being Different for the Difference
发现不同 创造不同

BRIGHTMOON
EST. 1968

Tech Innovation Empowers Brown Algae Industry Transformation & Upgrading

Executive Deputy Director, State Key Laboratory of Marine Food Processing & Safety Control
Vice President, Qingdao Bright Moon Seaweed Group Co., Ltd.
Dr. Demeng Zhang
zdm@bmsg.com
2026.11

An international enterprise dedicated to
creating healthy lifestyles for humanity

CONTENTS



Industry Development History
& Tech Innovation



Innovation System &
Industry Growth

Bright Moon & the Brown Algae Bio-Industry

BRIGHTMOON EST. 1968

being Different for the Difference 发现不同 创造不同



Seaweed Biomass

Extraction & Conversion



Algae Food



Alginate Carrageenan Agar Fucoidan Algae Oil Fucoxanthin Algae Polyphenols



Bright Moon & the Brown Algae Bio-Industry

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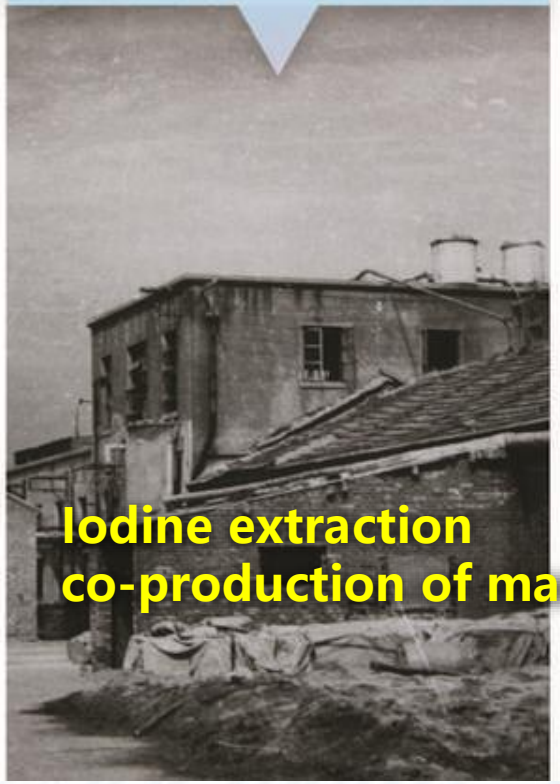
being Different for the Difference 发现不同 创造不同

1968年-1998年
产业开拓 · 创业发展
Pioneering



Iodine extraction
co-production of mannitol & alginate

1998年-2003年
涅槃重生 · 稳固发展
Rebirth



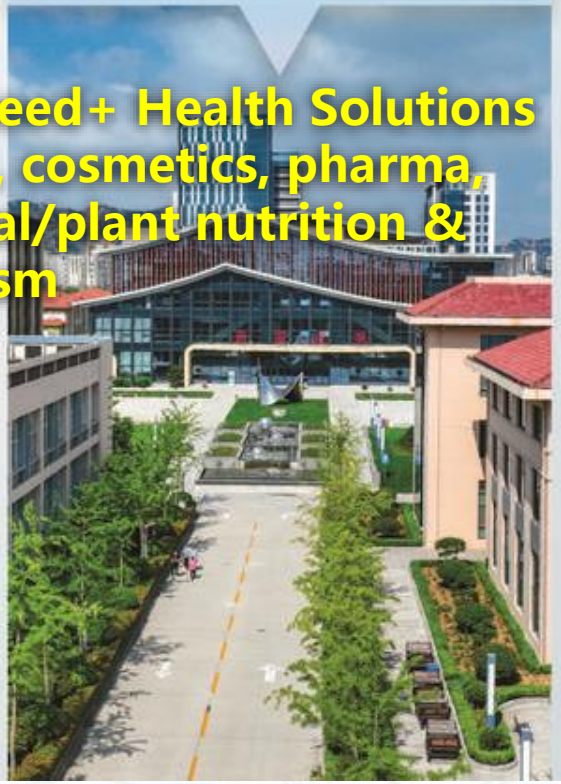
Alginate quality upgrading
Food & pharma-grade

2003年-2013年
产业升级 · 扩张发展
Upgrading



2013-Present
创新转型 · 高质量发展
Transformation

Seaweed+ Health Solutions
Food, cosmetics, pharma, animal/plant nutrition & tourism



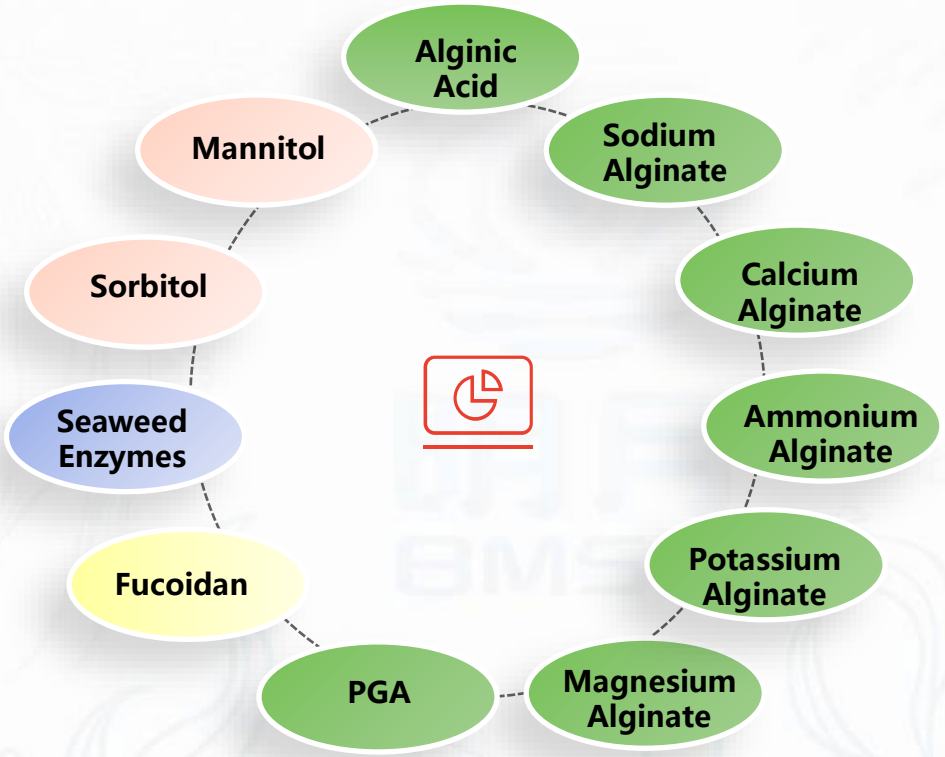
Bright Moon & the Brown Algae Bio-Industry

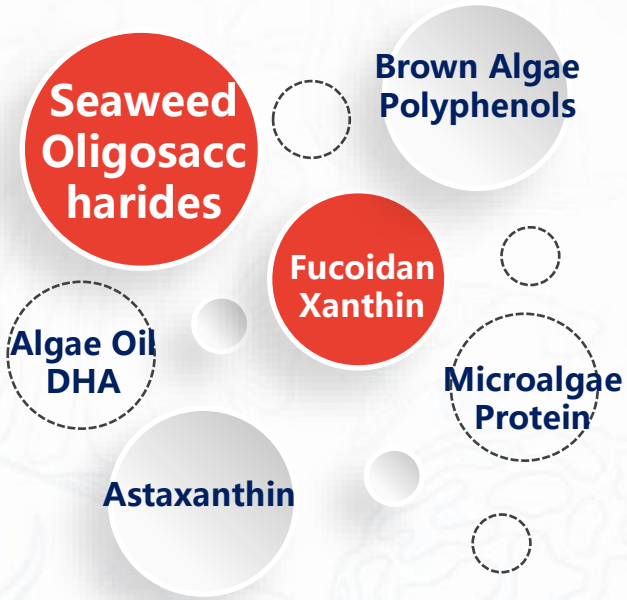

海藻碘



海藻胶


甘露醇





Extraction & Development of Seaweed Active Substances: Past & Future

1 ton of brown algae supports a 10-billion market!



