

Hi & Fi Asia-China 2019

Orachorn M.

Food Industry, KMITL

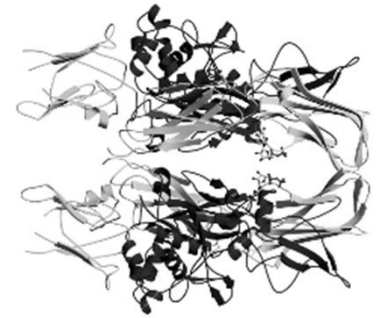
Presentation outline

- Factory visiting → TDS/DONGSHENG Biotech
- Transglutaminase (TG)
- Health ingredient and Food ingredient Asia 2019
- Biotechnology area
- Commercial products



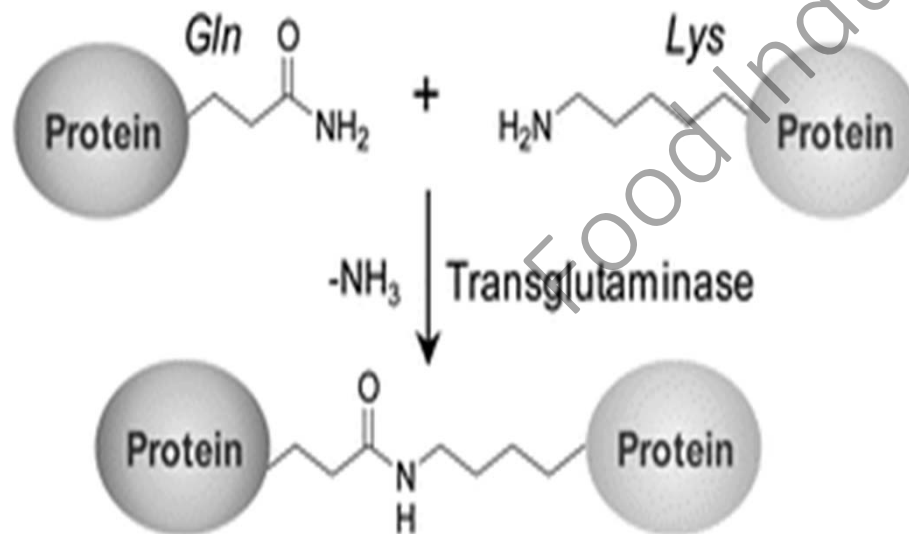
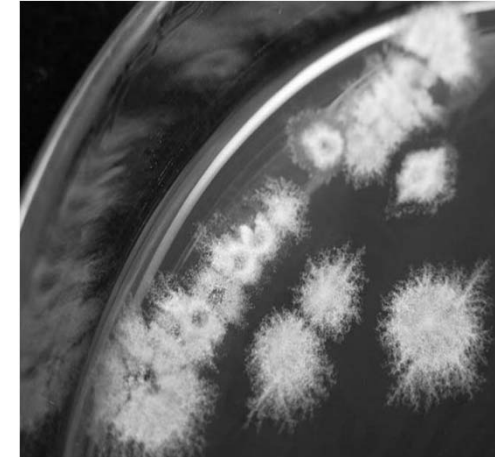
Dongsheng Bio-Tech Co., Ltd.

- 1992 → Chondroitin Sulfate, Export to USA
- 2007 → transglutaminase (TG) → 5,000 tons/year



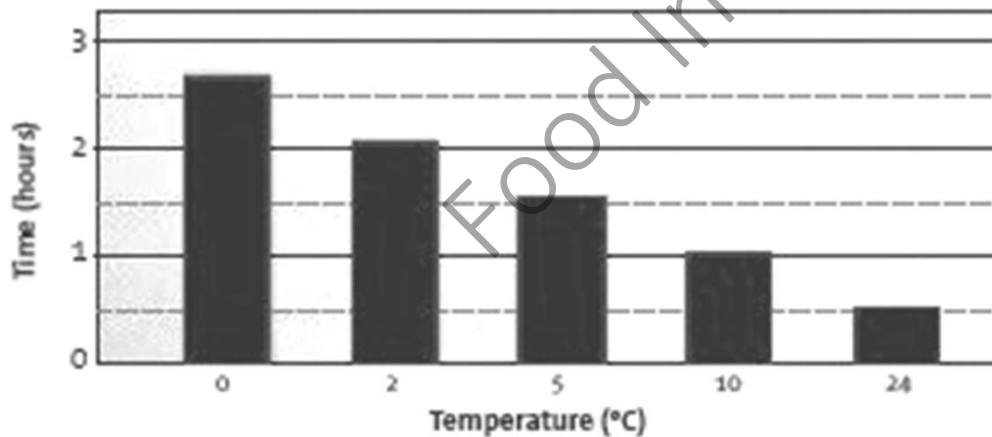
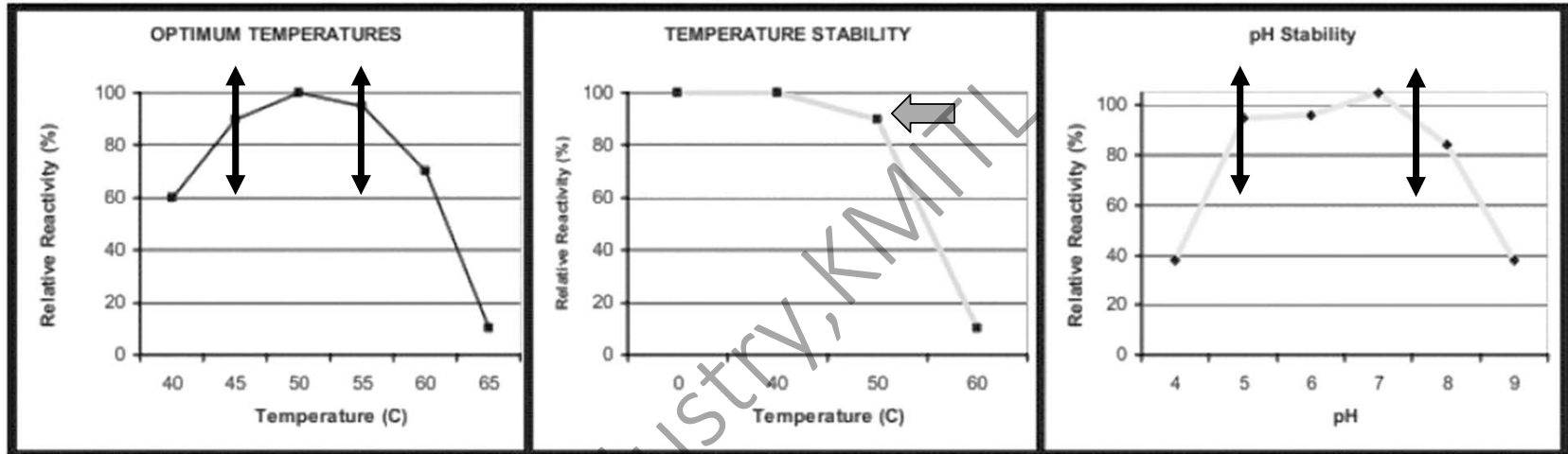
Transglutaminase (TG)

- Industrial Transglutaminase is of microbial origin isolated from bacteria *streptomyces mobaraensis*
- TG is produced by fermentation of specially designed non-GMO bacteria.



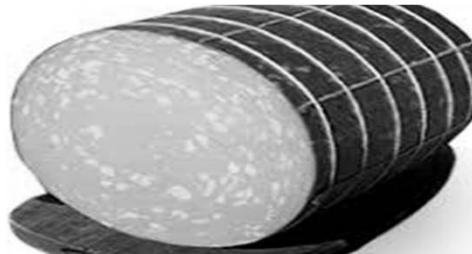
- TG cross-links most of the proteins with lysine (lys) and glutamine (gln) by covalent bonds.
- TG improves physical properties of protein in food: structure, texture and hardness.

Transglutaminase – Stability and Reactivity



- The reaction time of mTG is directly related to many variables depend on dose-rate, pH, temperature and concentration of substrate.
- It can optimize the equation getting the best possible technical results.

Meat processing applications



Emulsified sausages

Meat products that are emulsified with fat and cooked in a casing (e.g. frankfurters, hot dogs, etc.)



Fresh and Cooked, injected meat

Meat products that are injected with brines and sold fresh or cooked (e.g. marinates, cooked ham and shoulders, roasted turkey, chicken breast, bacon etc.)



