
		●	●	●	●
5%	K			MCK-22M(305 μ m)	MCK-22K(346 μ m)
6%	Na	MCK-30(220 μ m)	MCK-30J(295 μ m)	MCK-30L(328 μ m)	MCK-30K(350 μ m)
	K	MCK-32(213 μ m)	MCK-32J(288 μ m)	MCK-32L(320 μ m)	MCK-32K(345 μ m)
	Ca	MCK-35(210 μ m)	MCK-35J(283 μ m)	MCK-35M(305 μ m) MCK-35L(315 μ m)	MCK-35K(340 μ m)
8%	Na	MCK-50(215 μ m)			
	K	MCK-52(215 μ m)			
	Ca	MCK-55(210 μ m)			

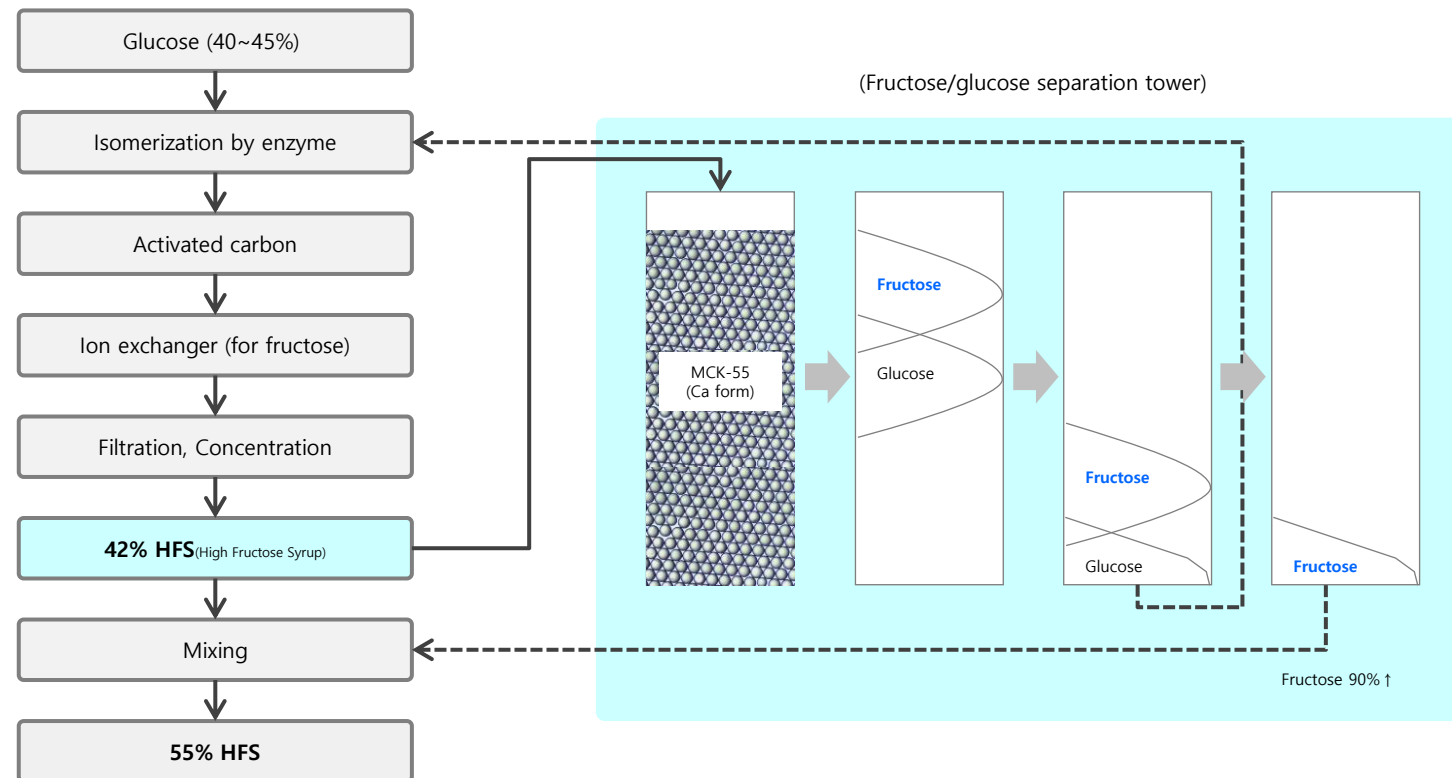
※ The data for particle size and crosslinkage is for reference.