Economic value per ton of kelp greatly enhanced by tech innovation— the upgrading journey of seaweed

Bright Moon & the Brown Algae Bio-Industry

BRIGHTMOON EST. 1968

being Different for the Difference

发现不同 创造不同

改造提升传统优势产业

REVITALIZE AND ENHANCE TRADITIONAL ADVANTAGEOUS INDUSTRIES

海藻功能原料产业

SEAWEED FUNCTIONAL RAWMATERIAL INDUSTRY











海洋健康产品产业

MARINE HEALTH PRODUCTS INDUSTRY





















科技赋能 协同创新

明月海藻集团产业生态链

BRIGHT MOON SEAWEED GROUP INDUSTRIAL ECOLOGICAL CHAIN

海洋生态肥料产业

MARINE ECOLOGICAL FERTILIZER INDUSTRY













培育壮大新兴产业

CULTIVATE AND STRENGTHEN EMERGING INDUSTRIES

海洋生物医药产业

MARINE BIOMEDICAL INDUSTRY

艾吉康 Algitocare　Bellin 海灵兰　童力乐　福态堂







海洋文化旅游产业

MARINE CULTURAL TOURISM INDUSTRY

明月海藻世界
明月·海洋主题家酒店
BRIGHT MOON HOTEL







超前布局未来产业

MAKE FORWARD-LOOKING ARRANGEMENTS FOR FUTURE INDUSTRIES

大力发展现代服务业

VIGOROUSLY DEVELOP SERVICE INDUSTRY

Innovation Platforms & Achievements

- National Manufacturing Single-Champion Demonstration Enterprise
- State Key Laboratory of Marine Food Processing & Safety Control
- National-Local Joint Engineering Research Center (2015)
- MOA Key Laboratory of Seaweed Fertilizers (2023)
- China's sole producer of ultra-pure sodium alginate
- World's only full-chain alginate-fiber dressing enterprise
- >90% domestic market share in pharma-grade sodium alginate













Bright Moon R&D Infrastructure

- 160 R&D staff, including 95 master/PhD degree holders
- 20,000 m² lab space, equipment original value RMB 93.4M
- 13 pilot/demonstration lines: implantable tissue-engineering materials, high-purity high-activity fucoidan, wet-spinning of bioactive alginate fibers, marine-derived gel products