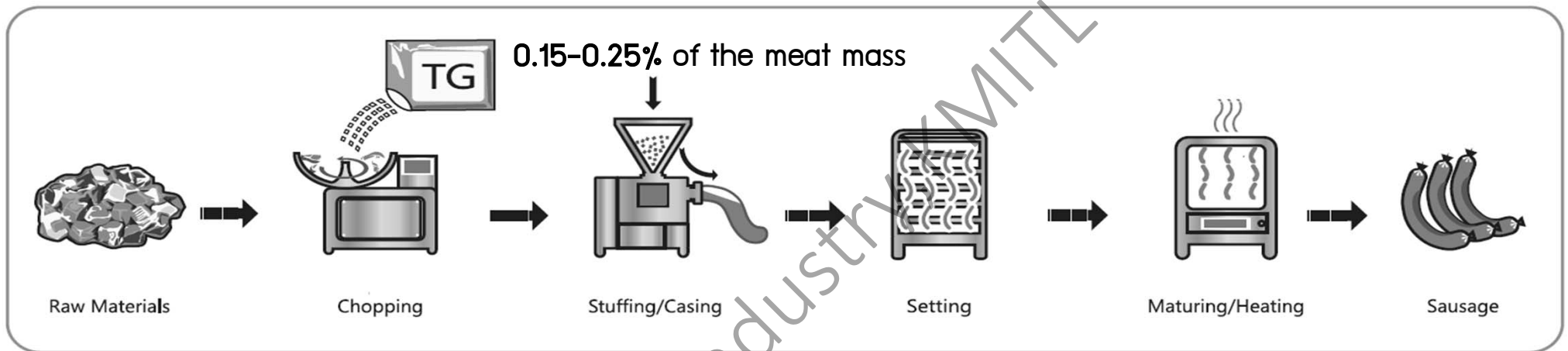
Fresh processed meat

Products made from fresh ground meat or cuts (i.g. meat balls, burgers, fresh sausages, raw chicken breasts and medallions, etc.)



Dry fermented sausages

Meat products that are dried and fermented (e.g. salami, pepperonis and semi-dried sausages, etc.)



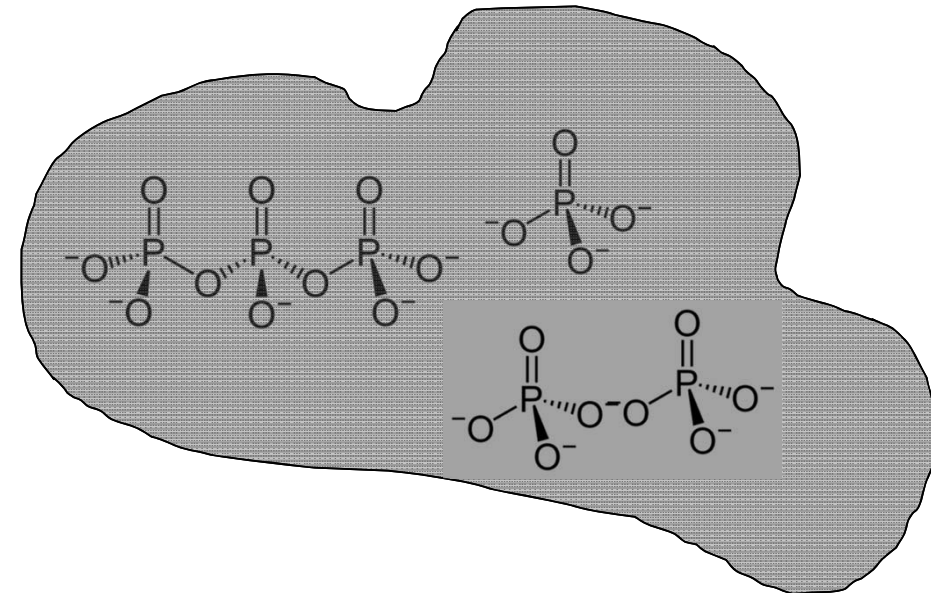
- ✓ Innovative clean label
- ✓ Free from allergens
- ✓ Improves the water holding capacity
- ✓ Slice ability



Meat processing application



- Phosphate Replacement in meat products
- Injected meat : cooked hams, shoulders, bacon etc.
- 0.2% to 0.6% of the final product weight



Surimi processing applications



Restructure Fish

Create value-added fish products from trimmings (through cold bonding),



Value Added

Reduces the need for the addition of other proteins to Surimi/Fish balls improving the elasticity and firmness of the product



Fish Balls

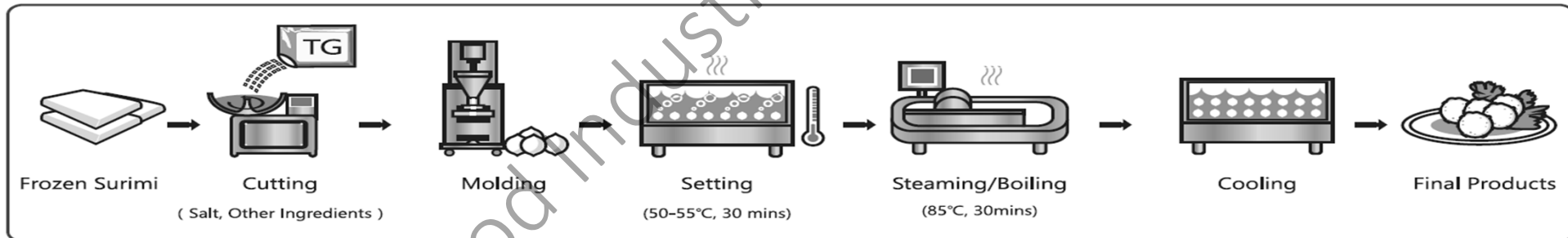
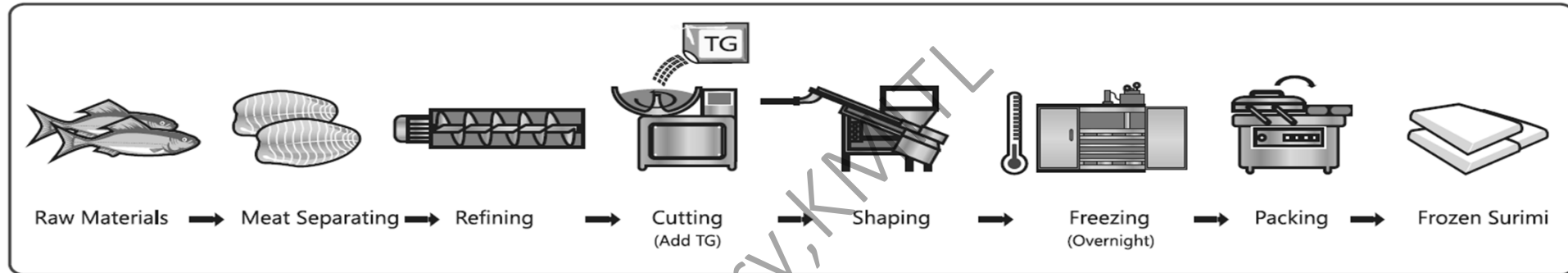
Improves texture and elasticity.
Increase gel strength.



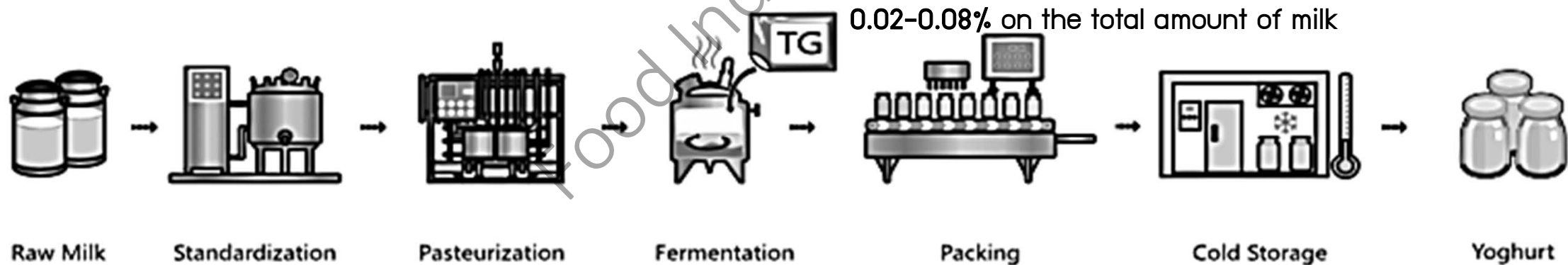
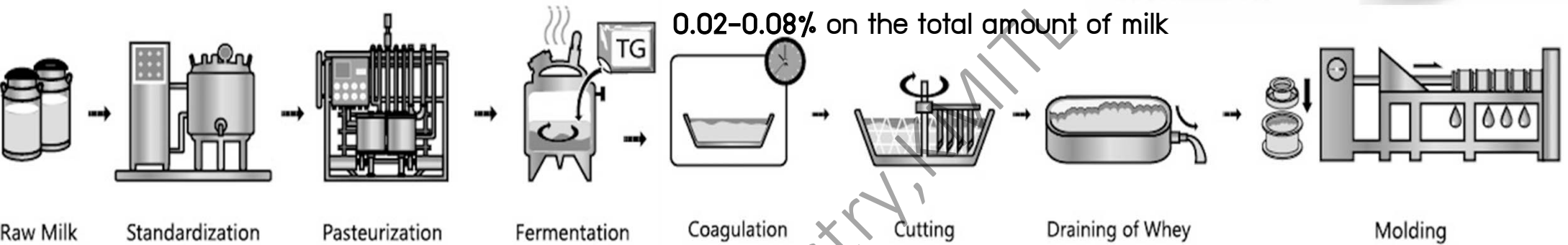
Surimi

