

# พลังวิจัยกระดับอาหารและ ผลิตภัณฑ์เสริมอาหารไทยสู่สากล

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ศูนย์พันธุวิศวกรรมและเทคโนโลยีชีวภาพแห่งชาติ  
14 มกราคม 2569



# Empowering Research for Food & Dietary Supplement Industry

## Advanced R&D

Driving frontier research to expand the boundaries of scientific knowledge.

## Innovative Solutions

Cultivating an environment to enable cutting-edge research and transformative technologies.

## Skill Development

Building expertise across food science, functional ingredients, processing technologies & regulatory compliance

## Industry-Centric Adoption

Translating innovation into scalable, industry-ready solutions

## Strategic Collaboration

Synergizing expertise and partnerships to accelerate innovation and impact

# Turning Research into Real-World Impact

## 8 Key Voices for product Innovation



Voice of Market & Competitor Insights



Voice of Consumer



Voice of Customer



Voice of Producer – Upstream



Voice of Manufacturer – Midstream (OEM/ODM/โรงงานผลิต)



Voice of Expert



Voice of Regulator & Standards



Voice of Sustainability & Social Impact

# Personalized and Holistic Health & Well-being

No one-size-fits-all solutions

## Ingredient Innovation



Food Ingredients



Cosmetic Ingredients



Pet Ingredients



## Proactive lifestyle choice

(Microbiome profile, activity, and dietary habits)



Sports Nutrition



Immune Care



Joint Care



Bright Vision



Metabolism



Weight Management



Sleep and Relaxation



Smart Choice

## Specific Life Stages & Conditions



Men Care



Women Care



Children Care



Active Aging Care



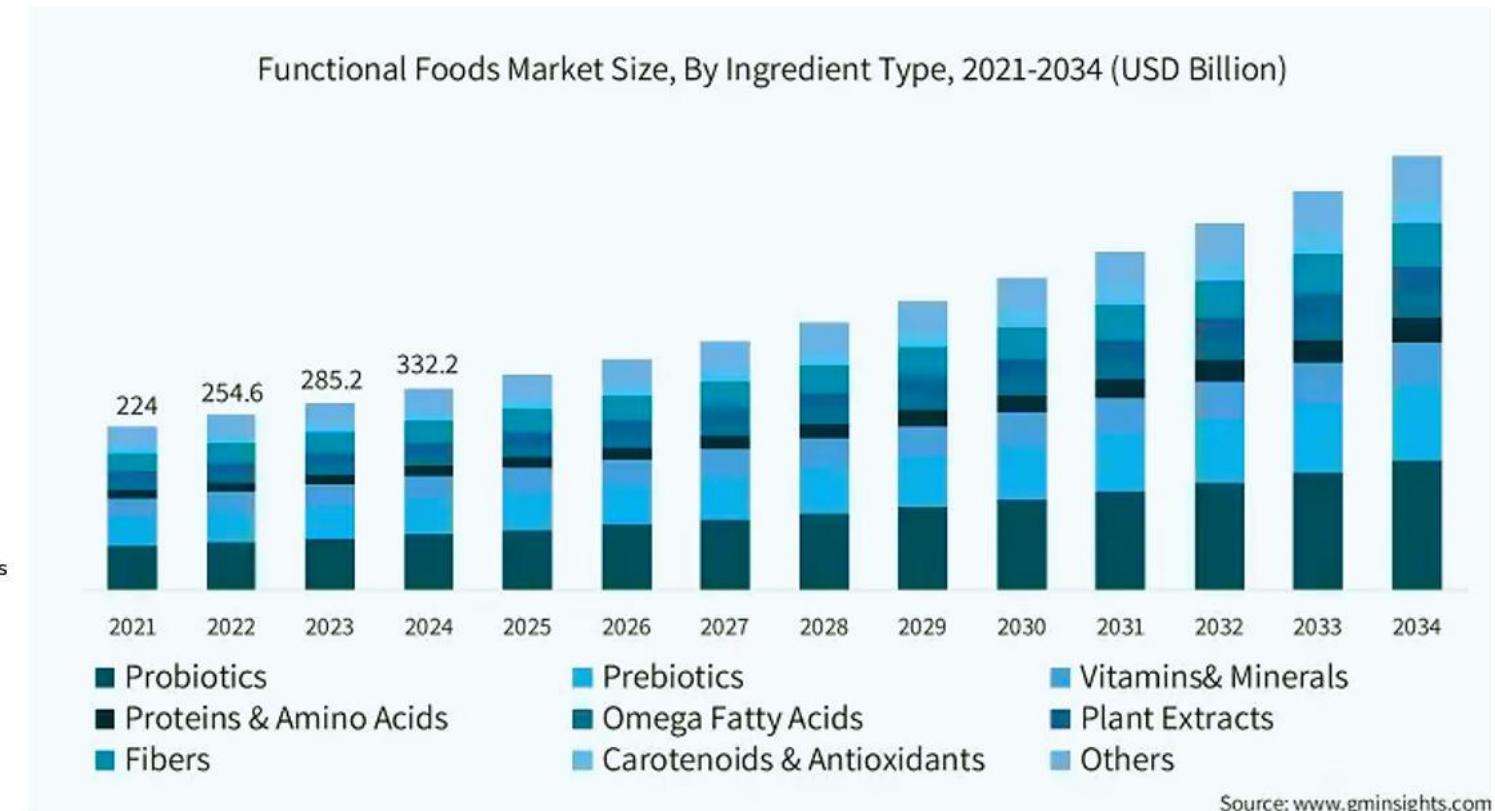
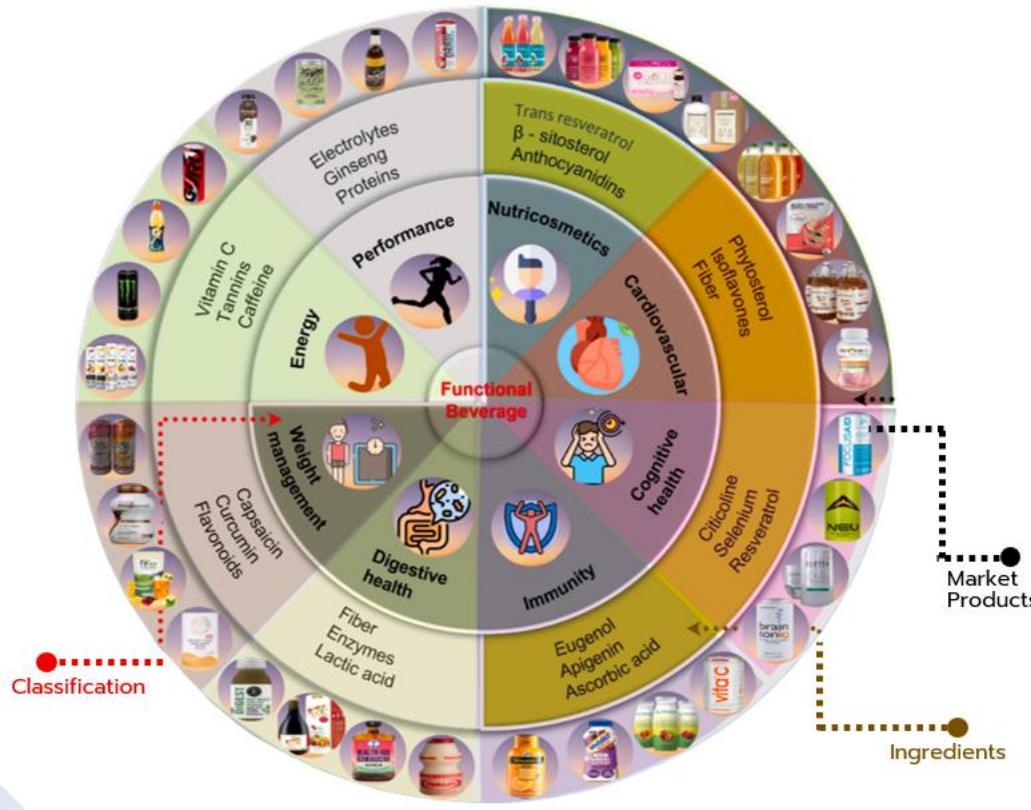
## Optimum Health goal