CONTENTS

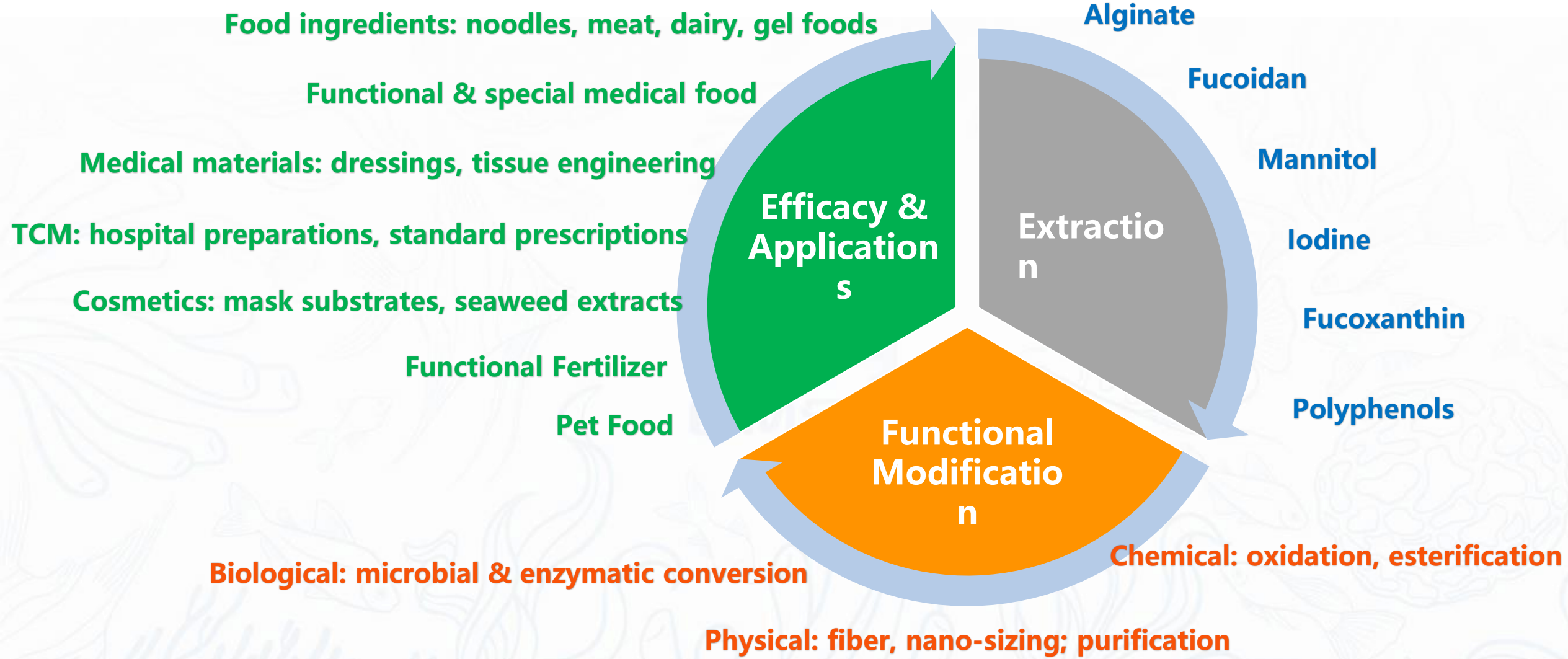


Industry Development History
& Tech Innovation

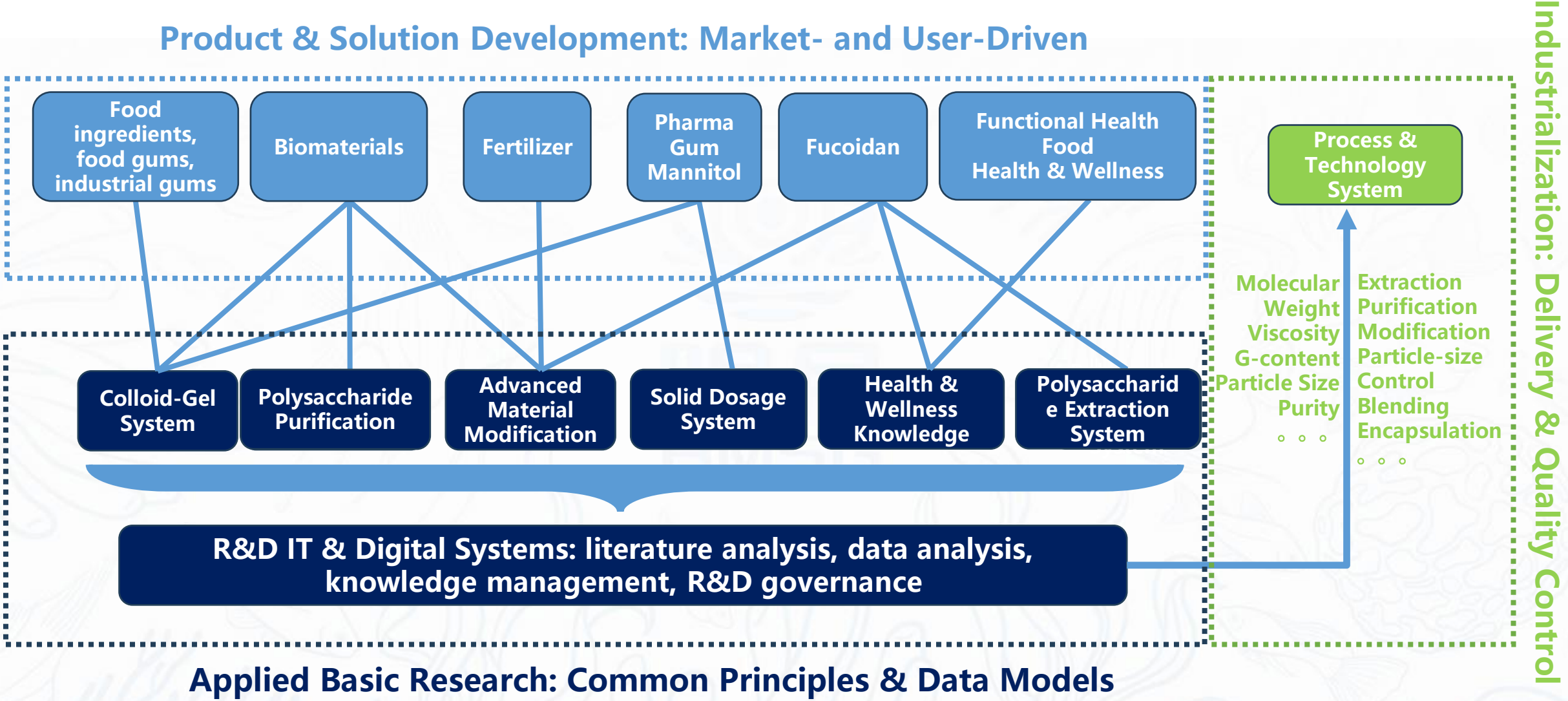


Innovation System &
Industry Growth

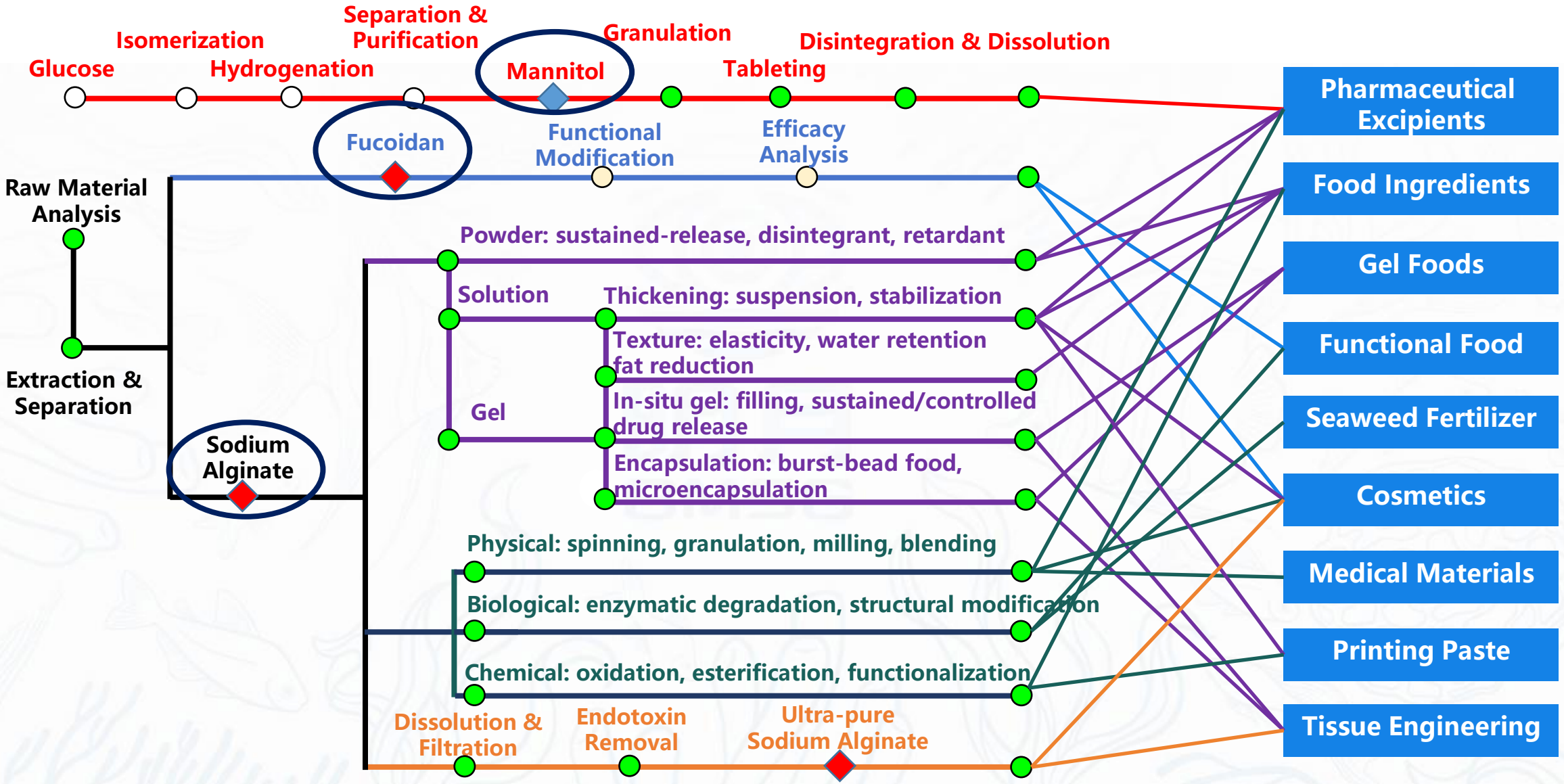
Research Areas — Seaweed Functional Substances & Health



Seaweed Industry Research Landscape



Applied Basic R&D System Planning & Development



1. Extraction & Separation Applied Basic Research

BRIGHTMOON EST. 1968

being Different for the Difference 发现不同 创造不同

ONE

- ✓ **Raw Material Research**



Figure 1. Fucoidan extracted from Tasmanian Undaria pinnatifida





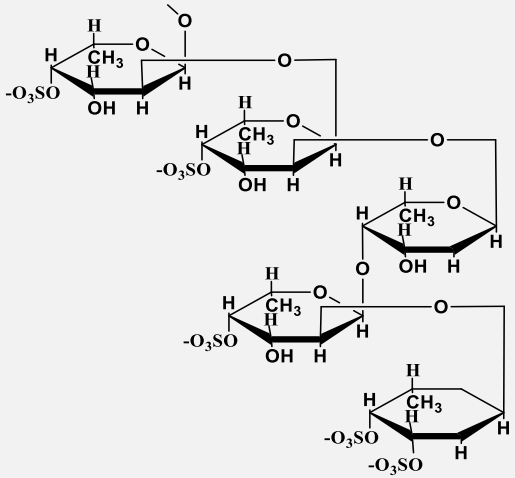






TWO

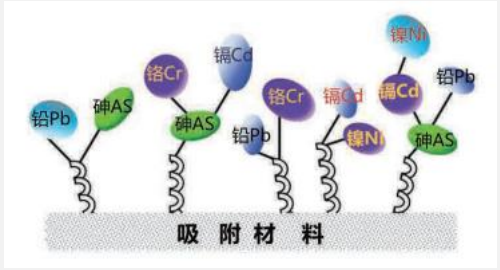
- ✓ **Fucoidan extraction with controlled fucose & sulfate content**



THREE

- ✓ **Arsenic-fucoidan binding forms; heavy-metal reduction technology**
- ✓ **Heavy-metal migration & removal in seaweed residue**





FOUR

- ✓ **Regulatory Compliance**
  Food, cosmetics, feed & pet food
- ✓ **Standardization**
  - ✓ **Enterprise, industry & national standards**



2. Marine Advanced Materials Basic Research

Functional Food
Biopharmaceuticals
Food Ingredients
Functional Fertilizer



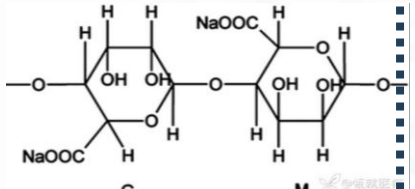
Seaweed Ferment



Alginate Oligosaccharides

Biological







Sodium Alginate

Physical



Wet Spinning

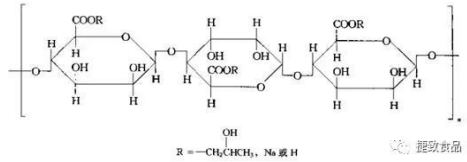


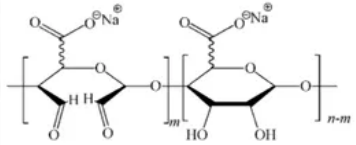
Calcium Alginate Fiber



Calcium Alginate Nonwoven

Chemical







Propylene Glycol Alginate (PGA)



Oxidized Sodium Alginate

2. Marine Advanced Materials Basic Research

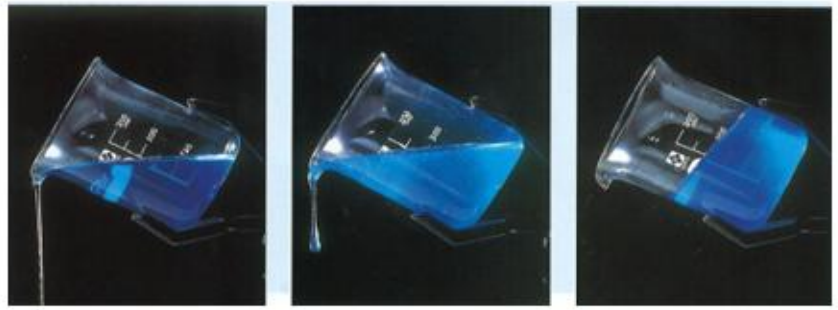
Parameters	Bright Moon	NovaMatrix
Viscosity (1%, mPas)	<800, customized	Fixed: 0-20, 20-200, >200
Bacterial endotoxin, EU/g	<20, <50, <100, <200	Fixed: <100
G/M	<0.8, 0.8-1.5, >1.5	≤1, ≥1.5
Max Monthly Supply	20 kg	3-6 months/kg
Price	RMB 200K-500K/kg	RMB 500K-1M/kg

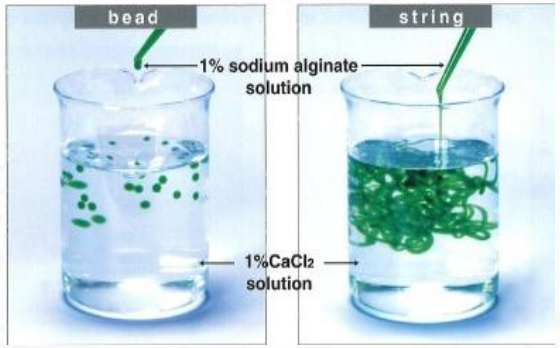




- 13th/14th Five-Year National Key R&D Program, Shandong Key R&D Program, Qingdao S&T Innovation Talent Program, etc.
- 4 Chinese invention patents, 1 PCT patent, 1 national key book
- Received 1st Prize, Shandong S&T Progress Award; 1st Prize, China National Light Industry Council; 2nd Prize, Qingdao S&T Progress Award