In low quality surimi products, Transglutaminase enhances the setting of the gel

Surimi processing applications



Dairy applications



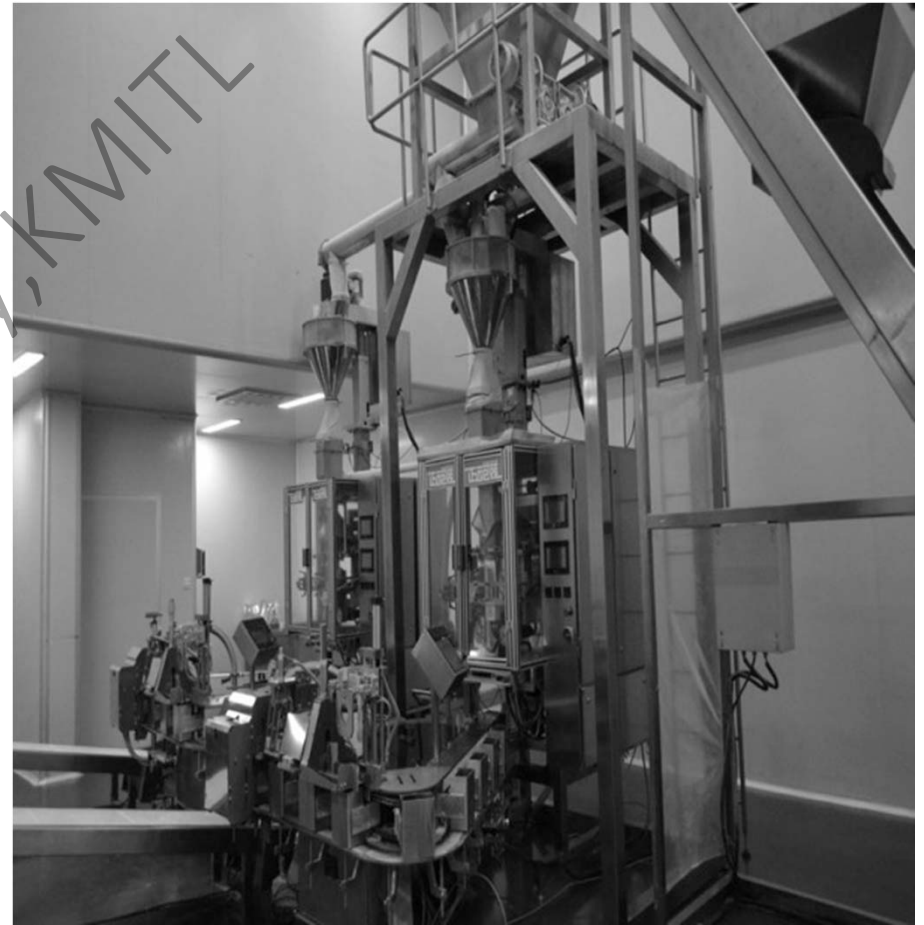
Fermentation System



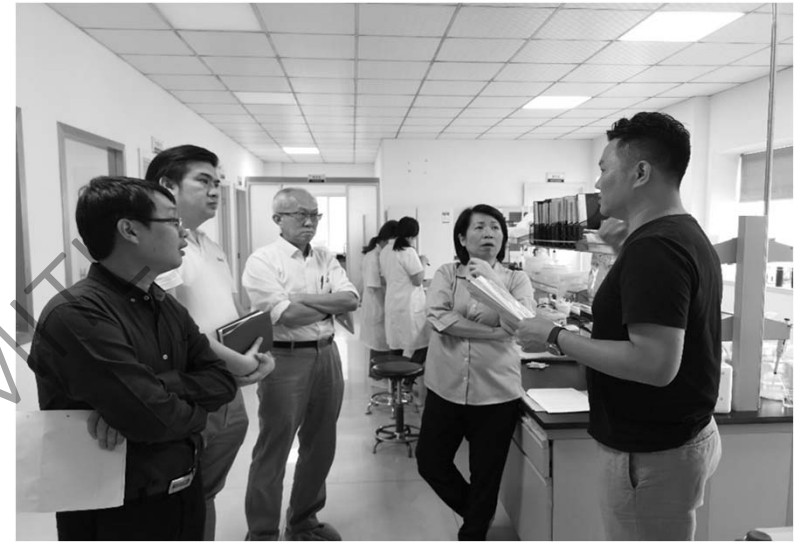
Drying & Leading Filter Machines



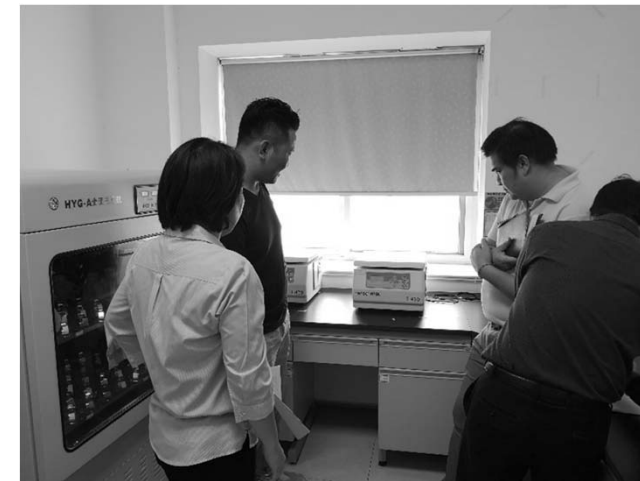
Manual & Automatic Packaging System



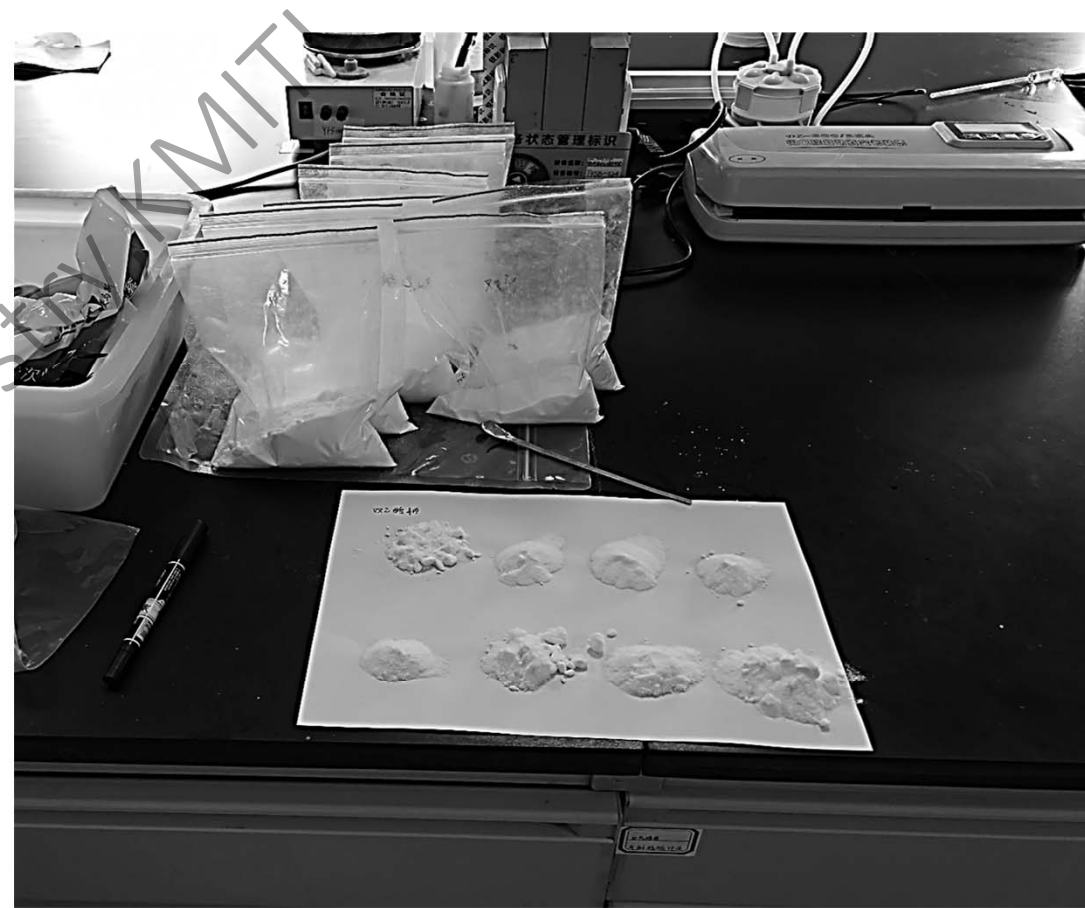
Quality control for enzyme activity



Quality control for enzyme activity



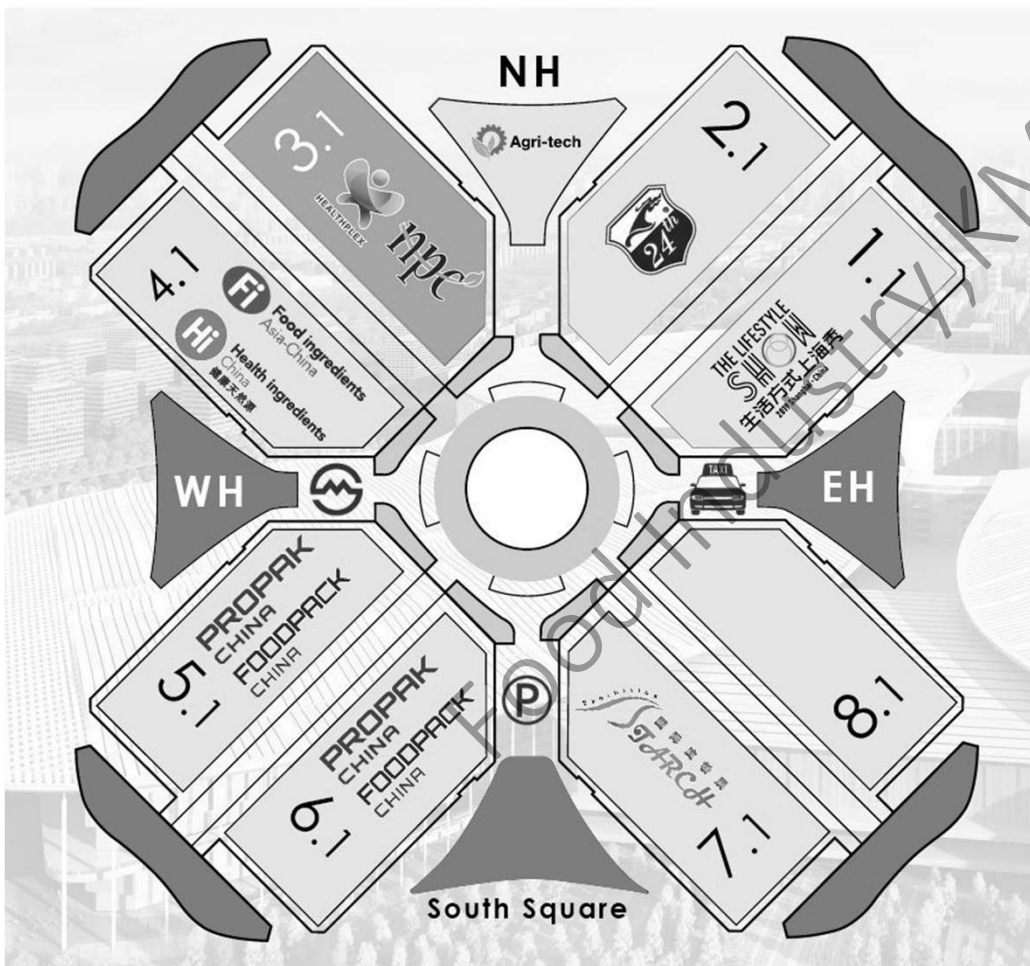
Quality control for enzyme activity



Quality control for enzyme activity



Health ingredient and Food ingredient Asia 2019



Hi Health ingredients
China
健康天然源

Fi Food ingredients
Asia-China



Health ingredient and Food ingredient Asia 2019

- Probiotic strain
- Culture and Fermentation Starters
- Probiotic products
- Prebiotic
- Microbial products

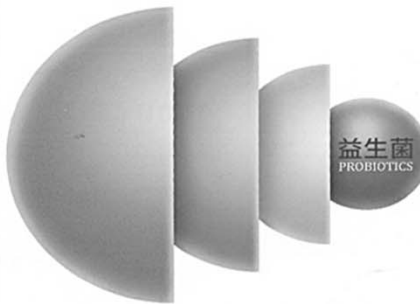


Probiotic strain

Probiotics 3.0 Technology Revolution

1.0 Era

Fermentation with high cell density technology



The first layer	The Second layer	The third layer
Active small molecule protects the cytoplasm	Low Molecular polymer protects the cell membrane	High polymer protects the cell wall

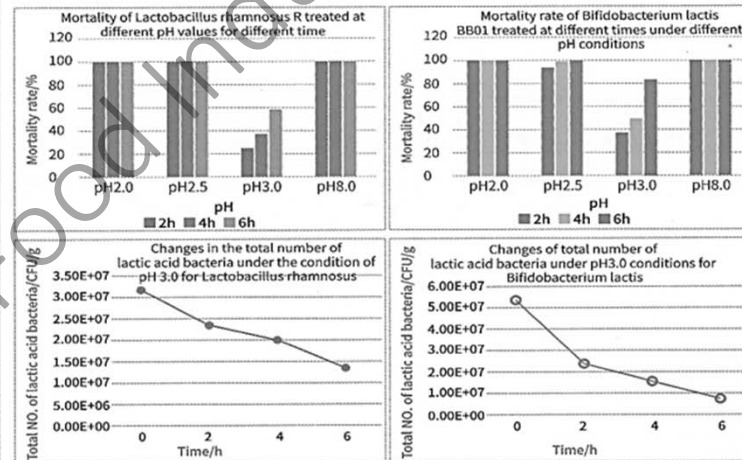
Triple-embedded protection technology ensures active preservation of probiotics during preparation and storage

2.0 Era

Viable bacteria stable technology in application

- Strictly control the humidity of the production environment to reduce the impact of environmental humidity on product quality.