Personalized foods  
Personalized supplements

## Smart Longevity

# Functional Foods

Functional foods are foods that offer health benefits beyond their nutritional value



# Functional Ingredient Trends 2026

Holistic Self-care  
 Shifting functional categories  
 towards wholesome  
 enjoyment & value of  
 connection

<https://www.foodnavigator.com>



**Gut-axis Frontier**  
 gut microbiome vs. pre- pro- & postbiotics



## Functional Nutrition

Proteins(Next-gen plant-based 2.0 & dynamic and evolving animal-based)



## Mental Health & Cognitive Revolution

From coping to resilience  
 (Adaptogens & Nootropics)



## Science-backed Longevity

Cellular health, Metabolic balance,  
 Cognitive function & Healthy ageing



**Underserved Women's Health**  
 Hormonal support & Mental wellbeing



Confectionery, snack,  
 gummies, chocolate,  
 functional sweets



Yogurts, Pudding,  
 Mousses



Beverages  
 (Prebiotic Cola)

# Scientific insights for accelerating innovative ingredients discover



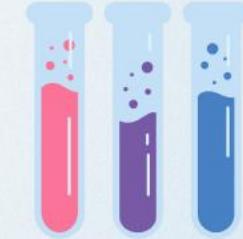
## AI-powered Discovery

- Novel bioactive compounds
- Upcycled ingredient
- Integrating nutrition, data science, AI & bioinformatics



## Nutraceutical Formulation

- Promising bioactives and other compounds from plants and other food sources.
- In silico discovery for downstream experiments
- Hard-to-copy supplement



