

SCIENCE & FLAVOUR



SINGAPORE INSTITUTE OF TECHNOLOGY & FOODPLANT

How SIT and FoodPlant are changing plant-based innovation in Asia

By Cath Isabedra

The plant-based food sector is surging across Asia, driven by consumer demand for healthier and more sustainable options. Yet, success in this space hinges on more than novelty – it requires culinary localisation, technical innovation, and effective research commercialisation. In Singapore, the Singapore Institute of Technology (SIT) and its food innovation

hub, FoodPlant, are at work, turning lab prototypes into market-ready products that suit local palates.

Through close industry collaboration, cutting-edge food tech, and even partnerships with world-class chefs, they are helping Asia's plant-based foods not only taste better but also scale up for commercial success.

From lab to market: Scaling culinary-driven food tech



SIT is a university built on applied research and industry partnership, and food innovation is a ke focus.

"At SIT, we recognise that transforming plant-based research into market-ready products requires more than just blue sky food science research," said Professor Susanna Leong, Vice President (Applied Research), Singapore Institute of Technology. "It's about creating solutions that resonate with the local consumers, both in terms of taste and nutritional value."

SIT's researchers collaborated with FoodPlant to bridge the often-overlooked chasm between formulation

and market fit. FoodPlant's pilot-scale processing capabilities—complete with extrusion, thermal processing, and spray drying—allow companies to validate, refine, and scale their innovations without significant capital investment.

Crucially, FoodPlant isn't just a production site. "It's a hub for testing, refinement and real-world validation," Prof Leong emphasized. "For plant-based food products to succeed in the marketplace, they must align with local culinary preferences and rely on more easily accessible ingredient sources."

Why does this matter? It enables food innovators to factor in unique flavors that are still familiar to consumers.

That's why they need to leverage culinary science as a competitive advantage.

A unique element of SIT's approach is its deep partnership with chefs from the Culinary Institute of America (CIA). This chef-scientist collaboration brings technical innovation to life.

"Chefs bring an artistry and hands-on expertise in culinary execution that is vital to refining the texture, flavour, and overall presentation of plant-based foods," Prof Leong explained.

These cross-disciplinary teams experiment with techniques like fermentation and emulsification to enhance sensory appeal, while ensuring nutritional balance. This is especially crucial in Asia, where local flavors, textures, and culinary formats—from zi char stir-fries to hotpot—must be authentically replicated or reimagined.

However, balance is key to success.

"The intersection of food technology and culinary artistry is where innovation truly flourishes," she added. When you look at plant-based development, food innovators should look beyond merely creating a functional product—they also must make sure it appeals to the consumer. "Achieving this balance requires a deep understanding of both the technical properties of ingredients and the subtleties of flavour, texture, and presentation."

Healthier alternative plant-based cheese from optimised formulation of ingredients
(Photo: Agrocorp)



Accelerating commercialisation for local innovators

“SMEs can tap into the expertise of SIT’s food scientists, process engineers and culinary partners,” said Prof Leong. “...allowing them to innovate more efficiently while reducing upfront capital costs.”

Companies like SustyFoods and Fish Soup Paradise have already demonstrated the impact of this model. “Empowering startups with hands-on control of the production process... can lead to major improvements in product quality and innovation speed,” said **Associate Professor Lim Bee Gim, Technical Advisor of FoodPlant.**

These examples highlight a broader truth: accessible infrastructure, paired with technical mentorship, can turn high-potential concepts into shelf-ready products that resonate with consumers.

Engineering sustainability into the process

Beyond taste and format, plant-based innovation must also address sustainability. At FoodPlant, technologies like extrusion, thermal processing, and spray drying enhance product quality and reduce waste across the supply chain.

“Extrusion allows plant-based ingredients—such as legume flours and protein concentrates—to be transformed into high-protein snacks or meat analogues with appealing textures,” said Assoc Prof Lim. “The process is highly efficient, converting the majority of input materials into final product with minimal processing loss.”

Thermal processing extends shelf life for sauces and ready meals, while spray drying turns plant-based beverages into longer-lasting powders. These technologies enable ambient storage, reduce spoilage, and increase distribution reach—critical advantages in emerging markets.

Moreover, upcycling has emerged as a strategic sustainability tool. For instance, okara—the byproduct of soy milk production—has been stabilised and reformulated by FoodPlant to create functional ingredients that improve nutrition and texture in plant-based foods.