- According to the characteristics of different strains, different auxiliary materials are used to ensure the number of live bacteria in the shelf life of the end products.
- Oppose the one-sided promotion of the amount of factory added, emphasizing the preservation of the number of live bacteria in the whole shelf life of the product.

Stress Resistance Data of Typical Strains



Remarks: Pepsin 3g/L was added to the artificial gastric juice when tested under the conditions of pH 2.0, 2.5, 3.0; trypsin(1g/L) and pig bile salt(1g/L) were added to the simulated small intestinal juice when tested under the condition of pH 8.0.

3.0 Era

Intestinal flora gene detection technology and personalized probiotic dietary intervention program

We advocate avoiding extensive probiotic intake patterns and promote a causal relationship between end products and changes in gut flora, ultimately achieving the goal of probiotics accurately interfering with gut microbiota. To this end, we can provide the following services for the brands we serve:



01

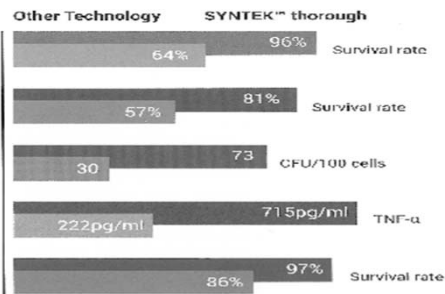
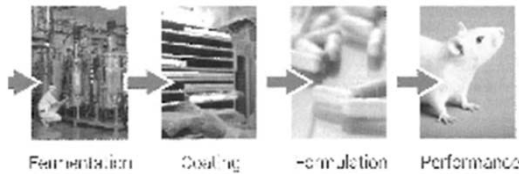
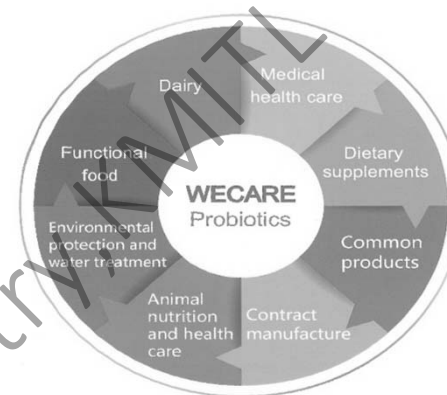
Using the second-generation gene sequencing technology to accurately analyze the accuracy of the gut microbiogens to the genus and strains, and fully evaluate the impact of brand end products on intestinal flora;



02

According to the intestinal micro-ecological big data model we have mastered, combined with intestinal metagenomic analysis data, we provide personalized probiotic diets for brand consumers.