Starch sugar

Fructose/glucose separation using MCK-55 / MCK35L / MCK-35M

Isomerization of fructose by the use of enzyme glucose which features a higher sweetness (1.7 times of sugar). The starch sugar is proved to be economically efficient and is substitutable to the use of sugar. However, the enzyme reaction is a reversible reaction. The isomerization is limited up to 42% (equal to 90% of sugar sweetness) due to reaction equilibrium. Hence, it is required to increase the glucose percentage up to 55%, with the IER technology.

A typical process to treat the fructose/glucose mixture with the Ca type ion exchange resin tower is described as below. As the mixture passes through the IER layer, glucose moves faster than fructose which has a higher affinity with Ca ion. In this principal, glucose elutes in before the fructose. The collection of glucose is sold as a finished product, and the fructose is put to the previous process to react with the isomerization enzyme.



Starch sugar

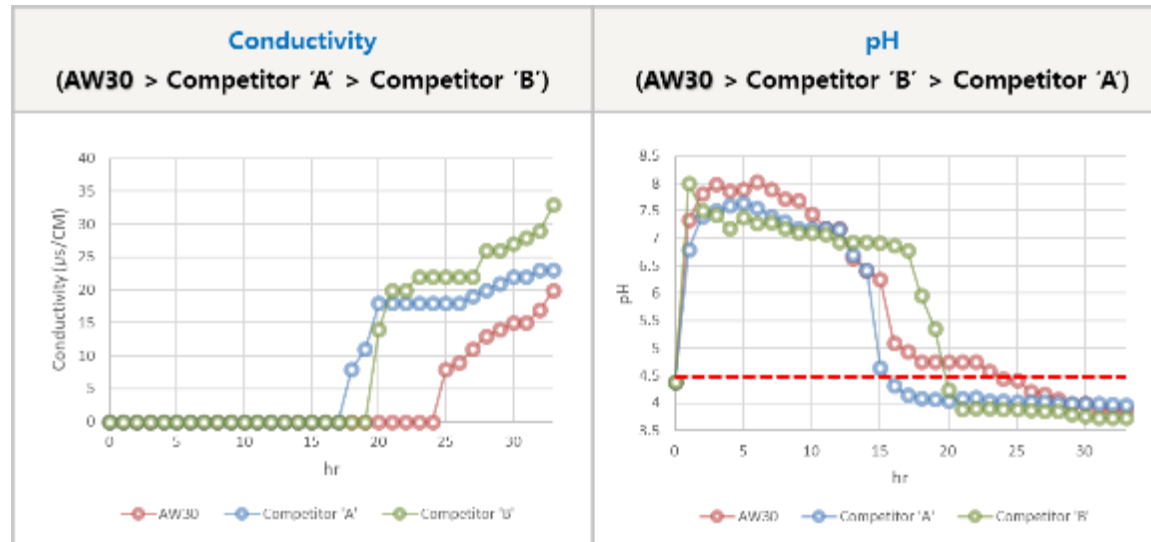
Comparative Experiment #1 : Refining Capacity of WBA Resins

1. Test Procedures and Conditions

- ① Regenerate SAC resin with HCl and WBA resins with NaOH
- ② Load each 100ml regenerated H⁺ cation and OH⁻ form anion resin into column
- ③ Set thermostatic bath with syrup at 40°C
(recommended to use column cover jacket for maintaining the syrup temp.)
- ④ Sweetening-on (SV 2.5)
- ⑤ Loading syrup (SV 2.5)
- ⑥ Hourly sampling hour the treated through fraction collector
→ measuring conductivity and pH

2. Test Results

Procedures / Conditions		1 st Column (SAC)	2 nd Column (WBA)		
Resin sample		TRILITE CMP18 (fixed)	① TRILITE AW30	② Competitor 'A'	③ Competitor 'B'
Pre-treatment (Regeneration)	Ionic form Conversion	Na ⁺ → H ⁺	FB → OH ⁻		
	Conditions	6% HCl, 10BV	8% NaOH, 10BV		
	Flowrate		SV 3		
	Sample vol.	100ml	each 100ml		
Syrup loading	Flowrate		SV 2.5 (250ml/hr)		
Syrup type / Inlet conditions	type		Maltose syrup		
	Brix		34.22		
	pH		4.38		
	Conductivity		340 μS/cm		
	Color		16 ICUMSA(IU)		
	Temp.		40°C		



TRILITE AW30 shows superior performance in conductivity and pH compared to competitor products 'A' and 'B'.