## Science-backed evidence

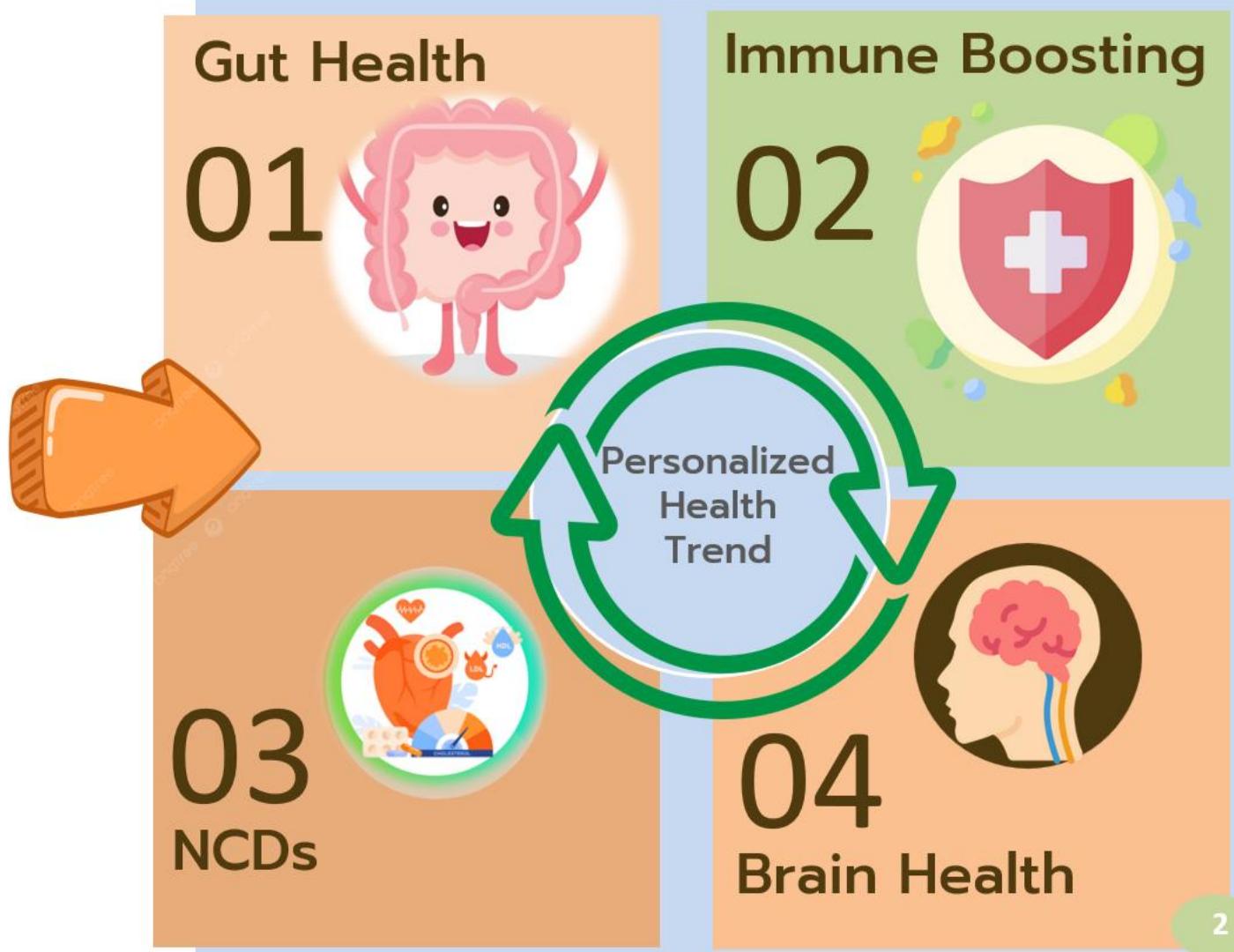
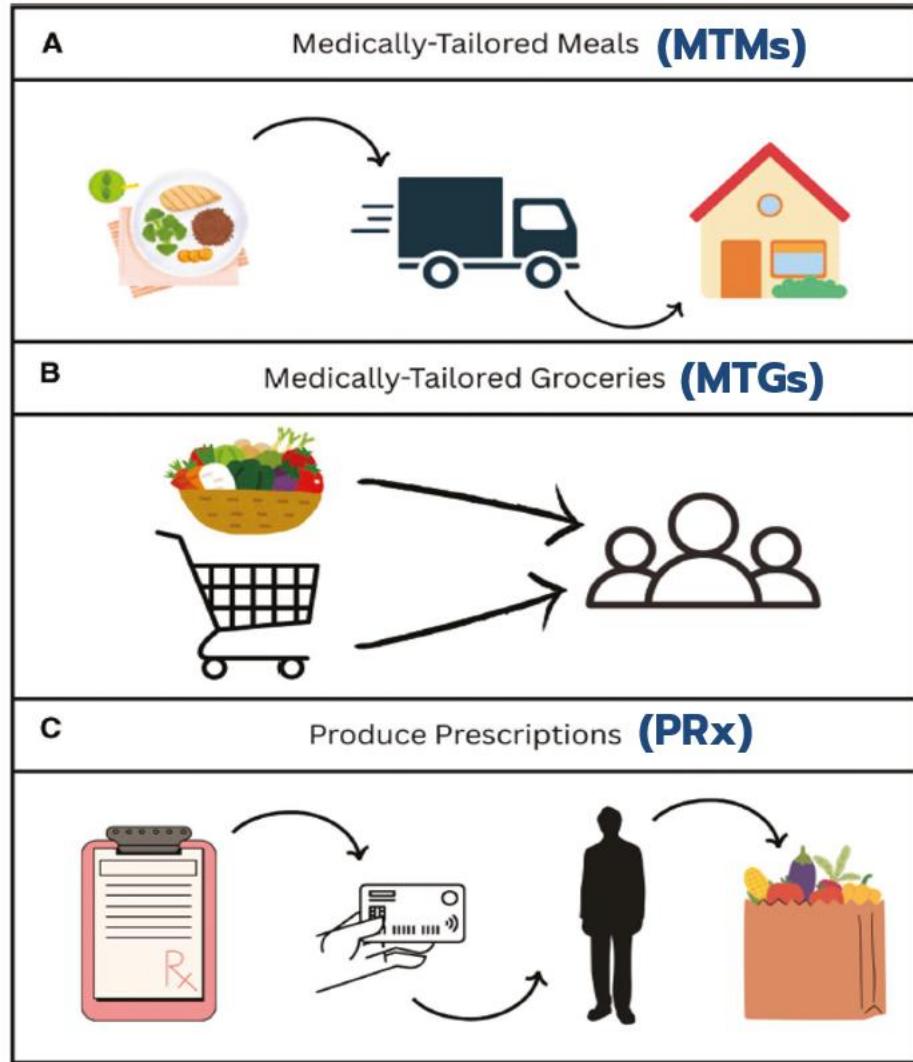
- Safety
- Efficacy
- Synergistic effect
- Function, pathway, metabolism



<https://pipacorp.com/nutraceuticals-ai/>

# FOOD is Medicine (FIM): Nutritional Therapy

Home-centric Living: Food program, Guidelines, and Social media



# Transforming Knowledge into Globally Competitive Thai Products

## Key Trusted Areas

- Functional foods
- Herbal extracts and botanicals
- Dietary supplements and nutraceuticals
- Food technology and processing innovation