3. Colloid-Gel Applied Basic Research












乳制品


饮料


烘焙


肉制品


面制品


功能食品


方便食品


保健品

海藻活性物质的五大功效特性

体重控制　免疫调节　肠胃道保健　血糖调节　美肌

BRIGHTMOON EST. 1968
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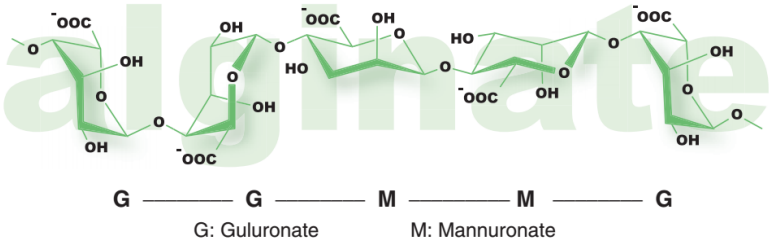
Application of sodium alginate in biomedicine







- ☑ Gel under physiological conditions
- ☑ No degrading enzymes in the human body
- ☑ Excellent biocompatibility

Medical devices & drugs

Intermediate



PSS
GV971
GAVISCON

Excipients



Sustained-release agents, disintegrants, stabilizers, suspending agents

Impression material



Dental Impression Materials

Dressings

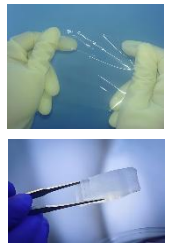


Non-wovens, sponges, films, hydrogels

Tissue filling and repair



Myocardial repair, aesthetic filling, Anti-acid reflux, anti-urinary incontinence, ESD



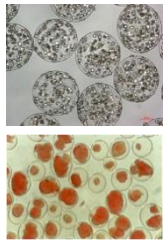
Mucosal repair, anti-adhesion, dental sealing, bone cement, radiotherapy isolation

Arterial embolization Sustained Release



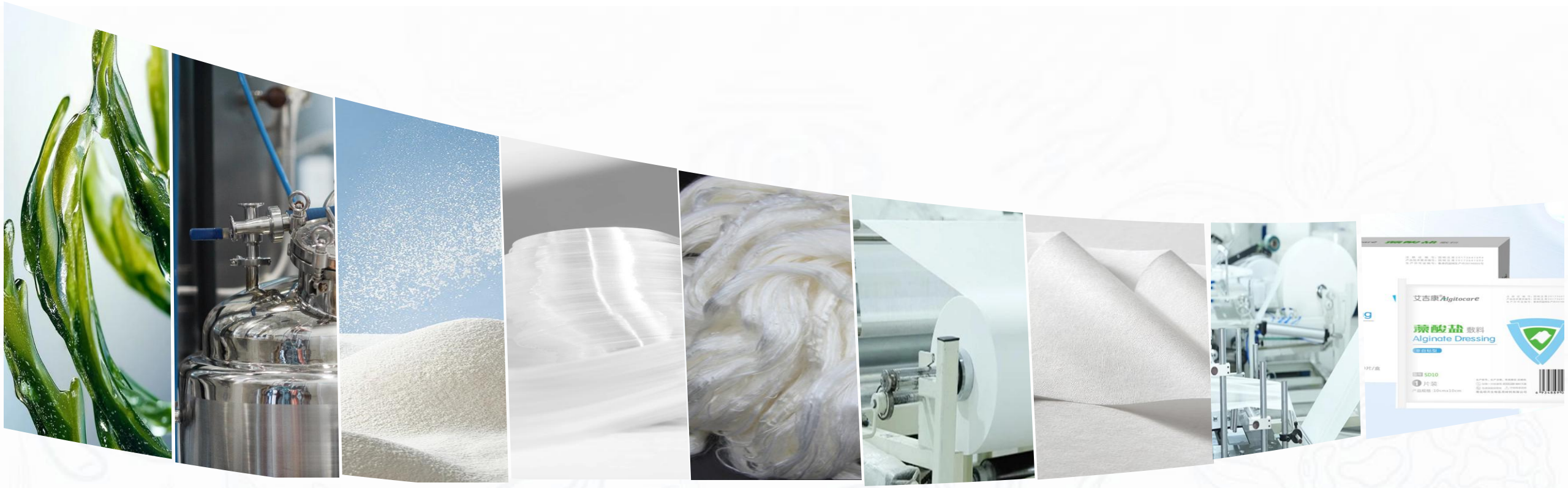
Tumor embolization, sustained release, lacrimal duct plugs

Cell microencapsulation



3D printing bioinks, organoids, bioartificial liver, artificial pancreas, cell microcarriers

3. Colloid-Gel Applied Basic Research



全球唯一贯通“藻-纤-布-械”全产业链企业

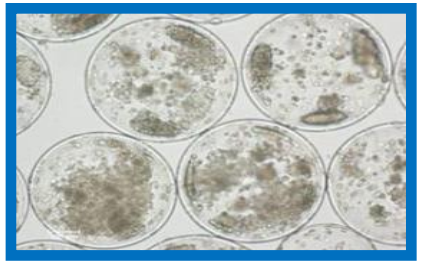
Only Enterprise with Full Chain: Sodium Alginate → Fibers → Non-wovens → Medical Devices

Qingdao Bright Moon Biomedical Materials

3. Colloid-Gel Applied Basic Research







Cell carriers



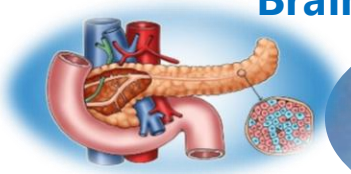
Scaffold

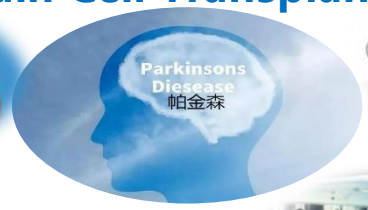


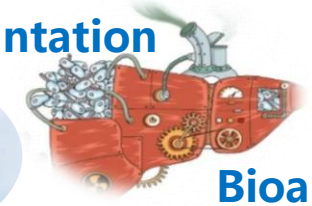
Hydrocolloid

Islet Transplantation

Brain Cell Transplantation







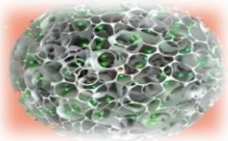
Bioartificial Liver



Lacrimal Plug



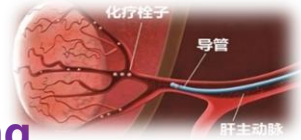
Artificial Blood Vesicle



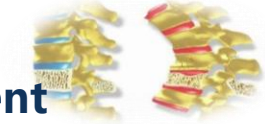
Stem Cell Microcarrier



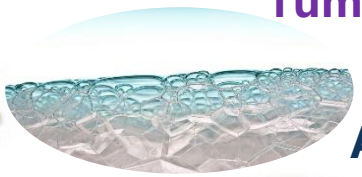
Urethral Wall Filling



Tumor Embolization



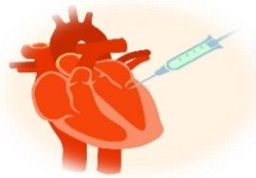
Bone Cement



Anti-adhesion



Drug Dispersant





Medical Aesthetic Fillers

Myocardial Tissue Engineering

3. Colloid-Gel Applied Basic Research

> **Advanced skincare technology delivers natural, pure, safe, high-quality personal care products**

Qingdao Bright Moon AIXI Cosmetics Co., Ltd.

Operates GMP-standard Class 100,000 production workshops, providing one-stop OEM/ODM services across R&D, manufacturing and marketing. Products are exported to 40+ countries and regions.