Single Strain Probiotics



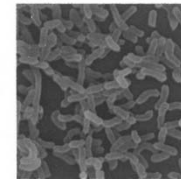
功能性益生菌系列
益生菌 Probi-C

功能诉求
有助于增加肠内好菌
改变细菌丛益菌生态
提升消化酶机能
维持肠道健康

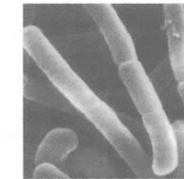
适用对象
消化不良或营养吸收不佳者
肠胃蠕动不佳排便不聚者
喜食大鱼大肉及外食者
肠癌症患者

功能性试验
临床研究:
增加肠道好菌的数量

原料规格
1000亿 CFU/g



植物乳杆菌550
Lactobacillus plantarum 550



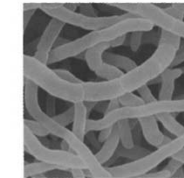
植物乳杆菌360
Lactobacillus plantarum 360



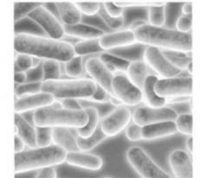
植物乳杆菌220
Lactobacillus plantarum 220



植物乳杆菌210
Lactobacillus plantarum 210



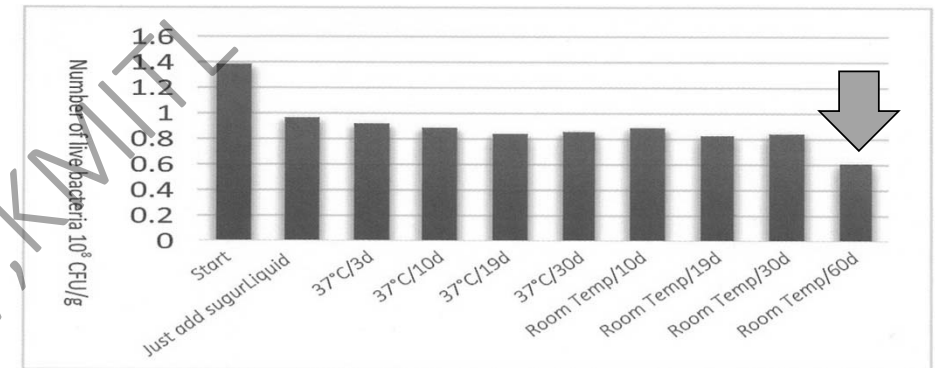
鼠李糖乳杆菌S24
Lactobacillus rhamnosus S24



干酪乳杆菌10640
Lactobacillus casei 10640

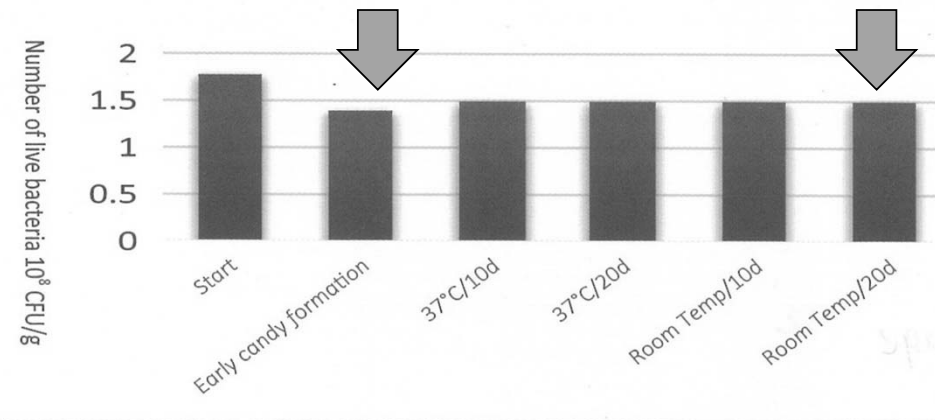
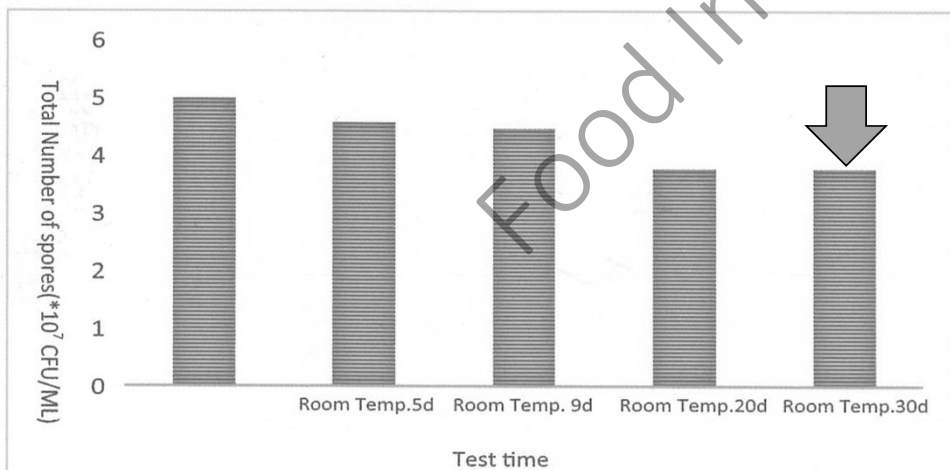
Heat-resistant probiotic strain

- *Bacillus Coagulans* BC01
- 100% survival in digestive system
- Survival at 50–90°C
- 5% survival rate at 160°C, 2 hr.



The survival rate of *Bacillus coagulans* BC01 applied to the soft candy

3. Applied to room temperature yogurt



Survival rate of *Bacillus coagulans* BC01 applied to hard candy

Muti-probiotic strain



ITEM	TYPE	FUNCTION	STRAINS
1	BEST FOR U®SEK01	Constipation diarrhea two-way adjustment	Bifidobacterium lactis, Bacillus coagulans, Lactobacillus plantarum, Streptococcus thermophilus
2	BEST FOR U®SEK02	Soothing allergies	Lactobacillus reuteri, Lactobacillus rhamnosus, Bifidobacterium lactis, Bifidobacterium breve, bacillus coagulans
3	BEST FOR U®SEK03	Inhibition of Helicobacter pylori	Lactobacillus acidophilus, Lactobacillus bulgarricus, Lactobacillus reuteri, Bacillus coagulans, Lactobacillus casei
4	BEST FOR U®SEK04	Improve immunity	Lactobacillus rhamnosus, Lactobacillus reuteri, Bifidobacterium longum susp. longum, Bifidobacterium longum susp. infants, Bifidobacterium lactis
5	BEST FOR U®SEK05	Female private care	Lactobacillus acidophilus, Lactobacillus rhamnosus, Lactobacillus plantarum, Lactobacillus casei
6	BEST FOR U®SEK06	Oral care	Lactobacillus paracasei, Bifidobacterium lactis, Bifidobacterium longum susp. longum, Lactobacillus rhamnosus, Streptococcus thermophilus
7	BEST FOR U®SEK07	Comprehensive health care	Bacillus coagulans, Bifidobacterium lactis, Lactobacillus acidophilus, Lactobacillus reuteri, Streptococcus thermophilus