## Upcycling & Biomass Valorization



## Plant-Based Production & Extraction



**BIOTEC**  
a member of NSTDA

## Physical & Advanced Processing



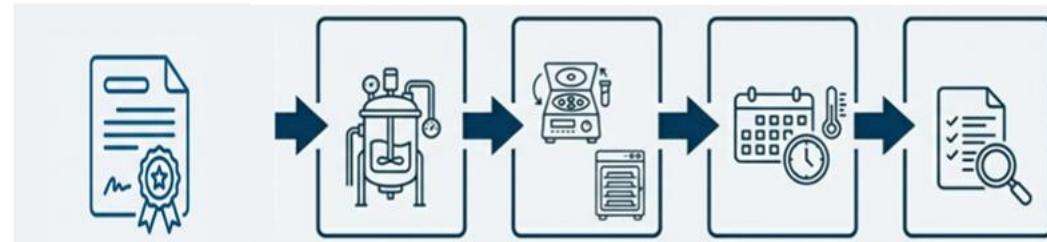
## Microbial & Enzyme Bioprocessing



## Chemical & Chemo-Enzymatic Synthesis



## Cell-Based & Tissue Culture Systems



## Scientific Evidence for Market Approval



### EFFICIENCY & HEALTH CLAIM



### SAFETY



### QUALITY & STANDARD

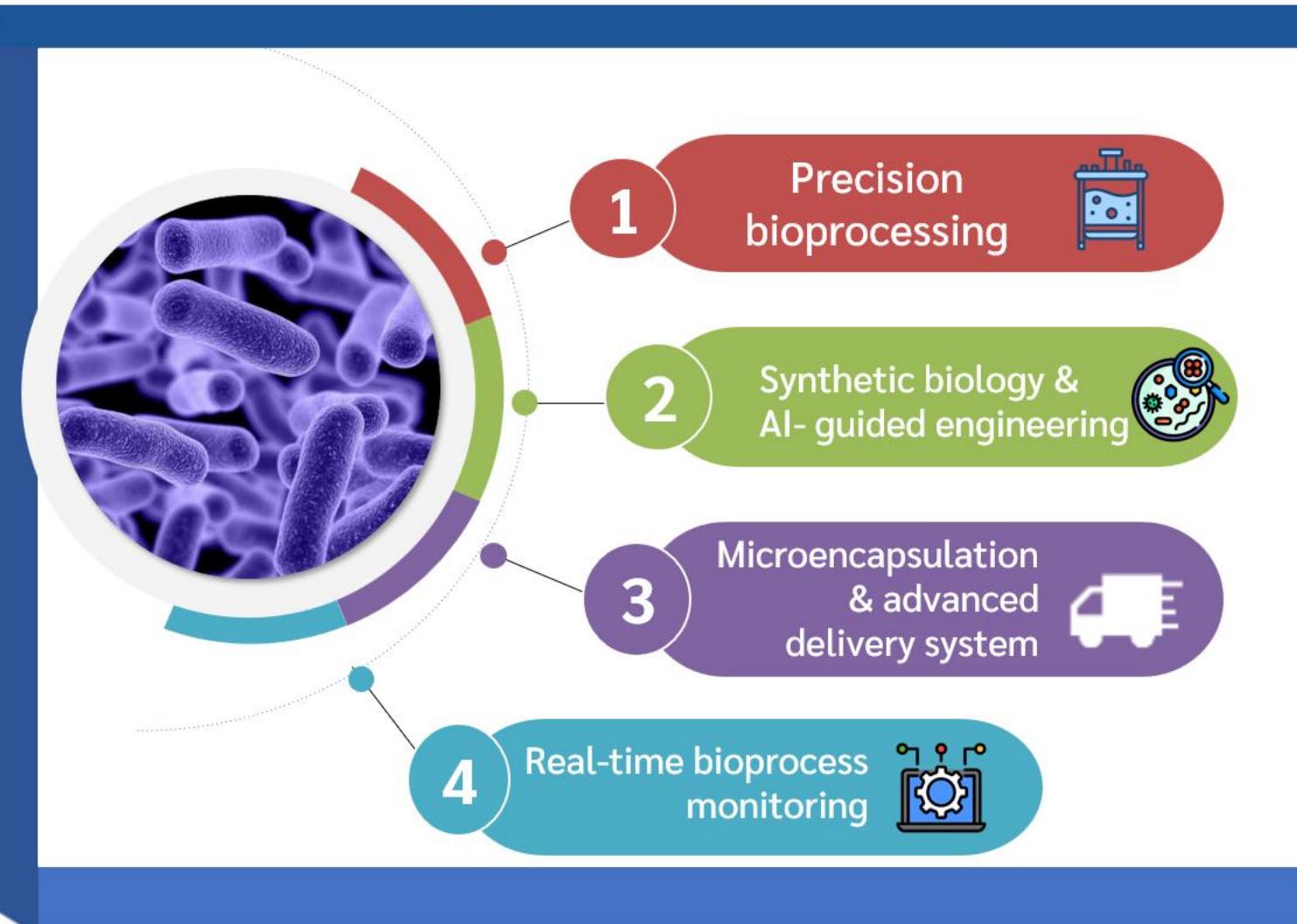
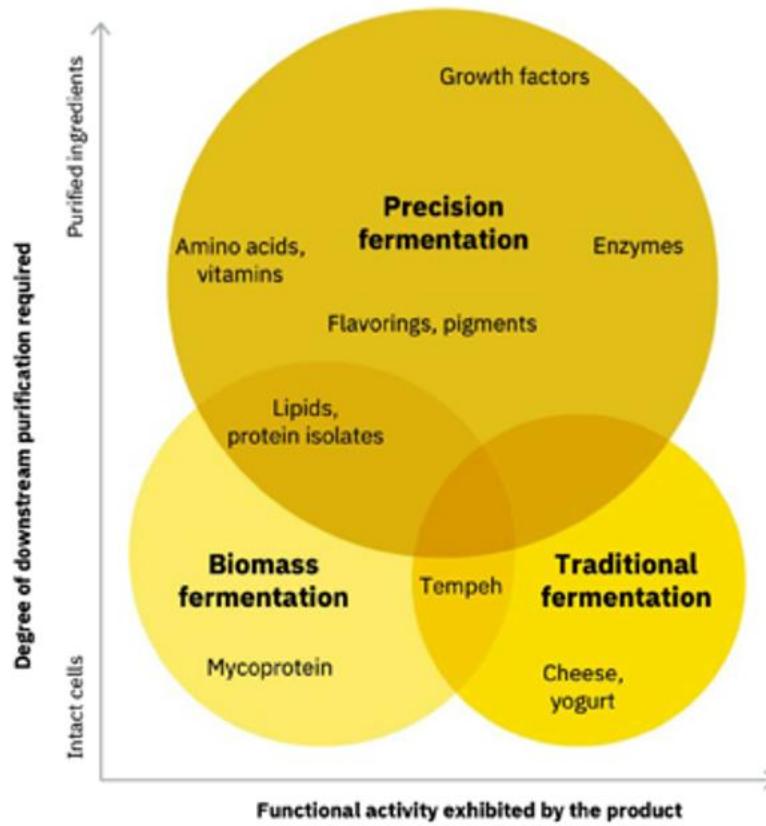