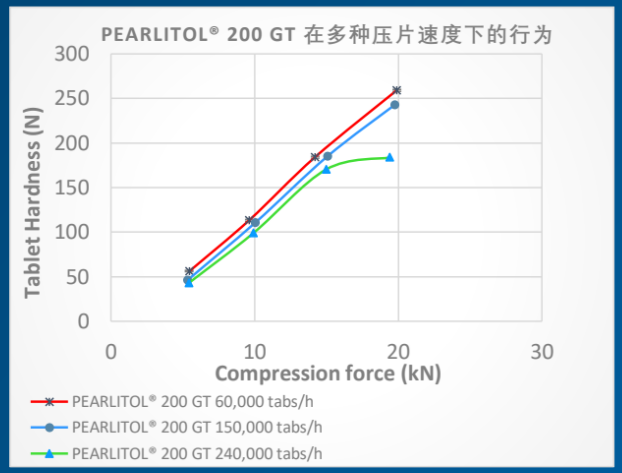


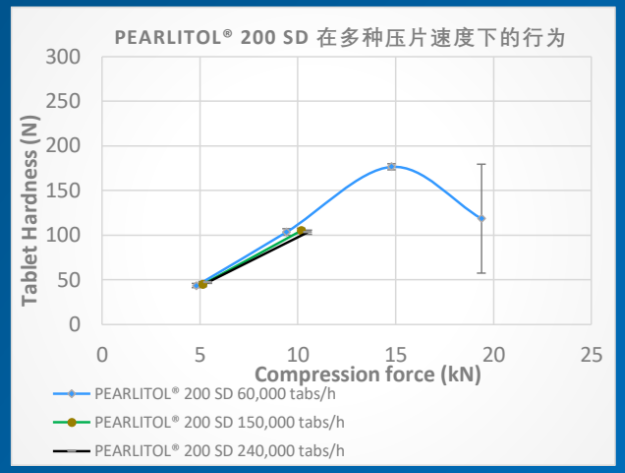
Bright Moon AIXI Cosmetics

4. Mannitol Solid Dosage Applied Basic Research

关键优势：极优的压片性能

喷雾干燥甘露醇在高压片压力下容易出现裂片现象，即使压片速度不高

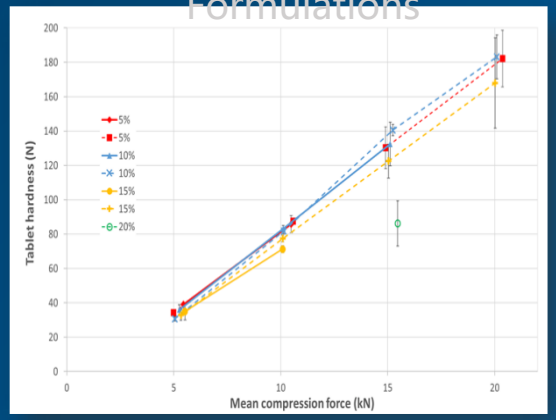




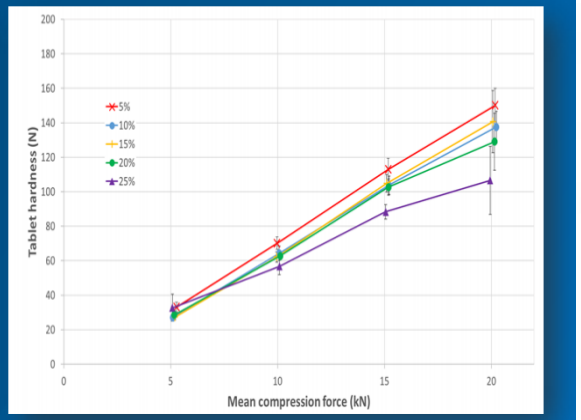
MedelPharm Stylcam compression simulator mimeting a Korsch XL400, D10R9 punches, 400mg tablet with 1.2% magnesium stearate

ROQUETTE RESTRICTED

压片性能 Unlocking Direct-Compaction Formulations



PEARLITOL® 200SD压片性能

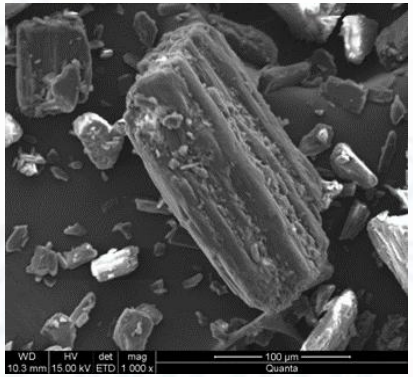


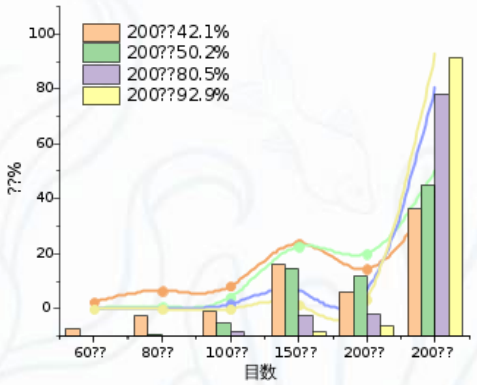
PEARLITOL® 200GT压片性能

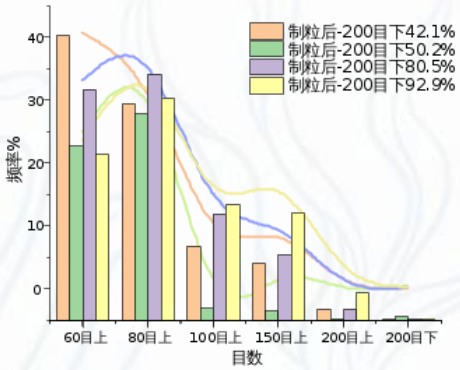
- ---------有预压
- ——无预压

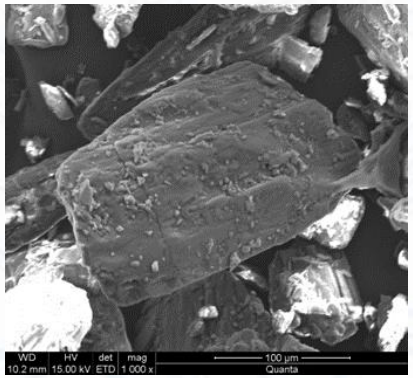
结果表明，以舍曲林为模型药，在不施加预压的情况下，PEARLITOL® 200GT能有效解决片剂裂片的问题。

ROQUETTE RESTRICTED









4. Mannitol Solid Dosage Applied Basic Research

Marketed drugs formulated with Bright Moon C-series & SD-series mannitol

登记类型	药用辅料
登记号	F20180000935
品种名称	甘露醇
企业名称	青岛明月海藻集团有限公司
企业地址	青岛市黄岛区明月路777号;青岛市黄岛区明月路777号
省份	山东
产品来源	国产
包装规格	25kg/袋 25kg/桶
规格	25C、50C、160C、100SD、150SD、200SD
更新日期	2023-12-22
与制剂共同审评审批结果	A



5. Health & Wellness Knowledge System

11 Key Benefits of Fucoidan

- Helps eradicate Helicobacter pylori
- Offers radiation protection
- Protects the gastric mucosa
- Improves intestinal function
- Boosts immune function
- Helps manage chronic gastritis
- Alleviates chemotherapy side effects
- Supports liver protection
- Helps regulate blood sugar
- Helps regulate blood lipids
- Exhibits antiviral activity