TRILITE AW30 runs longer time up to 20~50% based on ionic leakage starting point and the ending point of below pH 4.5.

Starch sugar

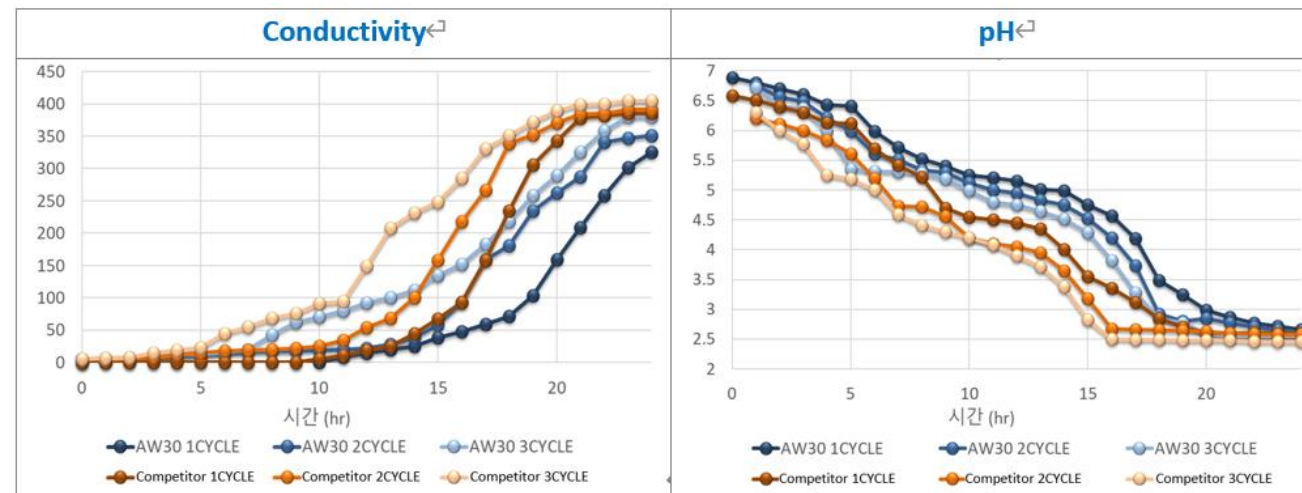
Comparative Experiment #2 : Refining Capacity of WBA Resins

1. Test Procedures and Conditions

- ① Load each 100ml regenerated OH- form anion resins into column
- ② Set thermostatic bath with syrup at 40°C (recommended to use column cover jacket for maintaining the syrup temp.)
- ③ Sweetening-on (SV 3) & Loading syrup (SV 3)
- ④ Hourly sampling the treated syrup through fraction collector during 3cycles(24hrs/cycle) → measuring conductivity and pH

Procedures	Item	Unit	Features
Syrup	type	-	After cation exchanger
	Source	-	Korean customer
	pH	-	2.23
	Conductivity	μs/cm	1,149
Feeding	Resin sample	ℓ	0.1
	Temp.	℃	40
	SV	-	3
	Time	hr	24
	No. of Cycle	-	3
NaOH Regeneration	First cycle	%	4%
		SV	2.7
		BV	2.7
	Second/Third cycle	%	4%
		SV	2.7
		BV	1.35

2. Test Results



TRILITE AW30 shows better conductivity and pH control performance

Starch sugar

Cross Reference Guide
(Demineralization)

Type			Dupont Amberlite	Lanxess Lewatit	Purolite
SAC	Gel	SCR-B	-	S1568	-
	Gel	MC-08			
	Porous	CMP18	FPC 88	S2568	C150S
WBA	Porous	AW30	FPA 66	S4428 / S4268 / S4468	A103S / A123S / A133S
		AW30M			
		AW30C	FPA 77	S4528	-
SBA	Porous	AMP24 / AMP26	FPA 22	S7468	A510S
SAC (Chromatography)	Gel	MCK series	CR99 series	MDS series	PCR series