### HACCP



### ENVI-FRIENDLY

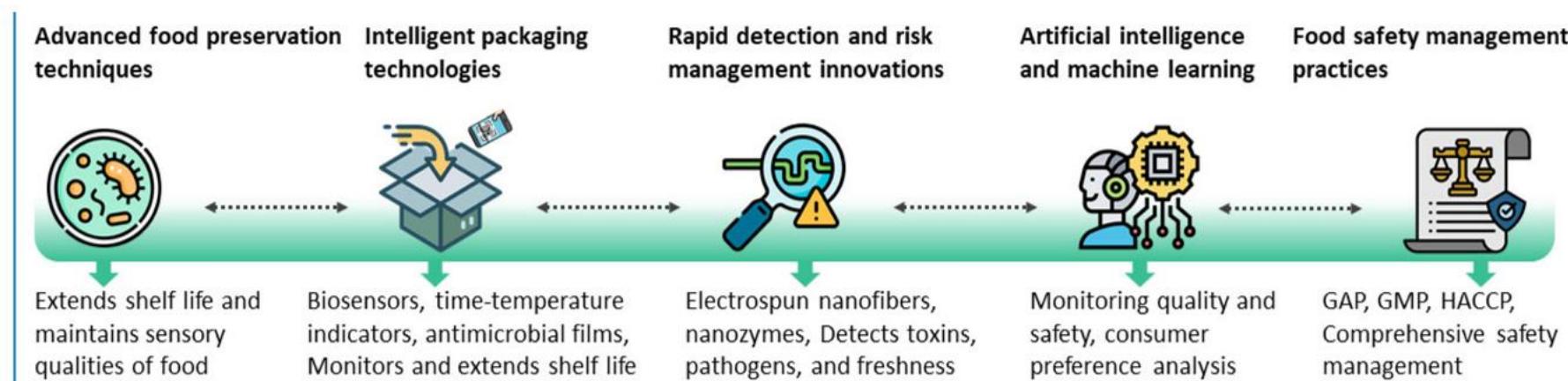
# Innovative Production Strategies for Revolutionizing FI through Bioprocessing



# Driving Innovation Towards Global-Standard Efficiency, Quality & Safety

## Advanced Analytical Testing for Product Innovation

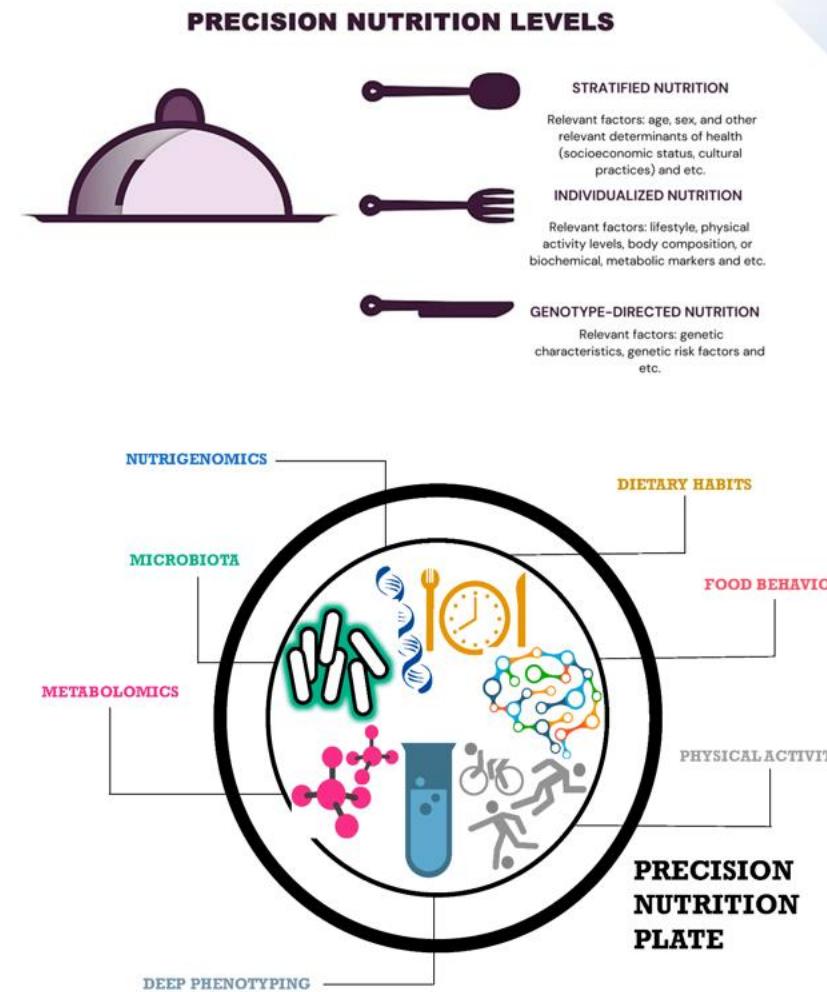
- Comprehensive testing to ensure the safety and quality of products
- Analytical methods to quantify nutrients and active ingredients accurately
- Microbiological testing to detect contaminants and maintain hygiene
- Stability testing to evaluate product performance over time
- Regulatory-compliant testing protocols for domestic and international markets
- Testing for Pre- & Post-marketing



# PRECISION NUTRITION



Source: Rabobank 2019

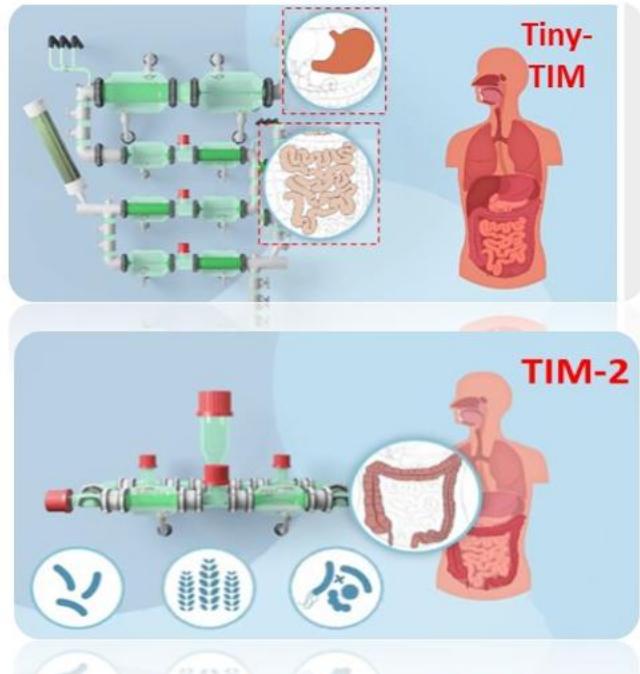


# Advanced Simulated Gut Models

## Food Digestion Platforms



Modified from ASM Journals. Microbiology and Molecular Biology Reviews. Vol. 86, No. 4. Stress Response in Bifidobacteria



**: TIM (TNO Intestinal Model)** TNO (Netherlands)

**: SHIME®**

(Simulator of the Human Intestinal Microbial Ecosystem)  
ProDigest (Belgium)

**: IViDiS** (In Vitro Digestive System, Semi-dynamic/static system),  
CSIRO (Australia)

**: GI-Sim** (Sweden)

# Multi-Omics Technology for Personalized Wellness

**METABOSERP**  
 powered by **foodSERP**



Metagenomics  
 (Microbiome + gene functional) + Metabolomics + Proteomics

## PERSONALIZED WELLNESS

### Biomarker

Identify microbial and metabolic biomarkers for stress, sleep, etc.