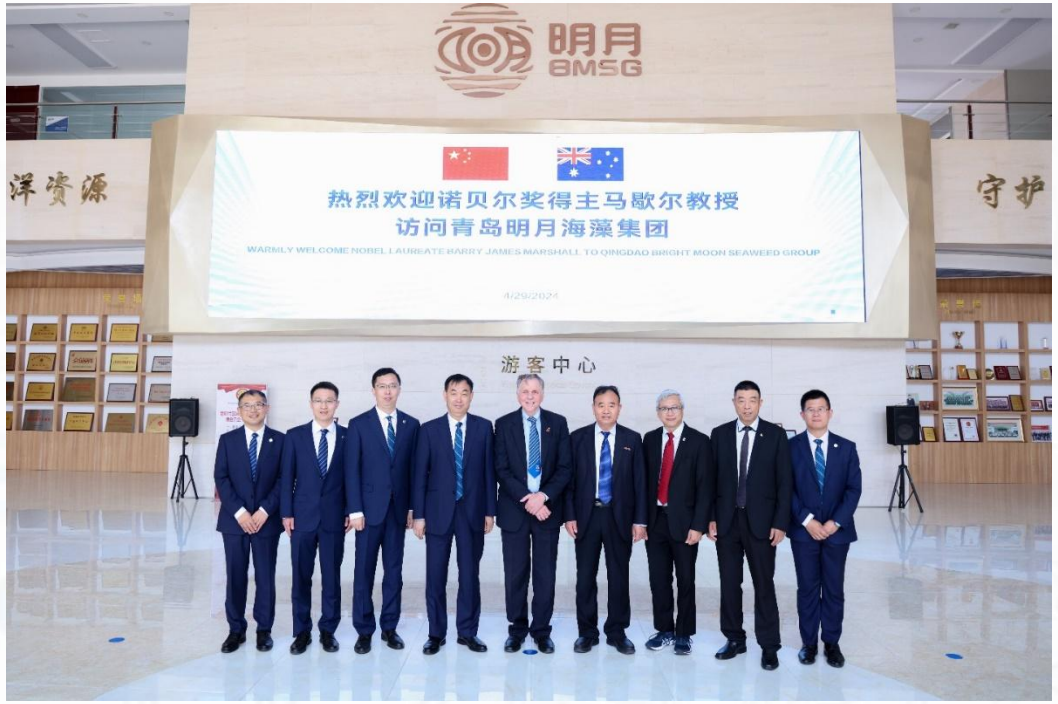


岩藻多糖清幽乐｜岩藻多糖藻黄金



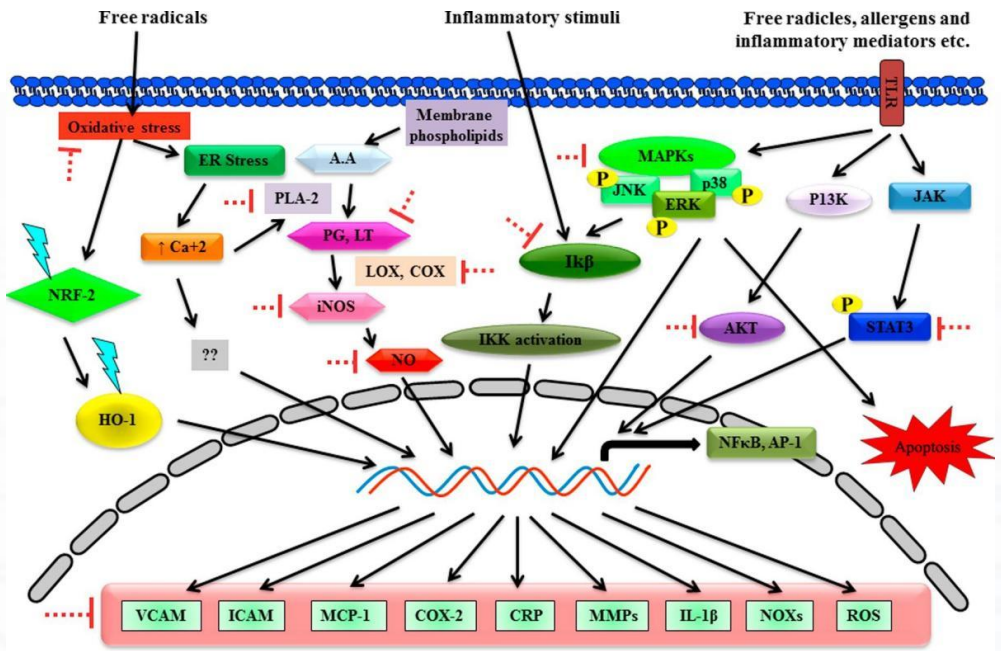
岩藻宝

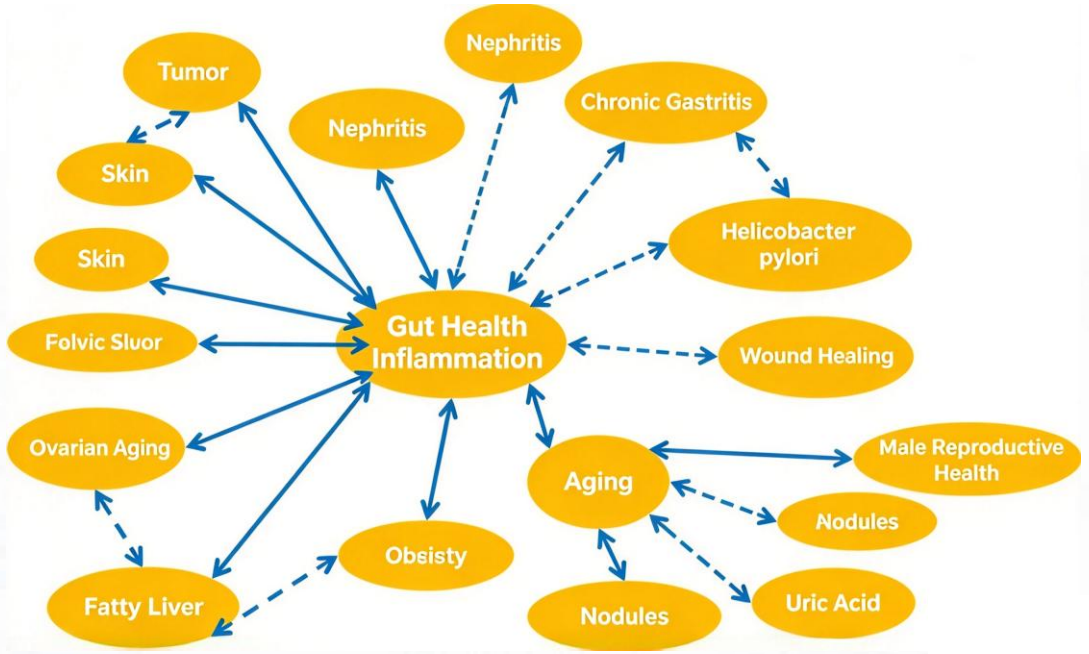




Bright Moon Seaweed Bio-Health Technology

5. Health & Wellness Knowledge System





成分	主要作用机制	是否直接清除HP	功能侧重	临床证据成熟度	产品定位
岩藻多糖	抗黏附（BabA/AlpA）、抗炎（IL-6、TNF-α）、调节菌群	是（吸附清幽，非杀菌）	降低定植 + 改善症状 + 协同根除	高（细胞/动物/临床）	核心功能成分
罗伊氏乳杆菌	竞争黏附、产生抑菌物质、免疫调节	是（吸附清幽）	辅助根除 + 缓解不良反应	较高	辅助成分
韩国红参	抗氧化、抑制NF-κB、线粒体保护	否	抗炎、胃黏膜保护	中	辅助成分
大蒜提取物	体外抑菌、抗炎	否（主要体外实验）	抑菌潜力	低	功能补充
韩国泡菜	调节微生态、抗炎、抗氧化	否	胃炎缓解	低	膳食干预
绿茶	抑制脲酶、抗黏附、抗炎	否	抗氧化、辅助抑制	低	日常保健

君臣佐使	对应屏障	成分
君	• 机械屏障：肠上皮细胞完整、细胞之间紧密连接、减少肠漏（通透性低）	•L- 谷氨酰胺：上皮细胞最重要的能量来源之一，快速增殖细胞的燃料，紧密连接稳定的支持因子。 •丁酸盐（后生元）：上皮最优先使用的燃料（提供70%左右能量）。提升紧密连接稳定性，降低通透性，抑炎，促进屏障修复。 •锌（肌肽-锌的形态）：刺激细胞增殖，促进损伤愈合，减轻肠道损伤，促进修复。（使用量，副作用）
臣	• 化学屏障：增强黏液层、抗菌肽、腔内防御（免疫蛋白）	•岩藻多糖：1：岩藻多糖刺激杯状细胞分泌黏液，提高黏液蛋白表达，增加厚度。2：岩藻多糖属于硫酸化多糖，特点是：粘弹性强，持水能力强，容易形成凝胶样环境（别的益生元没有的），增强黏液稳定性。3：抗炎。（胃黏膜黏液层厚度论文） •壳寡糖：选择性促进有益菌，抑制炎症相关菌，不属于强发酵型（通常产气较少），对上皮还有一定直接保护作用。
佐	• 生物屏障：这类成分直接作用于菌群组成和代谢	•壳寡糖：选择性促进有益菌，抑制炎症相关菌，不属于强发酵型（通常产气较少），对上皮还有一定直接保护作用。 •益生元（褐藻寡糖、低聚果糖、菊粉）：益生元选择性促进益生菌生长，优化菌群结构，同时抑制炎症通路、增强紧密连接蛋白表达，并维持免疫稳态。
使	• 免疫屏障：这类成分调节局部免疫反应、控制慢性炎症	• 乳铁蛋白：一种具有多种生理活性的天然蛋白质，免疫系统的重要参与部分，参与调节免疫、抗菌、抗炎、调节铁吸收、促进肠道细胞增殖分化等多种病理生理过程。 • 维生素D：维生素D是免疫“校准器”。调节免疫系统的功能，增强免疫力，提升抗菌肽的表达等。

5. Health & Wellness Knowledge System

液体饮品

固体饮料

凝胶条压片糖果

口腔护理



5. Health & Wellness Knowledge System

Special groups: infants, pregnant women, seniors, middle-aged, fitness, post-oncology, bedridden

Nutritional Needs Characteristic Analysis + **Digestion & Absorption Functional Analysis**

Nutrition & Health Solutions for Special Populations

Functional food, health food, special dietary food

5. Health & Wellness Knowledge System

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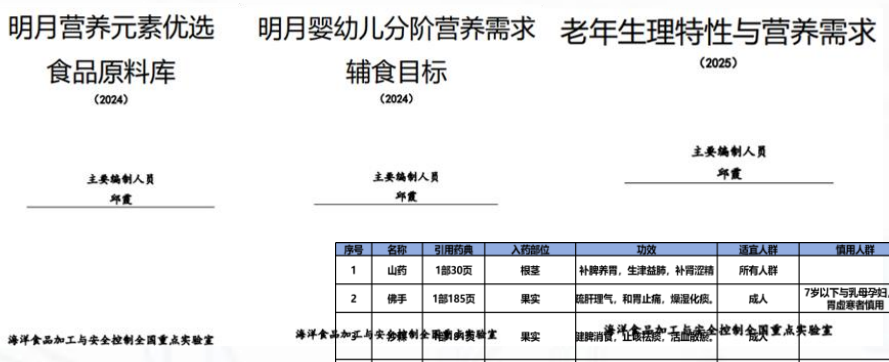
Nutrition Guidelines by Life Stage • Dietary & Health