Multi-Probiotic strain

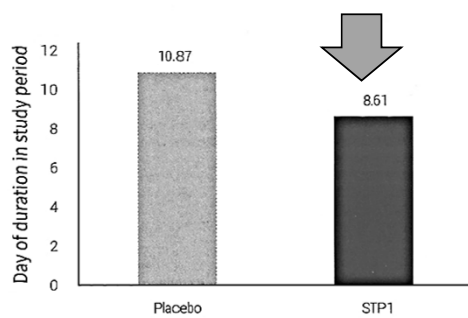


Probiotic granule
for Immune health

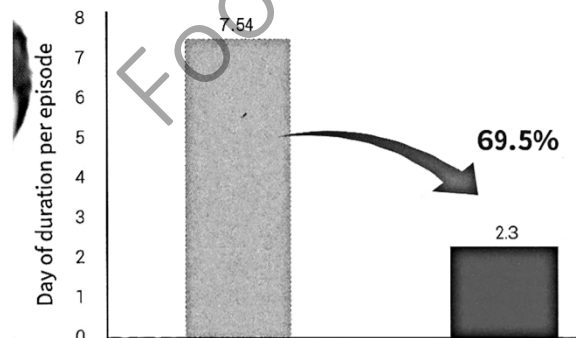
STP3 probiotic
for liver health



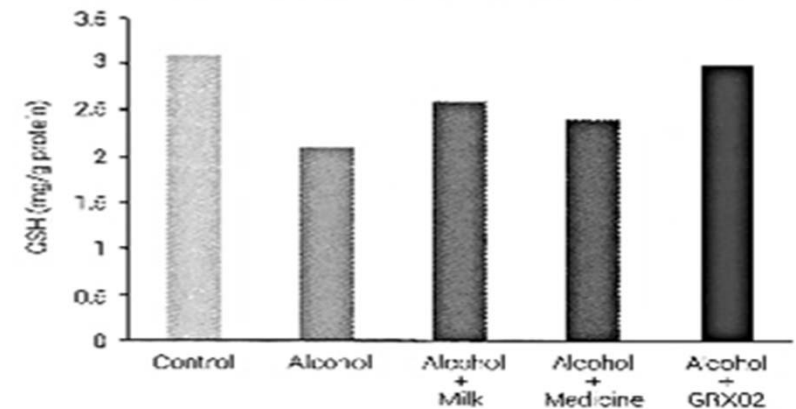
The Period of Common Cold Infection



The Frequency of Cough



Effectively Enhanced GSH Content



Fermentation starter

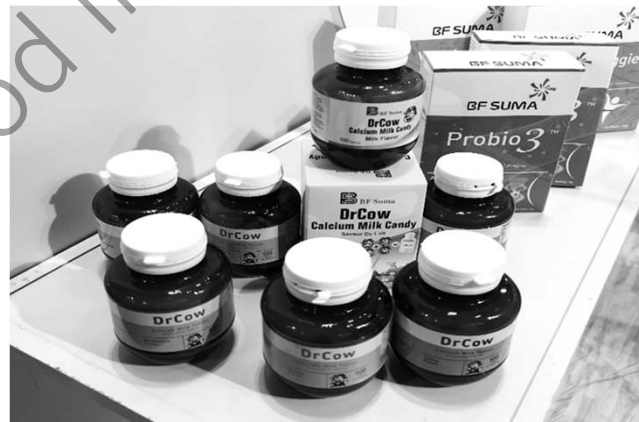


- *Streptococcus thermophilus*
- *Lactobacillus bulgaricus*
- *Lactobacillus acidophilus*
- *Bifidobacterium longum*



Probiotic supplement products

➤ For baby and kids

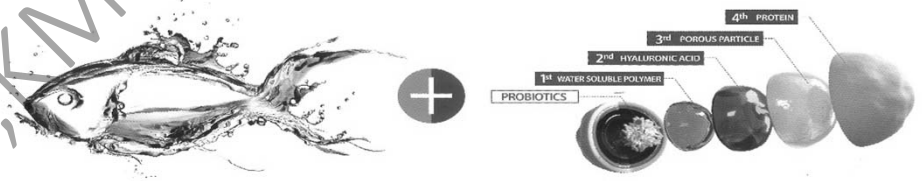


Probiotic supplement products



Probiotic products for beauty

Intestinal health and skin health together!
IBL Collagen Probiotics



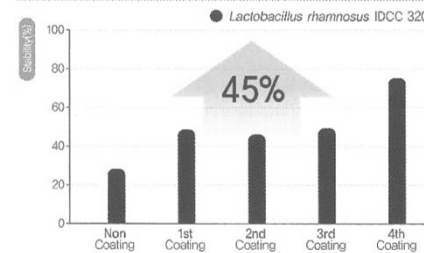
- ✓ Fish collagen peptide 1,000mg contain
- ✓ ILDONG Quadruple coated Probiotics 10 Billion Input



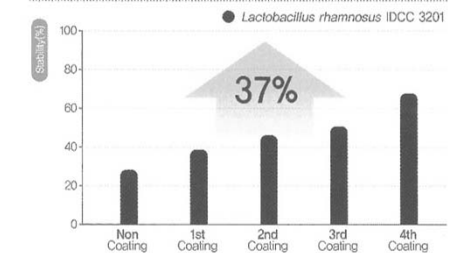
Stability Test

Improved stability in acidic and high temperature condition

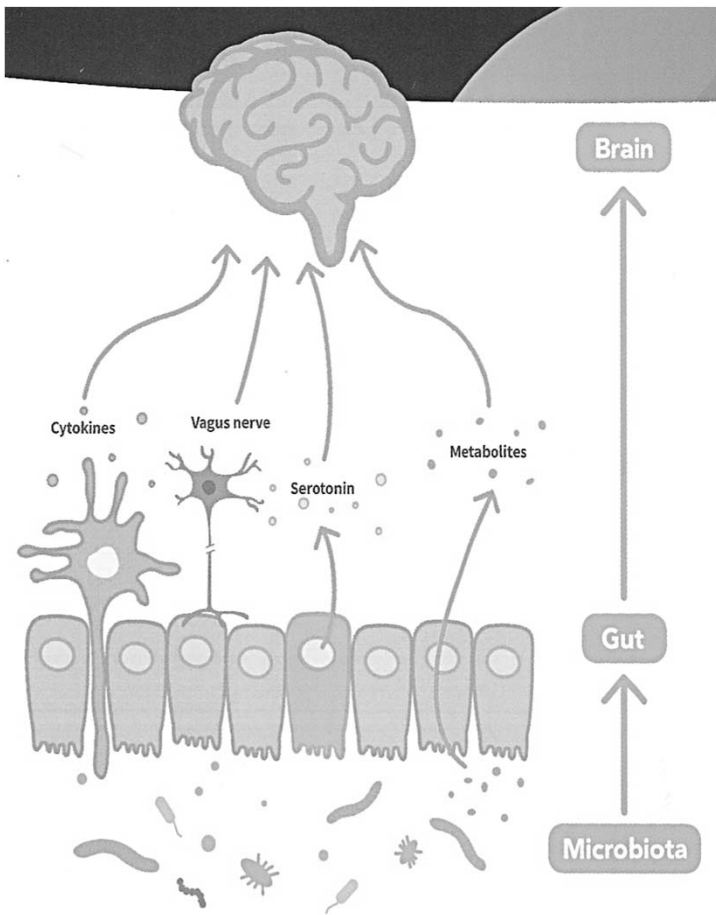
○ pH 2.3, 2 hrs



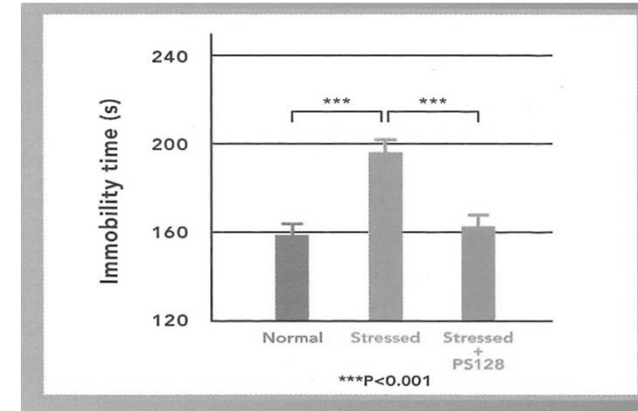
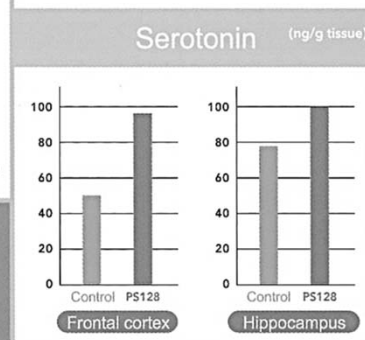
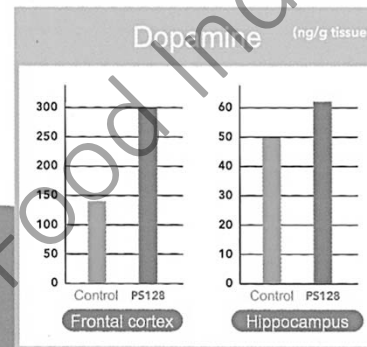
○ Hot-air drying(50°C), 3 hrs



Probiotic product for improve brain functions



- Boost and regulate Dopamine and Serotonin
- *Lactobacillus plantarum* PS128



Natural and vegan

Halal certified

21 patents granted worldwide (EU, JP, KR, CN, USA & TW)

FDA approved

Safe for adults and children (4 year of post-market study and no antibiotic resistance known EFSA)