Starch sugar

Cross Reference Guide (Chromatographic Separation)

Particle Size (μm)	Ionic form	TRILITE 삼양 트라이트 Ion Exchange Resin	DUPONT	LANXESS	Purolite	Applications
340-350	Ca	MCK-35K (6%)		MDS 1368 Ca/350	PCR652Ca	Fructose/Glucose HFCS
	K	MCK-22K (5%)	CR99 K/350	MDS 1268 K/350		Beet sugar/Molasses
		MCK-32K (6%)				High-purity dextrose
	Na	MCK-30K (6%)	CR99 Na/310	MDS 1368 Na/350	PCR651Na PCR450Na	Lactose removal/Glucose recovery Oligosaccharides
310-320	Ca	MCK-35L (6%)	CR99 Ca/320	MDS 1368 Ca/320		Fructose/Glucose HFCS
	K	MCK-32L (6%)	CR99 K/320	MDS 1368 K/320		Beet sugar/Molasses
						High-purity dextrose
	Na	MCK-30L (6%)	CR99 Na/320	MDS 1368 Na/320		Lactose removal/Glucose recovery Oligosaccharides
300-310	Ca	MCK-35M (6%)	CR99 Ca/310	MDS 1268 Ca/310		Fructose/Glucose HFCS
	K	MCK-22M (5%)	CR99 K/310	MDS 1268 K/310		Beet sugar/Molasses
						High-purity dextrose
280-300	Ca	MCK-35J (6%)	CR99 Ca/280	MDS 1268 Ca/290 MDS 1368 Ca/290	PCR833Ca	Fructose/Glucose HFCS
	K	MCK-32J (6%)	CR99 K/280	MDS 1268 K/290	PCR145K	Beet sugar/Molasses High-purity dextrose
	Na	MCK-30J (6%)			PCR833	Lactose removal/Glucose recovery
						Oligosaccharides
210-220	Ca	MCK-35 (6%)	CR99 Ca/220	MDS 1468 Ca/220	PCR732Ca PCR632Ca PCR631Ca	Fructose/Glucose
		MCK-55 (8%)			PCR855Ca	HFCS
	K	MCK-32 (6%)	CR99 K/220			molasses
		MCK-52 (8%)				polyols/sugar alcohols