孕期/备孕期	婴幼儿	青少年	中青年	老年
• 叶酸 • 钙铁锌等元素 • 维生素 • 蛋白质 • 益生菌 • DHA	• 维生素 • 钙铁锌等元素 • 益生菌 • DHA • 乳铁蛋白 • 叶黄素	• 钙铁锌等元素 • 维生素 • 益生菌 • DHA • 胡萝卜素 • 蛋白质	• 维生素 • 钙铁锌等元素 • 叶黄素 • 蛋白质 • 花青素 • 益生菌	• 维生素 • 钙铁锌等元素 • 辅酶Q10 • 胶原蛋白 • 深海鱼油 • 氨基酸



Management for Chronic Diseases

助力打造全国海洋特色临床营养产业高地



序号	名称	引用药典	入药部位	功效	适宜人群	慎用人群	禁用人群	用法用量	适宜配伍	不适配伍	贮藏	备注
1	山药	1部30页	根茎	补脾养胃，生津益肺，补肾涩精	所有人群			15～30g/日	脾胃虚弱：复配山芋、白术；尿频者：复配白茯苓；痰气喘急者，复配甘蔗汁。		置通风干燥处，防蛀。	
2	佛手	1部185页	果实	疏肝理气，和胃止痛，燥湿化痰。	成人	7岁以下与乳母孕妇，脾胃虚寒者慎用		3～10g/日	咳嗽日久痰多：复配橘络、丝瓜络、枇杷叶。		置阴凉干燥处，防霉，防蛀。	
3	沙棘	1部[illegible]页	果实	健脾消食，止咳祛痰，活血散瘀。	成人			3～10g/日	清热祛痰与止咳定喘（参考蒙古族验方）：沙棘18g 白葡萄干15g，甘草9g，栀子6g，木香15g(原方1/10剂量)		置通风干燥处，防霉，防蛀。	
4	炒麦芽	1部163页	果实	生麦芽健脾和胃，疏肝行气。炒麦芽行气消食回乳。焦麦芽消食化滞，脘腹胀痛。	大多数人群适宜		授乳期妇女禁用	10～15g/日；回乳炒用60g/日。	食积不消：复配白术（zhu）		置通风干燥处，防蛀。	
5	罗汉果	1部221页	果实	清热润肺，利咽开音，滑肠通便。	成人适宜	6岁以下慎用	脾胃虚寒者禁用	9～15g/日	喉痛失音：罗汉果1个，切片，水煎。肺燥咽干：罗汉果半个，陈皮6g，瘦猪肉100g。		置干燥处，防霉，防蛀。	
6	金银花	1部230页	干燥花蕾	清热解毒，疏散风热。	成人适宜	3岁以下与孕妇，脾胃虚寒及疮疡属阴者慎用	脾胃虚寒者禁用	6～15g/日。煎服	风热感冒咽痛：复配菊花薄荷。健脾开胃清热解毒：复配陈皮山楂。解暑开胃：复配红枣泡茶。		置阴凉干燥处，防潮，防蛀。	抗病原微生物作用；抗炎作用，促进炎性细胞吞噬功能作用；降血脂作用；兴奋中枢神经；抗生育作用；对肉瘤S180和艾式腹水癌有明显的细胞毒作用。
7	茯苓	1部251页	干燥菌核	利水渗湿，健脾宁心	大多数人群适宜		阴虚火旺者禁用	10～15g/日	肾虚白浊：茯苓复配肉苁蓉、鹿茸、山药。血瘀经闭和行经腹痛（原处方1/10）：桂枝10g茯苓10g牡丹皮10g白芍10g桃仁10g（孕妇忌用经期停服）。		置干燥处，防潮。	
8	荷叶	1部287页	干燥叶	清暑化湿，升发清阳，凉血止血。	成人适宜	6岁以下与孕妇慎用		3～10g/日。荷叶炭3～6g/日。	荷叶复配藕节、知母、地黄（炭）、栀子（焦）、白芍、当归、香墨用于血热所致的咯血、衄血、尿血、便血。		置通风干燥处，防蛀。	
9	莲子	1部285页	成熟种子	补脾止泻，益肾涩精，养心安神	大多数人群适宜	大便燥结者慎用		6～15g/日	下痢饮食不入：鲜莲肉50g复配黄连25g和人参20g；梦遗泄精：莲肉复配益智仁和龙骨		置干燥处，防蛀。	
10	淡竹叶	1部342页	干燥茎叶	清热泻火，除烦止渴，利尿通淋	成人适宜	3岁以下慎用	孕妇和体虚有寒者禁用	6～9g/日，煎服。	热病烦渴:配麦冬、芦根、天花粉。口舌生疮,牙龈肿痛:配木通、生地黄。小便不利,赤涩淋痛:配灯心草、海金沙。		置干燥处。	
11	菊花	1部323页	菊的干燥头状花序	散风清热，平肝明目，清热解毒。	大多数人群适宜，3岁以下减少用量	3岁以下减少用量。气虚胃寒，食少泄泻者慎用。		5～10g/日	风热感冒：复配桑叶、连翘、薄荷、桔梗。清肝明目：复配石决明、决明子、夏枯草。精血不足，眼目昏花，滋补肝肾：复配枸杞子、熟地黄、山茱萸（参考杞菊地黄丸）		置阴凉干燥处，密闭保存，防霉，防蛀。	
12	野菊花	1部328页	野菊的干燥头状花序	清热解毒，泻火平肝。	大多数人群适宜	3岁以下与孕妇慎用		9～15g/日	清肝明目：复配金银花,麦冬,枸杞子。		置通风干燥处，防潮，防蛀。	

TCM-Food Homologous Raw Material Database: Classification & Key Materials

5. Health & Wellness Knowledge System



The U.S. FDA recognized alginate as dietary fiber in 2018, as dietary fiber

Alginate binds heavy metals (lead, cadmium, etc.) into insoluble forms, supporting heavy-metal excretion



Jiangsu Zaoshiji Nutrition Food

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Safe Complementary Food for Babies



Ocean&Baby
海与宝宝

China's Premium Infant Fruit Puree Producer



5. Health & Wellness Knowledge System

I. Rice Cracker Series

Standard, infant, organic



II. Sandwich Rice Cracker Series

Standard & infant standards



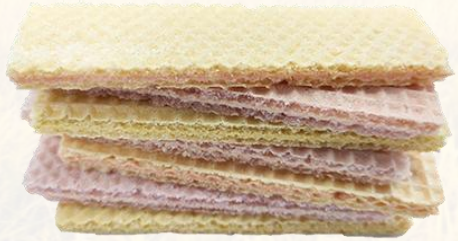
III. Seafood Crisp Series

Standard & infant (shrimp/fish cakes)



IV. Wafer Series

Standard & infant standards



V. Crisp Chip Series



VI. Kaki-no-tane Series



Bright Moon Haixiang Nutrition Food

5. Health & Wellness Knowledge System









Bright Moon Marine TCM

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5. Health & Wellness Knowledge System

Clinical Nutrition Industry

Product Line	Target Population
Composite Protein Drink (Basic) (Composite Protein Drink (High Dietary Fiber)	Perioperative Patients Elderly with Impaired Hiqd Function
Viomposite Protein Drink (Low GI)	Fatiteentts Impcien Hyprec liFuncidemia
Vitamin Complex Solution (For Anticogulation, Cerebrovscuir & Cardovsciar Diseasee)	Patients with Hyperlipe Perglycemia
ONS Composite Protein Drink K (For Anticoagullar (ariion, Ceebrovascular Aner Coiovoincular Dooeasey)	Perierly with Impaired Function
ONS Composite Prote trin Drink D (For Insulin Insune Resistance & Endoctinology)	Patients with Cerebrovascular & Cardiovascular Diseases
ONS for Kidney Disease Patients	Breast Cancer Patients Undergoing Chemotherapy
ONS for Kidney Disease **Patients**	Patients with Diabetes
ONerly widey Impaired Patients	Perioperative Patients Periperative Funcion