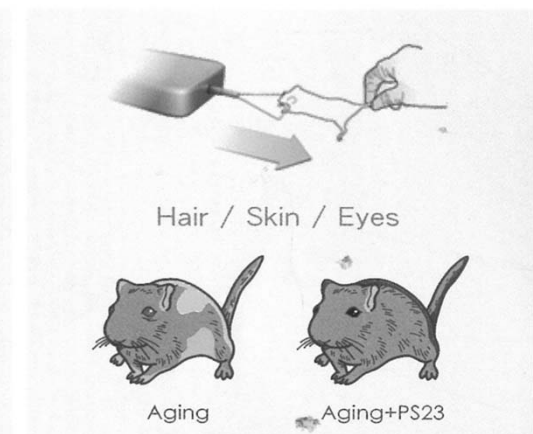
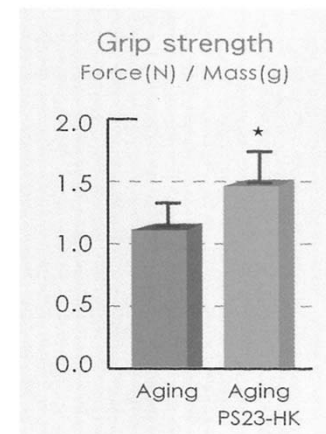
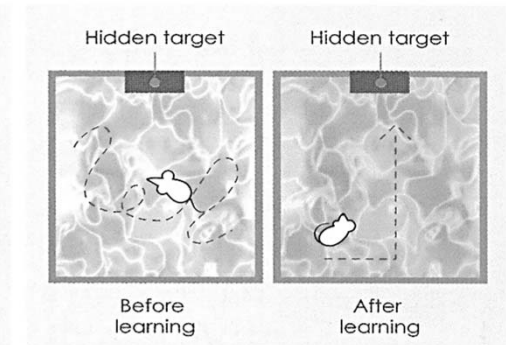
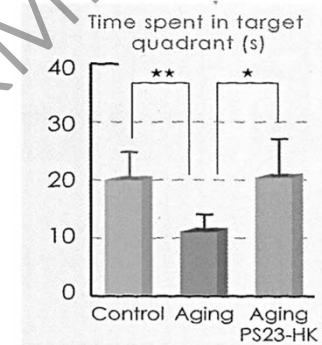
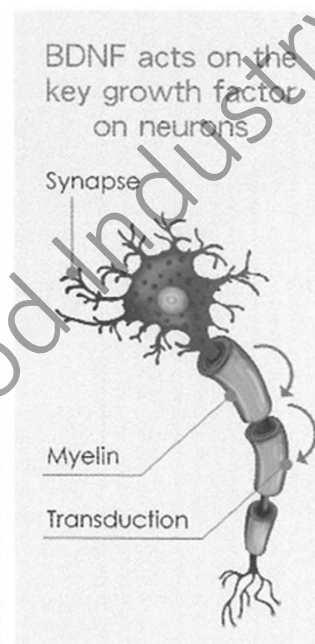
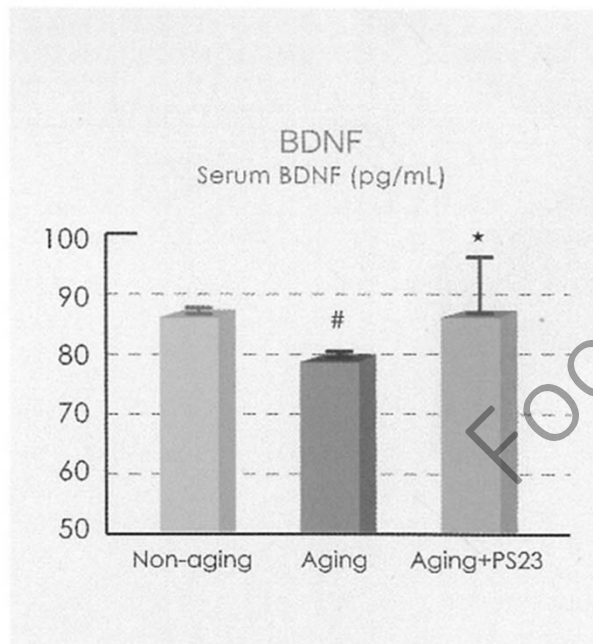
14 common allergens free (EU FIC Annex II)

GMP, ISO 22000, FSSC 22000

Made in Italy

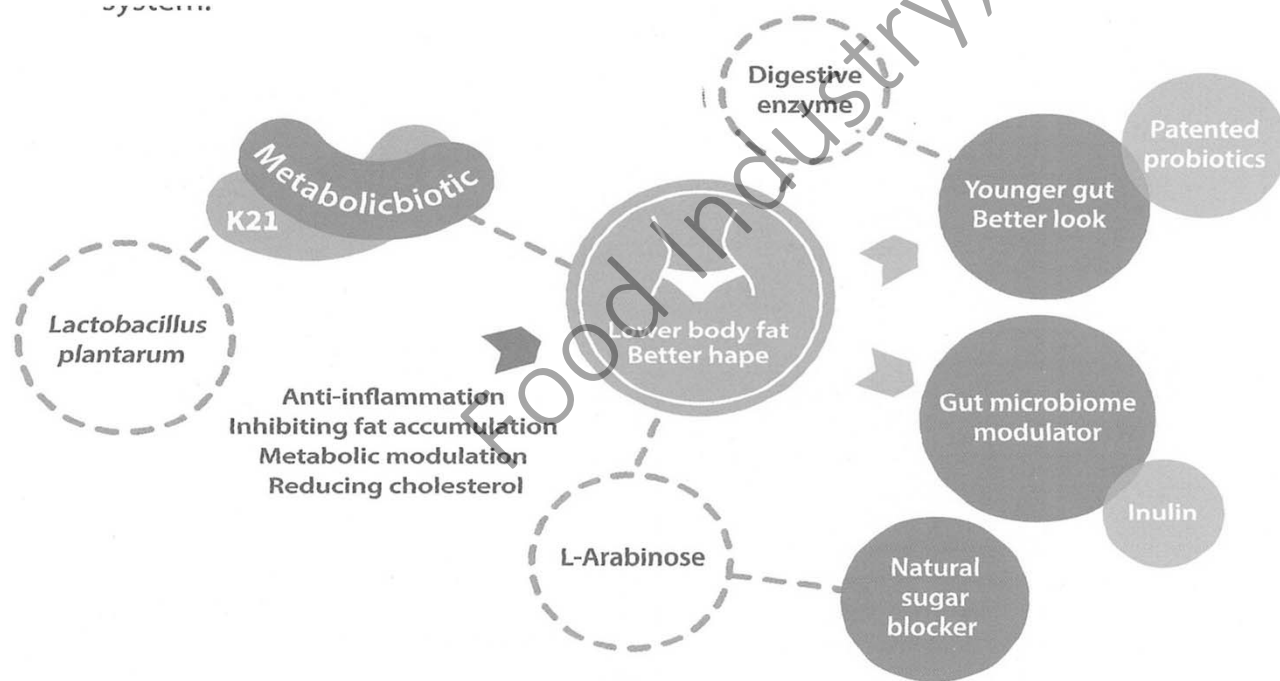
Probiotic product for improve brain functions

- Increase brain-derived neurotropic factor (BDNF)
- *Lactobacillus paracasei* PS23

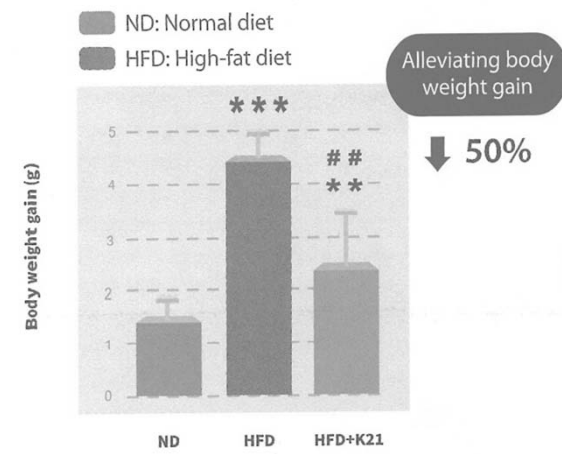


Probiotic product for weight control

- Metabolicbiotic
- *Lactobacillus plantarum* K21



LDL cholesterol	HDL cholesterol
↓ 13.9%	↑ 6.5%
Total TAG	Systolic Blood Pressure
↓ 53.9%	↓ 5.1%

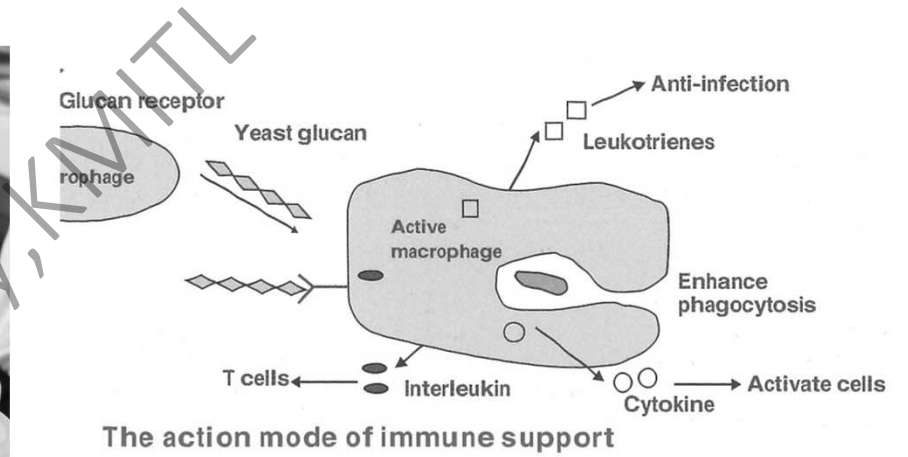


High-fat Diet Model (HFD)
 K21 supplementation for 8 weeks significantly decreases HFD-induced body weight gain.