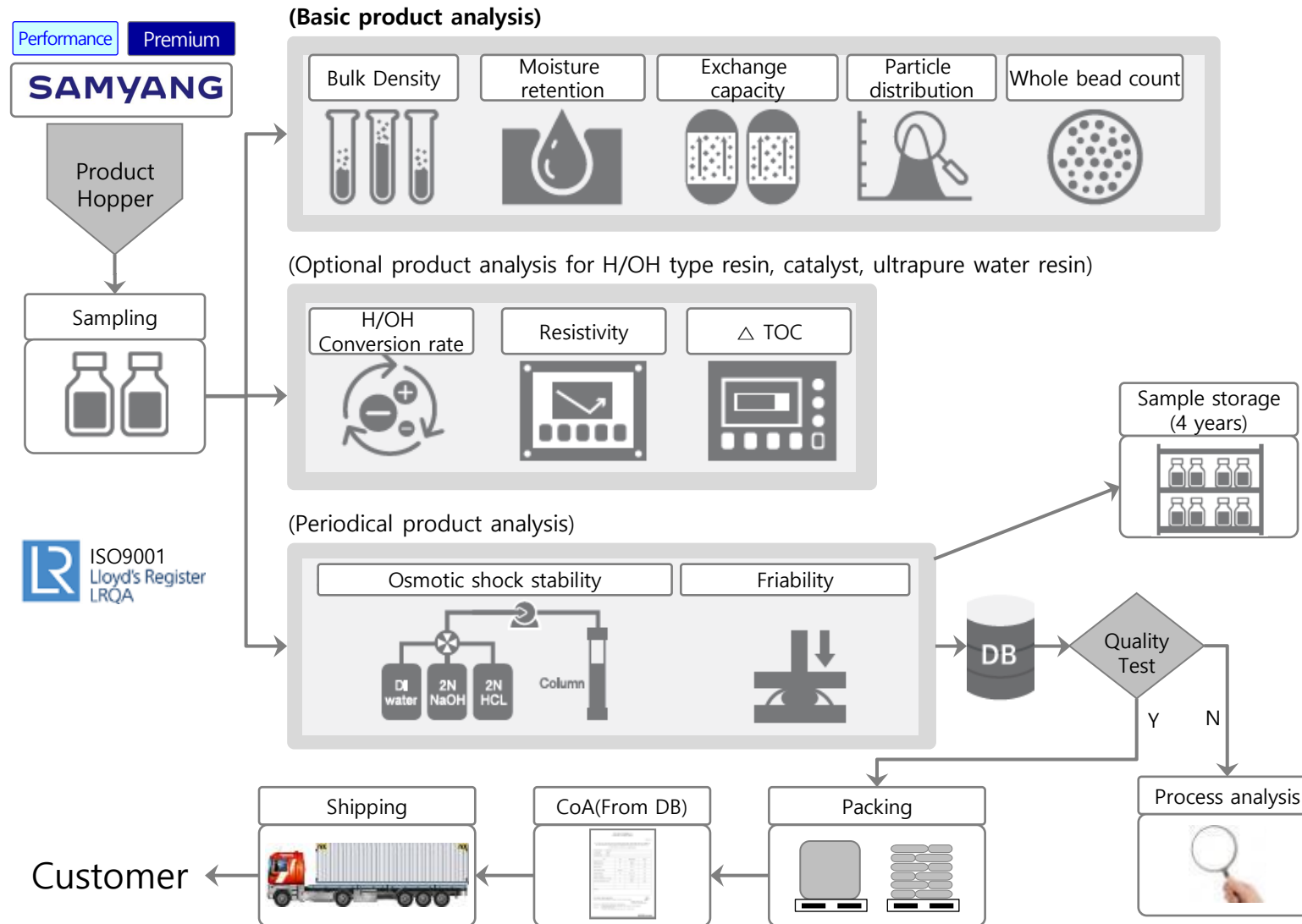
Starch sugar Decolorization

Major References

Company	Country	Years Delivered	I.U. (in)	Decolorization Process	I.U. (out)	TRILITE grades applied	Resin replacement cycle (months, Avg.)
SAMYANG	Korea	~ now	800~900	AC → Styrene IER	100~200	KA-11	12~13
	Korea	~ now	800~1000	AC → Styrene IER	100~300	KA-11	10~11
TS	Korea	~ now	800~900	AC → Styrene IER	100~200	KA-11	12
 Andalan Furnindo	Indonesia	2020~2021	300~500	Acryl/Styrene IER	150~300	AMP14L, ASP10, TR70	12
 Medan Sugar	Indonesia	2021~	300~500	Acryl/Styrene IER	150~300	AMP14L, ASP10	12
 Angels products	Indonesia	2005~2009	800~1250	Styrene IER only	200~400	AMP14L, TR70	8
 Jawa-Manis	Indonesia	2010	900	Acryl/Styrene IER	300~400	AMP14L	10~13
	Indonesia	2009~2010	1000	Acryl/Styrene IER	150~200	ASR16L (≡AMP14L)	11~12
 BOURBON	Vietnam	2005 ~ 2010	900~1000	Styrene IER only	300~400	AMP14	7~9

※ The above includes both past and current sales records.

Product Analysis and Quality control



Quality assurance system

We carry out strict quality control and conduct continuous audits from reputable quality organizations, ISO9001, Halal Certification for export to Islamic countries.

ISO9001 Certificate



Lloyd's Register

Current issue date: 1 April 2021
Expiry date: 31 March 2024
Certificate identity number: ISO 9001 - 0067930

Certificate of Approval

This is to certify that the Management System of:

Samyang Corporation - Chemicals Group Ion Exchange Resin

285, Jangsangpo-ro, Nam-gu, Ulsan 44778, Republic of Korea

has been approved by Lloyd's Register to the following standards:

ISO 9001:2015

Approval number(s): ISO 9001 - 0067930

This certificate is valid only in association with the certificate schedule bearing the same number on which the locations applicable to this approval are listed.

The scope of this approval is applicable to:

Manufacture of ion exchange resin.