A plant-based mochi corndog called Corndochi, comprising a firm meat-like sausage wrapped in soft and chewy mochi, coated with a crunchy breaded seaweed exterior, started off as Team Green Munch’s capstone project. (Photo: Goh Chool Teng)



Clean labels, familiar flavours, and future-ready formats

Singapore’s plant-based future hinges on innovation and alignment with shifting consumer expectations. “Consumers are becoming more ingredient-literate, scrutinising labels for synthetic additives such as emulsifiers, stabilisers, and preservatives,” Assoc Prof Lim shared.

This trend pushes food innovators toward clean-label formulations using natural fibres, protein isolates, and locally available ingredients. More importantly, flavour and textural adaptation for Asian meals is becoming non-negotiable.

“Singaporean consumers expect plant-based products to fit seamlessly into their dining habits, whether it’s for hotpot, zi char, or hawker-style meals,” she noted. “Manufacturers who can adapt to Asian culinary formats will have a clear competitive edge.”



Fermentation and the next frontier of food

"Fermentation allows us to engineer microorganisms to produce specific proteins, fats, and other bio-based components that can replicate the taste, texture, and nutritional profile of animal-based foods," said Prof Leong. "The scalability of fermentation is particularly promising—it allows for large-scale production at cost."

This opens the door to functional, clean-label, and affordable alternatives that meet environmental and nutritional standards, addressing two major friction points in the current plant-based market.

A model for Asia's plant-based growth

Singapore's integrated approach—academic innovation, state-of-the-art infrastructure, and culinary collaboration—has set the stage for regional leadership. The model championed by SIT and FoodPlant doesn't just reduce the time-to-market for plant-based products; it increases the likelihood of success.

As Prof Leong noted: "Localisation is essential... Without

it, the adoption of plant-based products will likely face resistance or slow growth due to a mismatch between the product and local tastes, dietary habits, and cultural norms."

By investing in regional relevance, taste-led design, and sustainable production, Singapore's ecosystem is helping define what the future of plant-based innovation in Asia can—and should—look like.

With insights from Professor Susanna Leong and Associate Professor Lim Bee Gim.



Professor Susanna Leong
Vice President (Applied Research),
Singapore Institute of Technology

Professor Susanna Leong is the Vice President (Applied Research) at the Singapore Institute of Technology. She oversees the development and growth of applied research, including formulating and implementing strategies, policies, and processes to enhance the quality and integrity of research activities in the university.

Her current research interests are in biomolecular engineering and bioprocess engineering for applications in food, health-care, and bioremediation. Her ongoing research projects are done in close partnerships with local enterprises, multinational companies, and government agencies with the intent to drive translation.

Prof Leong sits on several national technical panels, including Startup SG Tech and food scientific review panels. She is also an editorial board member for a number of international peer-reviewed scientific journals, including 'Chemical Engineering Science' and 'Food and Bioprocess Processing'.

Her previous appointments at SIT include serving as Cluster Director of the Food, Chemical, and Biotechnology cluster and Assistant Provost (Applied Research). Her research accomplishments have been recognised through several awards, including the Tan Chin Tuan Fellowship in Engineering, most cited author for 'Food and Bioprocess Engineering' (2006-2009), and the Danckwerts-Pergamon Prize awarded by Cambridge University. She was a recipient of the Public Administration Medal (Bronze), National Day Award in 2018. Prof Leong is currently a Fellow of the Cambridge Commonwealth Trust and holds an Adjunct faculty appointment at the Yong Loo Lin School of Medicine, National University of Singapore.

Prof Leong graduated with a BEng (First Class Honours) and MPhil in Chemical Engineering from the University of Manchester Institute of Science and Technology (UMIST) and a PhD in Chemical Engineering from Cambridge University.



Associate Professor Lim Bee Gim
Technical Advisor, FoodPlant | Associate Professor,
Singapore Institute of Technology (SIT)

Dr. Lim Bee Gim brings nearly 30 years of experience in food innovation, manufacturing, and education. She was the Founding CEO of FoodPlant, where she led the establishment of Singapore's first shared food processing facility. Under her leadership, FoodPlant became a strategic platform supporting companies—from startups to established manufacturers—in developing and scaling sustainable food solutions, including alternative proteins.

Currently serving as Technical Advisor at FoodPlant, Dr. Lim provides expert guidance in food processing, product innovation, and commercialisation. She is also an Associate Professor at the Singapore Institute of Technology, where she mentors future food technologists and actively designs and delivers industry training courses to upskill professionals in advanced processing technologies such as extrusion and thermal processing.

Her work focuses on bridging research with practice, enabling companies to accelerate sustainable product development through access to shared infrastructure, technical expertise, and hands-on capability building.