### Health checkup

Use microbiome-metabolome profiles for health monitoring



### Co-networking

Integrate multi-omics data to uncover host-microbe-metabolite interactions



### Precision supplements

Design personalized probiotics/supplement formulations



### Multi-omic Wellness platforms

Develop digital dashboards using a multi-omics health index

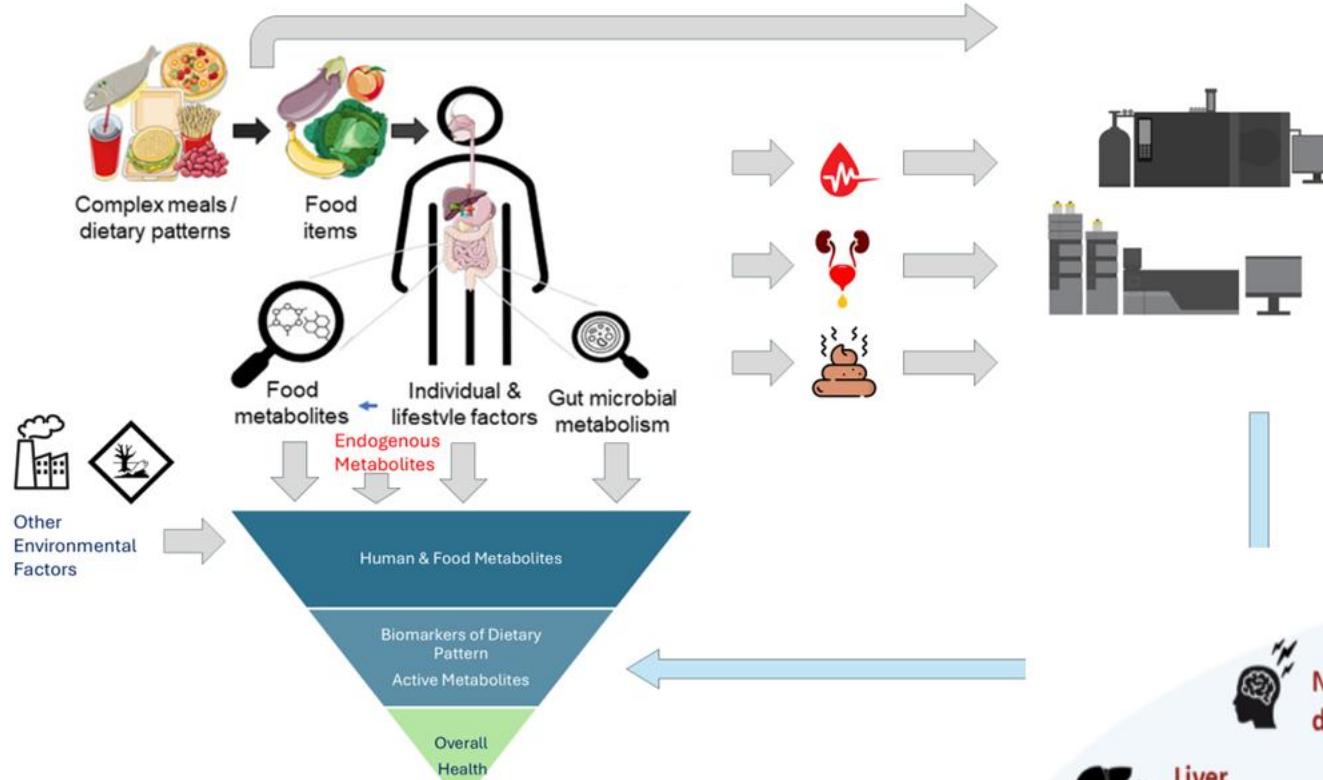
*Metabolic health  
 Cardiovascular risk  
 Stress & Sleep  
 Microbiome & Nutrition*