Il-Hyoung Lee
Korea Operations Manager
Issued by: Lloyd's Register Quality Assurance (Korea) Ltd.
for and on behalf of: Lloyd's Register Quality Assurance Limited

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HALAL Certificate



(LPPOM-MUI)

MAJELIS ULAMA INDONESIA
THE INDONESIAN COUNCIL OF ULAMA
KETetapan HALAL
اثبات الحلال
HALAL DECREE

No : LPPOM-00170093240119

إلى مجلس العلماء الإندونيسي - بعد الإختبار والفتوى - بالاعتماد على فحص المستندات والإجراءات من Majelis Ulama Indonesia (MUI), setelah melakukan pengujian dan pembahasan berdasarkan pemerintahan yang telah dilakukan oleh (The Indonesian Council of Ulama, after examining, and discussing the audit result conducted by):

LEMBAGA PENGKAJIAN PANGAN, OBAT-OBATAN DAN KOSMETIKA MAJELIS ULAMA INDONESIA (LPPOM MUI)

قررت بأن المنتجات الغذائية أو الأدوية أو مستحضرات التجميل التي تحمل اسمها أدناه حلال حسب متطلبات الشريعة الإسلامية.

Menetapkan bahwa produk yang disebutkan namanya di bawah ini adalah HALAL menurut Syari'at Islam. (declare that the product stated below as HALAL according to the Islamic Law.)

Jenis Produk : AS ATTACHED : نوع المنتجات
Nama Produk : AS ATTACHED : اسم المنتجات
Name of Product : SAMYANG CORPORATION ULSAN PLANT 1 : اسم الشركة
Name of Company : 285, JANGSANGPO-RO, NAM-GU, ULSAN, REPUBLIC OF KOREA : عنوان الشركة
Company's Address : 285, JANGSANGPO-RO, NAM-GU, ULSAN, REPUBLIC OF KOREA

Dikeluarkan di Jakarta pada : SEPTEMBER 08, 2021 : أصدرت هذه الشهادة بـ
Issued in Jakarta on : SEPTEMBER 07, 2025 : وصالة إلى
Valid until :
مدادمت تركيبة المواد الغذائية وصلة لثابتها ونظام ضمان الحلال (HAS 23000) مطابقة على شكل ذاتي قوة اسم الإثبات بالهلال
as long as the ingredients, production process, and the implementation of Halal Assurance System (HAS 23000) are in accordance to the decree of Fatwa Commission of the Indonesian Council of Ulama.
وحسب متطلبات التجميل بالأدوية

KAN
Korea Operations Manager
Issued by: Lloyd's Register Quality Assurance (Korea) Ltd.
for and on behalf of: Lloyd's Register Quality Assurance Limited

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LEMBAGA PENGKAJIAN PANGAN OBAT-OBATAN DAN KOSMETIKA MAJELIS ULAMA INDONESIA (LPPOM MUI)
THE ASSESSMENT INSTITUTE FOR FOOD, DRUGS, AND COSMETICS THE INDONESIAN COUNCIL OF ULAMA (LPPOM MUI)

HALAL ASSURANCE SYSTEM STATUS
保证哈拉系统的状态

No. HSA230002021019

إشهاد بـ
إشهاد بـ

Based on the on-site assessment and implementation of Halal Assurance System, The Assessment Institute for Food, Drugs and Cosmetics - The Indonesian Council of Ulama (LPPOM MUI) states that:

بناءً على التقييم الميداني وتنفيذ نظام ضمان الحلال (HAS 23000) مطابقة على شكل ذاتي قوة اسم الإثبات بالهلال

SAMYANG CORPORATION ULSAN PLANT 1

Name of Company : 285, JANGSANGPO-RO, NAM-GU, ULSAN, REPUBLIC OF KOREA
Address : 285, JANGSANGPO-RO, NAM-GU, ULSAN, REPUBLIC OF KOREA

Halal Assurance System Status: Excellent

Has been implementing Halal Assurance System

已经实施哈拉系统

SANGAT BAIK / EXCELLENT

Standar sampel dengan / 1000 unit : 90/100

SEPTEMBER 07, 2025

Issued in Jakarta on behalf of Majelis Ulama Indonesia (MUI) and LPPOM MUI



삼양 워터솔루션의 50년 축적된 기술을 인공지능 ChatGPT를 이용하여 담았습니다.
삼양트리라이트 홈페이지에서 "Trigent"를 경험해 보세요!