Case story
ScaleUp Bio , Singapore

Food for the future: nurturing innovation for the next food revolution in Singapore

The urgent need to develop a sustainable, resilient and robust food system for the future is a central focus for the global food-tech industry. This is a top priority in Singapore, where factors such as climate change and geopolitical turbulence are ever-present threats to a country that imports 90 percent of its national food requirements.

The associated risk generated by this dependency on imported food has triggered companies in Singapore's rapidly growing alternative food sector, where the collective aim is to transform the country's agri-food industry in line with the government's 30 by 30 goal – home-producing 30 percent of nutritional needs by 2030.

One enterprise at the forefront of this advance is ScaleUp Bio. Established in 2022 as a joint venture between a global leader in nutrition and food processing, and a company focused on driving the commercialization and advancement of new sustainable food sources, ScaleUp Bio is a pilot industrial scale contract development and manufacturing organization (CDMO).

Established in 2022 as a joint venture between a global leader in nutrition and food processing, and a company focused on driving the commercialization and advancement of new sustainable food sources, ScaleUp Bio is a pilot industrial scale contract development and manufacturing organization (CDMO). ScaleUp Bio has commissioned two food-grade precision fermentation facilities in Singapore, featuring high-speed separation and membrane technology from Alfa Laval. With customers in the USA, Europe, Australia and Asia already contracting their capacity , ScaleUp Bio provides state-of-the-art facilities, expertise, experience and essential services to start-ups and established companies seeking to develop new food innovations from lab to commercial-scale operations.

Global Head of Next-generation Food, VP Johan Agrell, and a team of colleagues from across Alfa Laval worked closely with ScaleUp Bio throughout the design and tender process on both projects. For the first one, Alfa Laval proposed an adaptable separation solution in the form of the **PureFerm 250** high-speed separator, which has the flexibility to run in different configurations.

"We wanted to show some differentiation and value of the Alfa Laval solution to demonstrate that we are a process expert – someone who they can work with and trust to help them develop this application in an emerging industry."

Johan Agrell
VP, Global Head of Next-generation Food

The PureFerm separator offered several advantages: it is fully hermetic; energy consumption is reduced by up to 40 percent; and it can be run to deliver continuous or intermittent solids removal depending on how it is configured. This flexibility was a significant factor when discussions turned to the potential incorporation of membrane technology into the process.

"ScaleUp Bio needs versatility in their downstream processing, and they saw the potential in Alfa Laval's **MultiSystem membrane filtration system** to deliver a unit that could operate from pilot scale up to commercial scale depending on requirements," Johan says. These two units, plus a CIP skid, have been installed and have undergone pre-operational testing in Singapore's first food-grade commercial fermentation facility. Initial concerns over how to meet Singapore's food safety and hygienic standards were addressed during the installation and commissioning. "Partnering with Alfa Laval to accelerate the development of this dynamic and promising industry has been invaluable in resolving bottlenecks for the next food revolution through submerge microbial fermentation. I look forward to our continued partnership," says Aaron Yeo, General Manager at ScaleUp Bio.

Located in the new, high-tech manufacturing district of Tuas on the western side of Singapore Island, the facility provides customers with submerged fermentation capacities between 100 and 10,000 litres with a focus on downstream processing–enabling a smooth transition from pilot to commercial scale. The second facility is a research and development lab-scale facility that will support innovation in new foods with equipment and services specifically designed to meet the requirements of the emerging alternative food industry. With this project, Alfa Laval will supply an **MBPX404 separation** system and two **PilotUnit Multi systems,** the latter having the versatility

In less than a generation we need up to 70 percent more nutritious and healthy food for a growing population – and ideally, while consuming less energy, water and raw materials to produce it. Precision fermentation is key to achieving that objective

Food production is responsible for around a third of all greenhouse gas emissions. Most emissions happen at the agricultural end of the supply chain. By removing the need for rearing livestock, the emission footprint of beef can be reduced by 90 percent with precision fermentation (UNEP, 2023).

The agricultural sector is accountable for 70 percent of freshwater withdrawals globally. Again, by reducing the requirement for growing feed to livestock and rearing livestock, water consumption in the agricultural sector can be reduced by more than 90 percent (UNEP, 2023).

to test all kinds of products for microfiltration, ultrafiltration, nanofiltration and reverse osmosis in batch or semi-batch mode. "Key to winning this order was our relationship with the customer," says Johan. "We had been working with them for the previous three years to understand exactly what they were looking for so that when the tender was released, they requested our equipment, and all we had to do was find the best price and lead time." These projects have provided significant learnings for both parties at the forefront of a rapidly growing industry. There is huge potential for ScaleUp Bio as it joins a small but growing band of specialist B2B companies offering contract development and manufacturing, end-to-end offerings to support innovation in the global food tech industry. For Alfa Laval, it demonstrates that it has the right equipment in its global portfolio and is ready to support in taking new ideas from lab to commercial-scale production.

"We knew these projects were a must-win for us," says Johan. "These are the first such projects in Asia and will serve as an incredible gateway to market for Alfa Laval to promote our separation and membrane technology while gathering meaningful insights into new precision fermentation processes and applications. The beauty of this industry is that there is so much potential. We don't yet know the full extent of what it can achieve, but it is exciting to be a part of this drive to increase the stability and sustainability of future food production."

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