5. Health & Wellness Knowledge System

明月安欣
MING YUE AN XIN



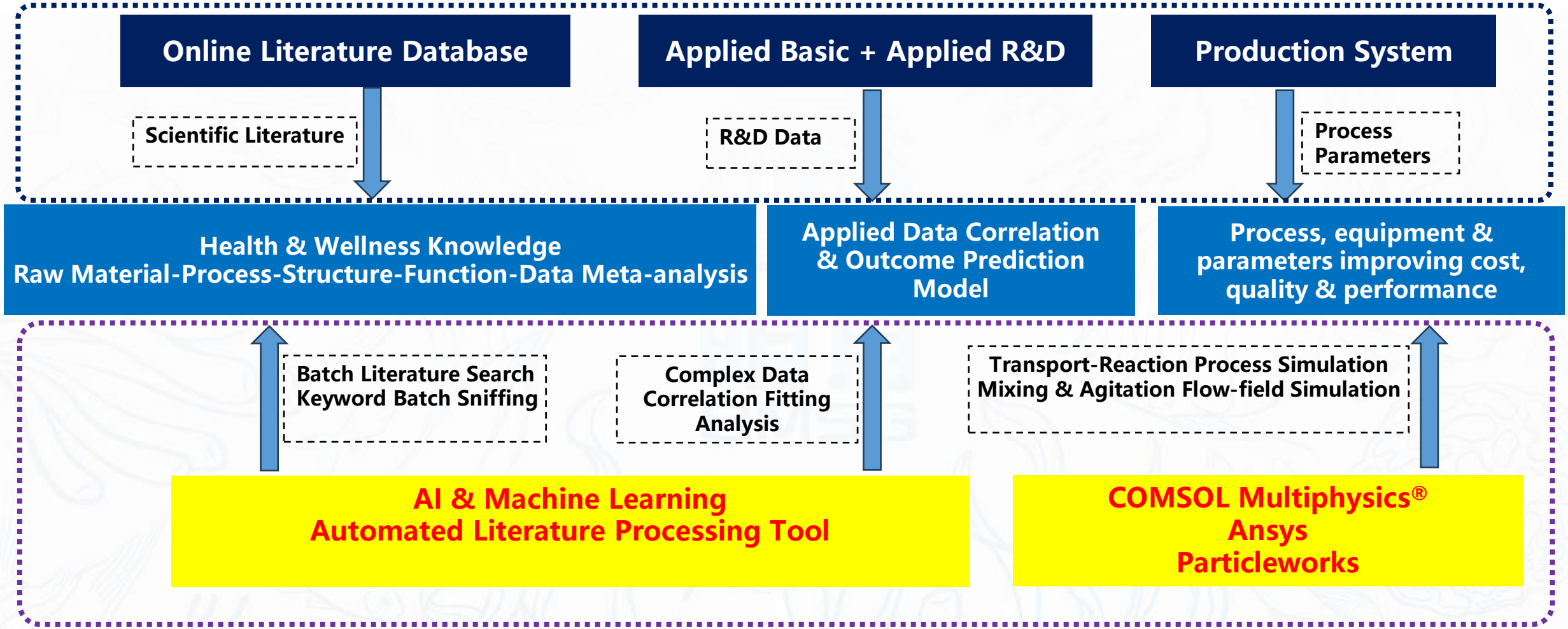




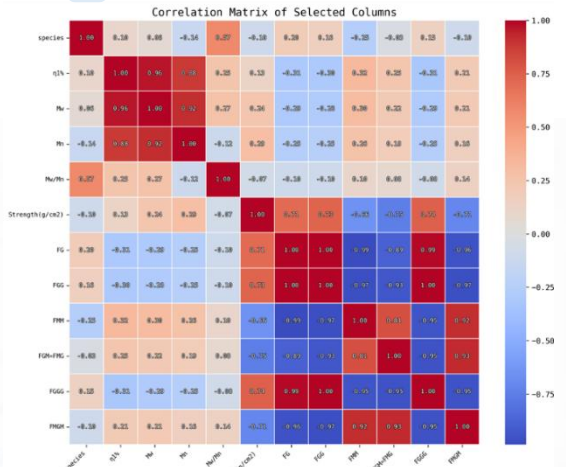


Qingdao Bright Moon Anxin Nutrition Technology Co., Ltd. Uses space-food freeze-drying technology to deeply integrate seaweed actives into pet food, improving gut function, coat condition, skin health, stamina and immunity.

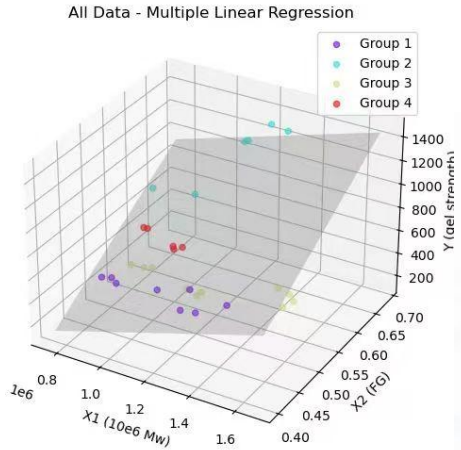
6. Digital Model System for Applied Basic R&D



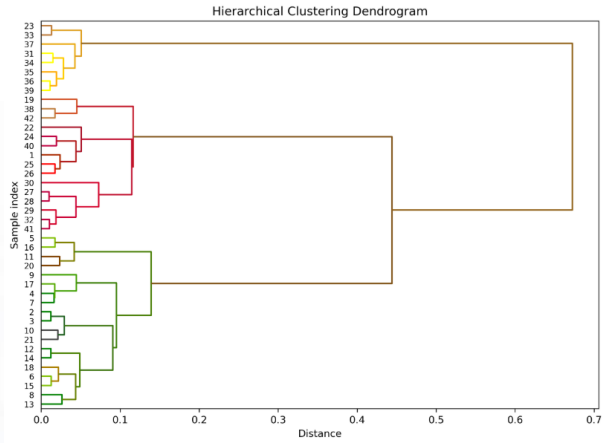
6. Digital Model System for Applied Basic R&D



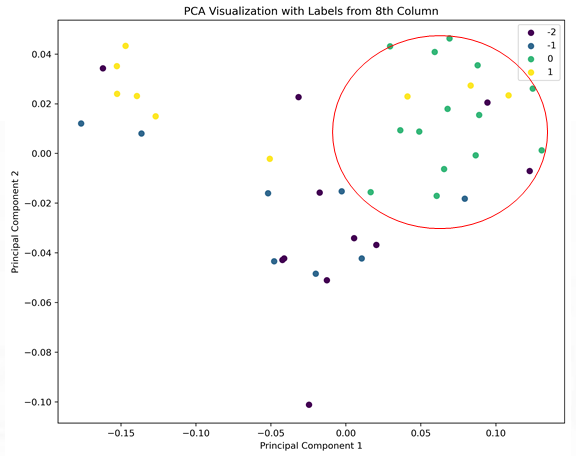
Multi-factor correlation analysis of sodium alginate properties



Gel strength factors (multiple linear regression)



Sample similarity (cluster analysis)



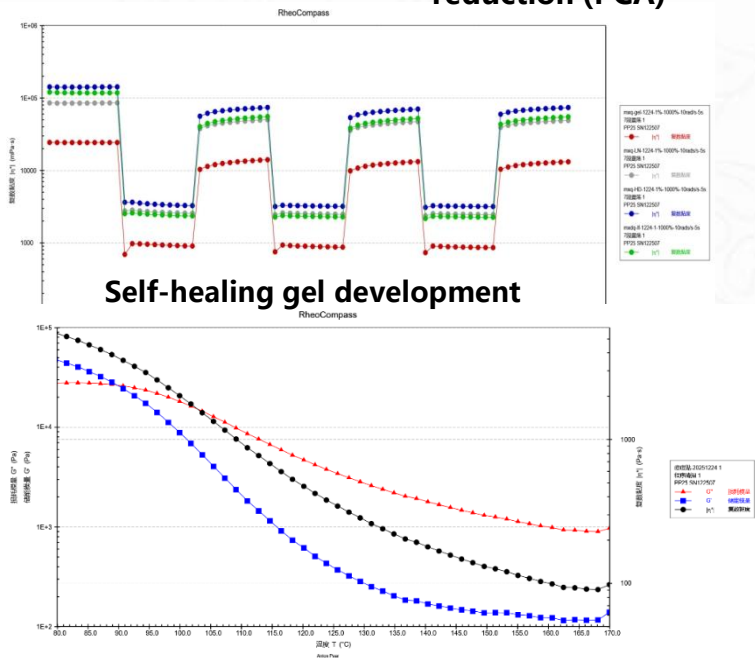
MW distribution dimensionality reduction (PCA)



Bright Moon AI Knowledge Base Assistant



Authoritative Literature



Self-healing gel development

Outlook: Marine Health Industry



Marine Biomass

Extraction & Conversion



Marine Food



Terrestrial and synthetic-biology-derived active ingredients also thrive in health application scenarios

Outlook: Marine Health Industry

Product Co-development

- Functional foods for gut health, cognitive improvement and metabolic health based on seaweed active ingredients
- Medical device innovation: premium alginate dressings, next-generation dental impression materials
- Marine cosmetic formulations and end product R&D

Market Cooperation

- Mutual market access: Bright Moon supplies high-quality pharma/food-grade seaweed raw materials; Korean partners provide formulation expertise & brand operation
- Joint expansion of Southeast Asian and global marine health product markets
- Cooperation in supply chain optimization and quality control



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THANKS

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