# Nutrimetabolomics: Personalized Nutrition/Longevity

## METABOSERP

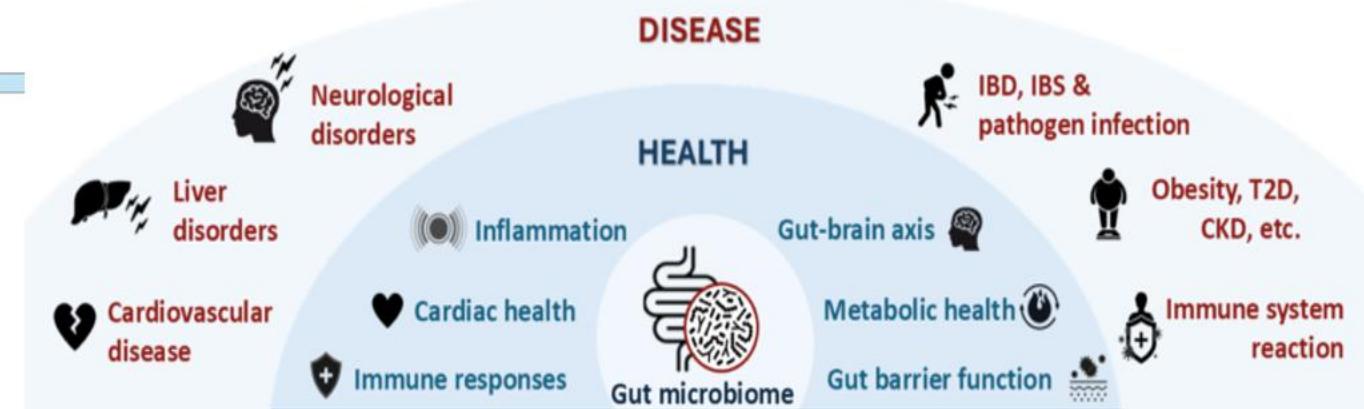
powered by **foodSERP**



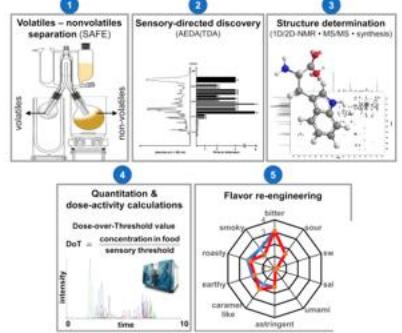
## foodSERP

### Targeted and Untargeted Metabolomics MetaboSERP®

- GC-SQ
- GC-QQQ
- GC-QTOF
- LC-QQQ
- LC-IM-QTOF

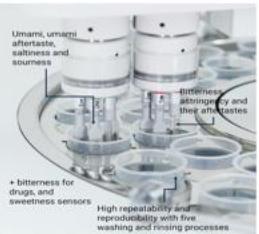


# Flavor & Texture Innovation



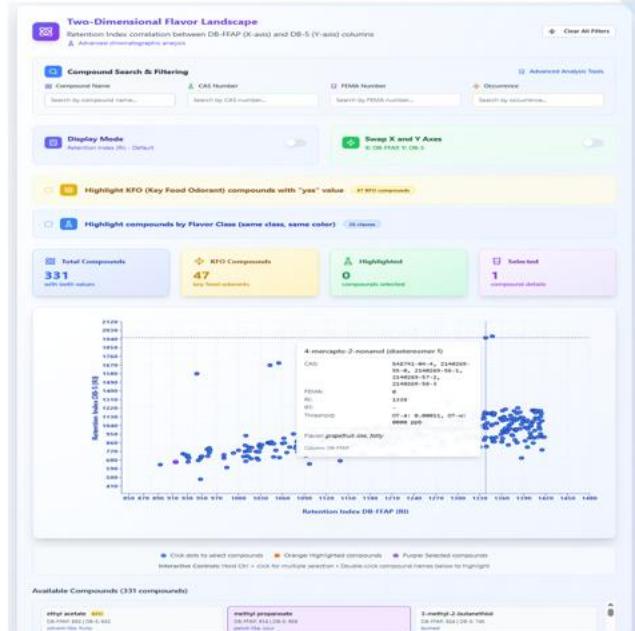
## Aroma and Taste Analysis

- Sensory Panels
- Flavor Profiling
- Quantification and analysis of odour molecules by gas chromatography olfactometry (GC-O)
- Measurement of volatile organic compound fingerprints, and dynamic flavor release phenomena by GC-O/TDF



## Applications

- Investigation and Identification of Flavor defects in Products
- Flavor reformulation
- Key Food Odour and Taste Compounds
- Shelf-Life investigation



# NSTDA-Food & Functional Ingredient Innovation

Functional Foods - Foods for Specific Groups-Precision Nutrition  
 Food Safety - Food Security - Food Packaging

## Functional Foods & Feeds

Well-Being (Health Benefits) Anti-Cancers, Anti-Hypertension, Anti-Oxidants, Anti-Inflammatory, Immune Simulation, Gut Health-Modulation (Prebiotics, Probiotics), Growth Promotion, Disease prevention



## Emerging Food Technology

Cultured Meats, Cultured Meat  
 Synbio & Precision Fermentation  
 Personalized Nutrition



**BIOTEC**  
a member of NSTDA

**MTEC**  
a member of NSTDA

**NANOTEC**  
a member of NSTDA

**NECTEC**

## Flavor & Texture Innovation

Food Odor Flavors, Palatants, Flavor Enhancers, Taste Modulation Solutions, Flavor Formulation  
 Elderly, plant-based foods



## Alternative Proteins & Foods for Specific Groups

Infant, Adult, Elderly Foods, Diabetes Diet, Medicinal Foods High Protein Foods, Vegetarian, Plant-Based Products Precision / Personalized Nutrition

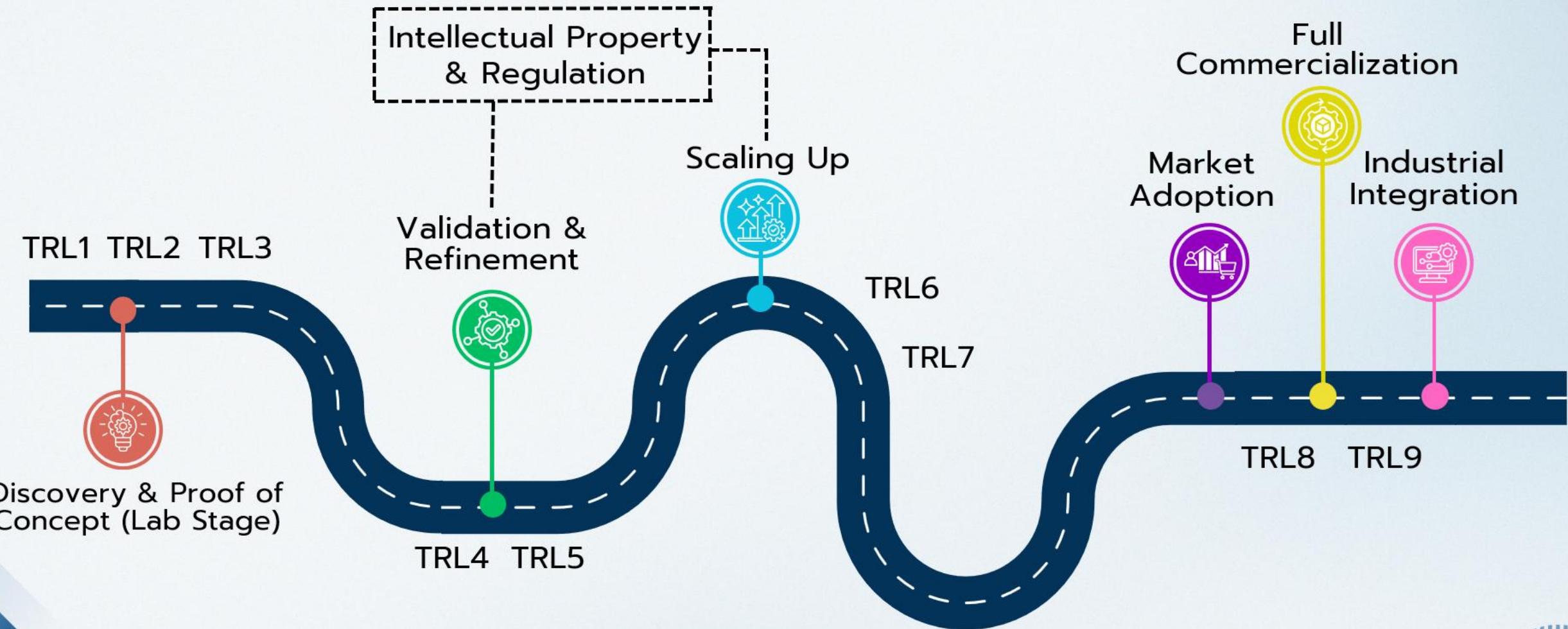
## Food Security, Safety, and Sustainability