Fermentation beverage products



Yeast supplement product



Prebiotic



益常青® 更纯正的低聚木糖
Super xylo-oligosaccharide

Heagreen 益常青

低聚木糖
Xylo-oligosaccharide

更低的水分活度
Lower water activity

更高的活性成分
Higher active ingredients

更明确的组份比例
Clearer ingredient ratio

更少的杂质
Fewer impurities

双歧杆菌
Bifidobacterium

低聚木糖是双歧杆菌的营养来源
Xylo-oligosaccharide is the source of Bifidobacterium

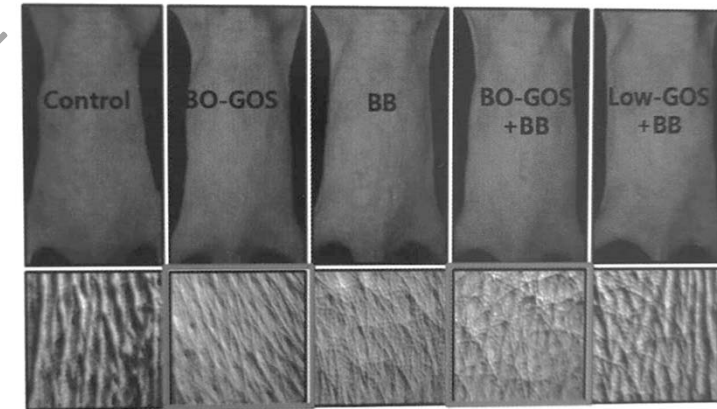
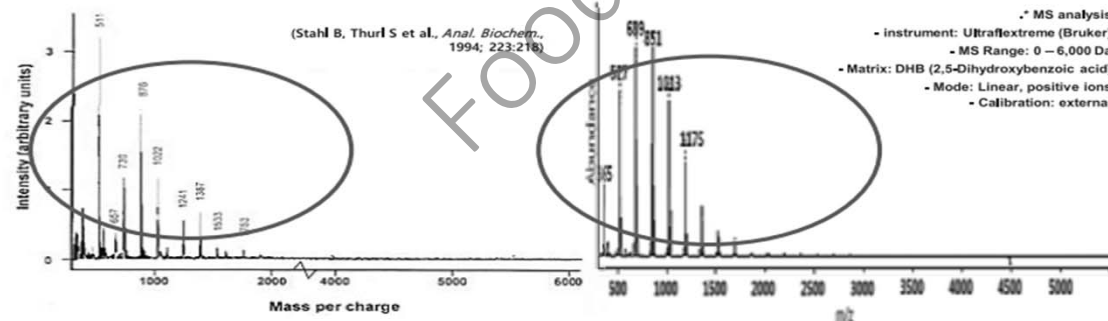


图3. 美肤低聚糖®对皮肤表面皱纹的影响

*Control: Saline/ *BO-GOS: 美肤低聚糖®/ *BB: Bifidobacterium longum/
*BO-GOS+BB: 美肤低聚糖®+ Bifidobacterium longum

Mother's Milk component Fortified
High-Purity Galactooligosaccharide, Mother's OLIGO®



〈Pic 3.〉 (左)Molecular size Distribution of Human Oligosaccharide(HMOs)
(右) Molecular Distribution of Mother's OLIGO applied mixed oligosaccharides

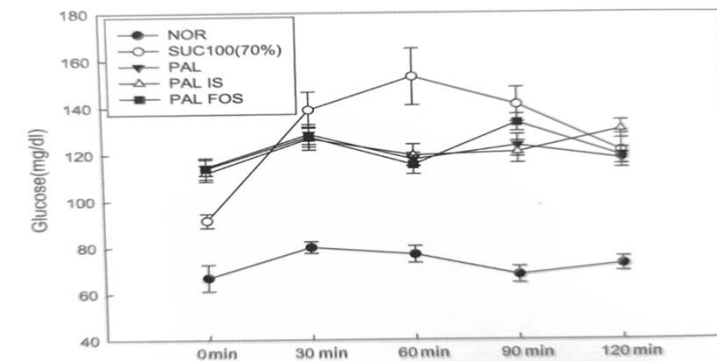
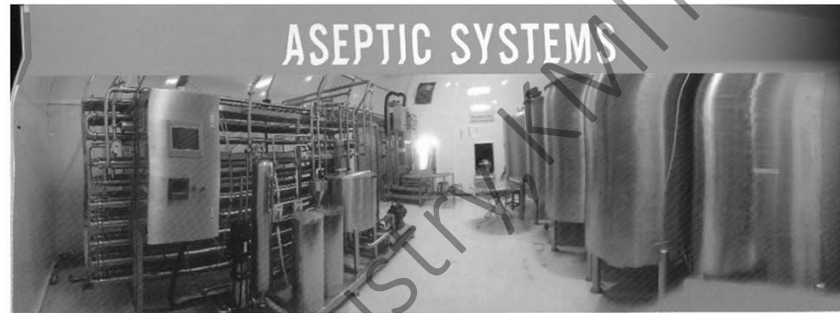


图3.随帕金糖浆变化而变化的葡萄糖

Fermentation products

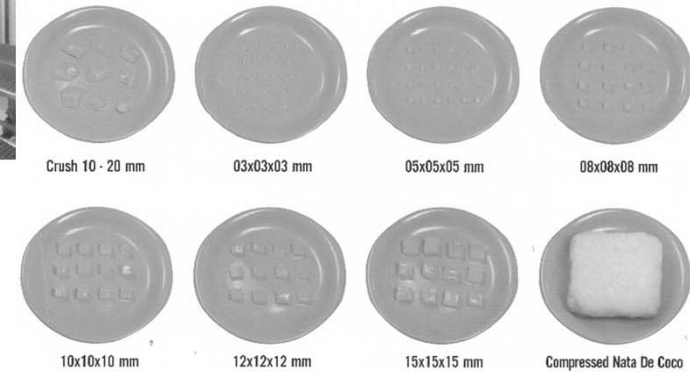


APPLICATION



Safe Food - Happy Life

NATA DE COCO SIZE



Plant compound preservative

Cinnamon

Cinnamon contains a variety of active ingredients such as cinnamaldehyde, cinnamic acid, volatile oil, polyphenols, polysaccharides and inorganic materials, which have a positive effect for diseases of the cardiovascular system, the digestive system, and the immune system. Cinnamaldehyde extracted from cinnamon, with broad-spectrum inhibition of bacteria, performs favorable bacteriostatic efficacy on mold, bacillus and cocci.



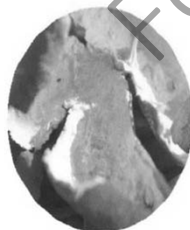
Cassia tora seed

The effective ingredients in cassia seeds are anthraquinones and phenols. Anthraquinones extracted from cassia seeds perform a strong bacteriostatic efficacy on staphylococcus aureus, hay bacillus and blue mold.



Citrus reticulata (tangerine) peel

The beneficial active substances in citrus reticulata (tangerine) peels are mainly orange peel volatile oil, flavonoids, alkaloids and trace elements. Limonene from citrus reticulata (tangerine) peel has a strong bacteriostatic efficacy.



Time span for testing	0 D	7 D	2 M	4 M	6 M	8 M	10 M	12 M	14 M	16 M	18 M
Blank contrast group (cfu/g)	<10	<10	2070								
Control group (cfu/g)	<10	<10	<10	<10	<10						
Experimental group (cfu/g)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10

检测时间	0 D	7 D	14 D	2 M	4 M	6 M	8 M	10 M	12 M	14 M
Blank contrast group (cfu/g)	<10	<10	3060							
Experimental group (cfu/g)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10

Natural colorant

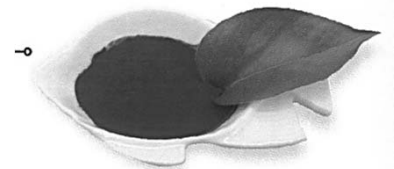
- Monascus colorant



- Spirulina colorant



Phycocyanin E25



Phycocyanin E16

