

S'pore research institutes pump resources into fermentation tech

Rising global interest in new proteins sees higher levels of funding

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As investor interest in fermentation-based proteins rises globally, research institutes in Singapore are pumping in more resources to better support the nascent sector here.

This comes after a number of overseas fermentation start-ups received regulatory approval to launch in Singapore, but are instead prioritising larger markets such as the United States and European Union.

Compared with plant-based proteins and cultivated meat, fermentation-based proteins have been traditionally underfunded, but in the first half of 2024 they achieved high levels of funding globally, outpacing the other two categories.

According to alternative protein think-tank The Good Food Institute (GFI), US\$398 million (US\$510 million) in capital was invested in fermentation companies globally in just the first half of 2024, compared with US\$130 million for cultivated meat and US\$138 million for plant-based proteins. In comparison, US\$443 million was invested in fermentation companies in the whole of 2023.

One factor behind the increasing investments could be that the fermentation sector is generally at an earlier stage of growth compared with the plant-based proteins sector, as companies are now scaling up production and would require more funding to do so, said GFI Asia-Pacific's (APAC) managing director Mirte Gosker.

Plant-based proteins, on the other hand, have been in the market for much longer, she added.

While traditional methods of fermentation are age-old, new fermentation techniques – which typically fall under two broad categories of biomass and precision fermentation – are emerging as a more sustainable way of producing proteins and other food ingredients.

Biomass fermentation start-ups – which have always received the bulk of funding – create new food products by essentially growing protein-rich microbes in a bioreactor for direct consumption.

The recently launched Bezos Centre for Sustainable Protein at the National University of Singapore, which received \$39 million in funding from the Bezos Earth Fund, will help bring these prod-



Precision fermentation giant Perfect Day's Very Dairy, made from fermented whey protein, was sold in FairPrice stores in 2022 and 2023. Media reports say the company had undergone restructuring in 2023, pivoting away from its consumer-facing business to focus more on R&D and the business-to-business market. PHOTO: PERFECT DAY

ucts closer to commercialisation, and look into how these food ingredients can improve the taste and nutrition of other alternative proteins such as cultivated meat and plant-based meat.

But precision fermentation technology – where microbes are used as “cell factories” to produce a range of food ingredients – is starting to garner more attention.

According to funding figures from GFI, global investments in precision fermentation start-ups in the first half of 2024 totalled US\$90 million, almost on a par with the total funding channelled into biomass fermentation firms in the same period – US\$103 million.

Multinational companies such as Unilever and Danone are also looking to enter the precision fermentation space – a move that underscores the industry's promise, said Ms Gosker.

These companies have a track record of allocating substantial research and development resources to resolve bottlenecks when they believe a food technology has high scalability potential, she added.

Food-tech investor Yip Hon Mun said precision fermentation technologies are more familiar and less complicated compared with cultivated meat, bringing them much closer to commercialisation.

There has also been a surge in US regulatory approvals since the beginning of 2024, with government funding favouring precision fermentation technologies in both

the US and Europe, he noted.

The National Research Foundation (NRF) in Singapore pumped in some US\$14.8 million in June to tackle the key challenges in the precision fermentation production process, and deepen its scientific and technical capabilities, with a new Centre for Precision Fermentation and Sustainability.

Professor Subodh Mhaisalkar, executive director of academic research at NRF, said: “The research will increase our talent pool in precision fermentation and better position Singapore to effectively regulate precision fermentation food products and its applications, as demand is expected to increase in tandem with global food security concerns.”

Ms Guo Xiuling, chief executive of Temasek-backed food-tech platform Nurasa, told reporters during the official launch of its Food Tech Innovation Centre in April 2024 that precision fermentation has always been a “strategic interest”, given its potential as a platform technology that can produce not just protein, but also other important nutrients.

Overall, however, the market size for both types of fermentation technology in the Asia-Pacific region still pales in comparison to Europe and the US.

Admittedly, there is some catching up to do, with greater consumer education needed on the benefits of fermentation-derived proteins, an area that GFI Asia-Pacific is looking to address, said Ms Gosker.

A number of fermentation-based start-ups, which have received the regulatory green-light from the Singapore Food Agency (SFA) to launch their products here, are prioritising overseas markets first.

For instance, precision fermentation giant Perfect Day ceased its business operations in Singapore in late-2023 and has stopped selling its products here.

The company, which produces animal-free dairy proteins, sold its Very Dairy milk and Coolhaus ice cream, made from fermented whey protein, in FairPrice stores in 2022 and 2023. The Straits Times understands that it stopped selling them from January 2024.

Perfect Day and A*Star were meant to launch a joint R&D lab by April 2021, but it was put on hold due to the Covid-19 pandemic. “The opening of the joint lab is now pending Perfect Day's review of their strategic directions,” said an A*Star spokesman.

Perfect Day did not respond to repeated queries from ST, but media reports said the company had undergone restructuring in 2023, pivoting away from its consumer-facing business to focus more on R&D and the business-to-business market.

Local biotech firm TurtleTree, which has operations in Singapore and the US, is prioritising the US market to commercialise its sustainably produced lactoferrin – a key ingredient found in human milk made using precision fermentation.

The company is aiming for regulatory approval in the US before following up with SFA for regulatory approval here, said its CEO Fengru Lin.

“Leading with US regulation allows us to capture the biggest market in the world... (but) we do see Singapore as a wonderful gateway to the rest of Asia, so it is a close second market that we are tackling,” she added.

Mr Yip, the food-tech investor, said: “Companies have always been drawn to Singapore's favourable regulatory environment, but as they enter their next growth phase, they face challenges such as a smaller market size, limited manufacturing capacity and an underdeveloped ecosystem.”

One of the key bottlenecks hindering the scale-up of fermentation technologies globally is the lack of sufficient bioreactor capacity, which is particularly pronounced in the Asia-Pacific region, according to a 2023 report.

Singapore has one such facility, known as ScaleUp Bio, which essentially provides contract manufacturing services to fermentation companies looking to scale up from the lab to pilot scale.

The company, which received a food manufacturing licence from SFA in May, has signed agreements with at least five companies here to begin production.

Mr James Petrie, chief executive officer of Australia-based Nourish Ingredients, told ST that the company selected Singapore as an Asia-Pacific hub as it offers a highly enabling ecosystem with regulatory and legal support, and production capabilities.

The company, which produces precision fermented fats that can be used to amplify plant-based meat and dairy products, is working closely with ScaleUp Bio to scale up production, and with SFA for regulatory approval in Singapore.

Finnish company Solar Foods, which received regulatory approval here in end-2022 for its fermented protein ingredient Solein, has launched a number of limited-edition products in Singapore at various food and beverage outlets, such as a chocolate ice cream infused with Solein at Italian restaurant Fico.

Previously, production quantities were limited, but since its first commercial-scale facility became operational in April, it is ramping up production.

“(The facility) will have a target capacity of 160 tonnes of the novel protein annually, enabling larger commercial use of Solein in the food industry,” said its spokeswoman.

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