Risk Assessment Analysis, Toxicity Evaluation, Microbial safety, Probiotic safety evaluation

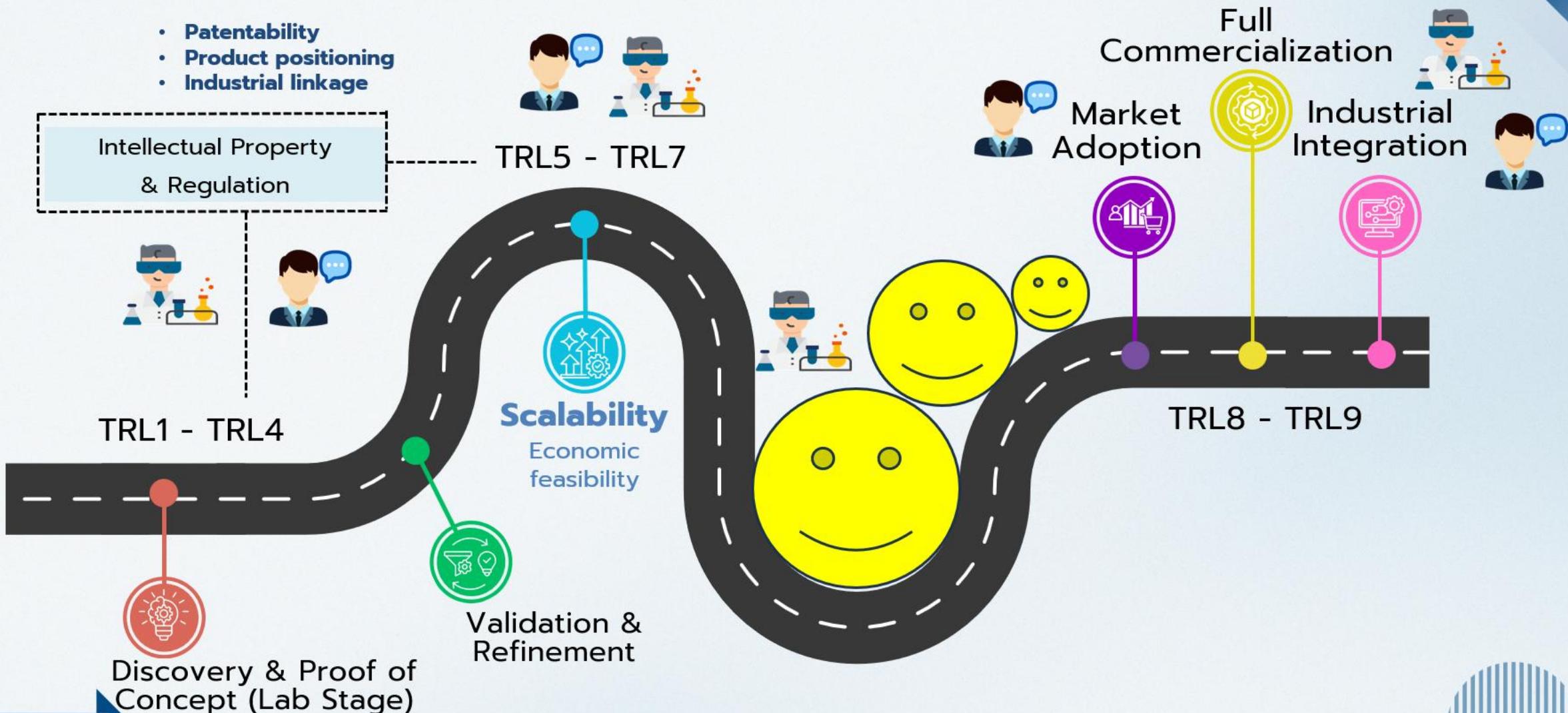
## Food Packaging

Shelf-Life Extension, Biodegradable, Sustainable, Green Processing

# Conventional Research Approach



# Quick-win Research Approach



## TECHNOLOGY & FACILITIES



SKIN & ANTI-WRINKLE LAB  
Advanced Cosmeceutical Services



## SERVICE PLATFORM



Advanced Flavor Innovation Lab



Precision Nutrition for Health & Wellness



Pre-Marketing

Post-Marketing



**foodSERP**



Efficacy, Quality & Safety Testing



บริการเทคโนโลยี/วิเคราะห์ทดสอบ

บริการพัฒนา/นวัตกรรมกระบวนการและผลิตภัณฑ์

การผลิตและขึ้นทะเบียนผลิตภัณฑ์



**PRODUCTION FACILITIES**



NanocosmeticGMP



FILM PACKAGING FACILITY  
Innovation & Quality in Every Layer



BIOTEC  
Peptide for Health  
Advanced Molecular Solutions



BIOTEC  
Probiotics  
Engineered for Gut Wellness

## PRODUCT GROUPS



Functional Foods



Functional Ingredients



Alternative Proteins



Food for Elderly



Food for Patients



Food for Specific Needs



Health & Wellness



Precision Nutrition



Pet Foods



Pet Care

# Translating Thai wisdom into modern science for food and FI innovation

- **Developing unique Thai value propositions** through indigenous ingredients, traditional wisdom and modern science
- **Meeting the demands** of health-conscious global consumers, transparent solution & trustworthy
- **Evidence-based claims and consumer trust**
- **Strengthening collaboration & ecosystem**
- **Encouraging enterprises (SMEs)** to adopt research-driven product design and branding strategies
- **Linkage to stakeholders** for commercialization



# ขอบคุณค่ะ

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