The Green Roof Revolution

Saumil Shah and his enterprise Energaia are introducing spirulina to the Thai market while working to keep their carbon footprint to a minimum. BY AMITHA AMRANAND

Those who frequent the city's farmers markets may have come across the good-natured Saumil Shah and his bottles of green paste. Saumil's Skyline Spirulina booth is usually next to the Twist juice stand, so you can have a dash of the superfood in your freshly squeezed juices. It turns your drink dark green but leaves the flavour untouched.

Spirulina may sound alien to many in Thailand, especially those outside of the health-food loop. This single-cell alga, which grows naturally in fresh water in Thailand and around the world, has been consumed in tablet, powder, and flake form as a dietary supplement in Europe and North America since the 70s. As it is easy to grow, spirulina is also used by NGOs to help combat poverty and malnutrition because of its high protein content and ample vitamins and minerals.

"We chose spirulina because of a few different properties that make it a very good strain to grow. It's very healthy and nutritious for people. And it's known because it's been a food alga for many years. So as we try to sell it, there's some history and familiarity in the marketplace," Saumil says.

This is not spirulina's first appearance in the Thai market. Jiemjit Boonsom and her husband Somchai combined their knowledge in fishery and irrigation engineering, respectively, to develop a spirulina farm in Chiang Mai in 1989. Boonsom Farm now produces spirulina tablets and capsules under several brands, and with 40,000 sqm of concrete wells, the farm is currently the largest spirulina-growing facility in Thailand. HM the King's Suan Chitlada project is another researcher, grower, and producer of spirulina in powder, capsule, and cracker forms.

Instead of competing in the Thai nutraceutical market, Saumil's five year–old company, Energaia, which grows spirulina and produces Skyline Spirulina products, is trying to penetrate the mainstream food market in Thailand and abroad. The company has also developed a sustainable production system that is slowly expanding to more rooftops in Bangkok.

From Rocket Science to Rooftop Farming

Hailing from Atlanta, Georgia, Saumil did his undergraduate and master's degrees in aerospace engineering and went on to work in the energy division at GE in the US on both engineering and commercial sides. He first became interested in algae in 2007 when he came across articles on how power plants were growing algae to make biofuel.

"Even though my background is in aerospace engineering, that's not only aircraft engines and manufacturing. That's also large power plants. That background is very helpful and similar because a lot of large power plants are basically big scaled-up jet engines that are made to spin and produce electricity."

Not only that: Saumil had, for a while, wanted to become an entrepreneur.

"People at this time who were focused on this work were in the US and Europe. I had lived in Thailand in 2006 for a year, and I liked it here. I knew that the climate was very good for growing food products all year round. So I left GE in 2008. I did a bunch of research myself, trying to formulate what my approach would be. I moved here to focus on trying to produce algae," Saumil says.

From Animals to Humans

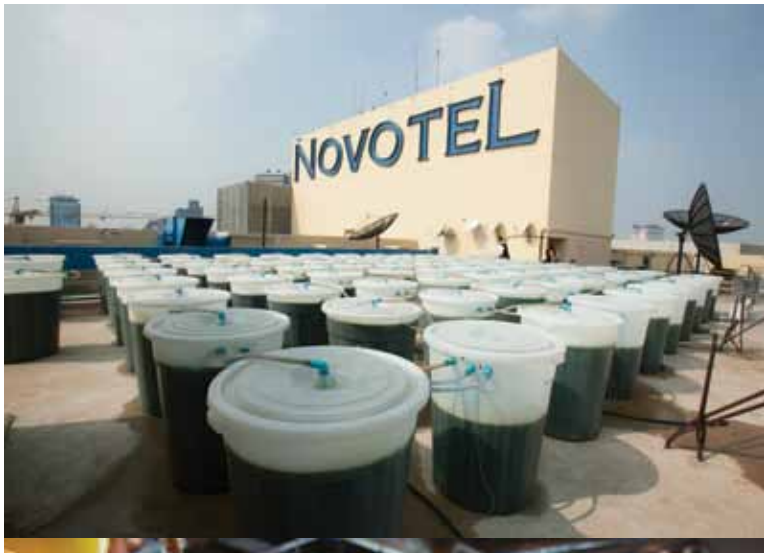
When he relocated to Thailand, Saumil decided to go into the animal feed market instead of biofuel because of the former's larger commercial potential. He met a local animal feed distributor who bought algae from China to be mixed into animal feed compositions and sold to local farmers. So Saumil began developing his enterprise towards growing and selling spirulina for animal feed.

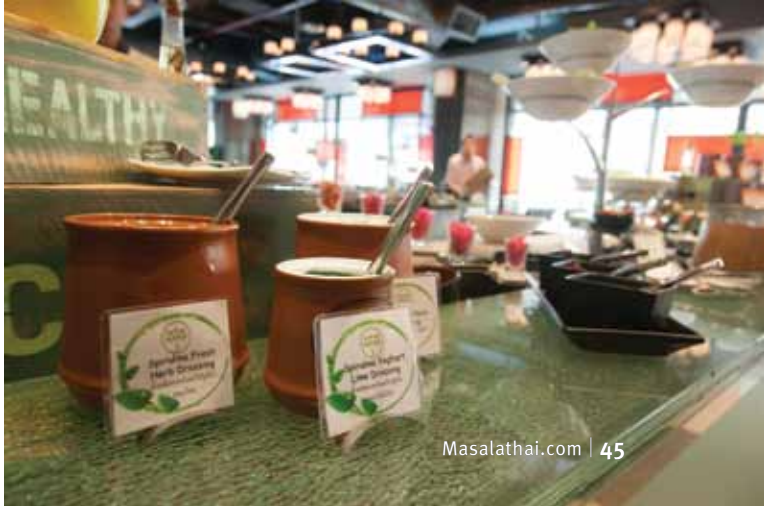
At the time, he had set up the lab and production facility in Ayutthaya, but the floods in 2011 left everything under metres of water for many months, and Saumil was forced to throw away nine months of work and start over again.

"It's hard to quantify [our losses] because we put a lot of money in, we put a lot of time in, and for peace of mind's sake, I didn't even bother to calculate…we didn't even try to see if we could salvage it. We just dumped it all," he recalls.

The entrepreneur returned to GE Thailand to earn his daily bread, while also setting up a new lab and production facility in the On Nut area in Bangkok. Cultivating spirulina for animal feed no longer made sense in the city, so Saumil turned to focus solely on developing products for human consumption.

From top: Spirulina flowing through an interconnected network of plastic tanks; spirulina in what Saumil calls its kindergarten and elementary-school stages; Energaia's spirulina farm on the rooftop of Novotel Bangkok on Siam Square; Novotel uses spirulina in its salad dressings.



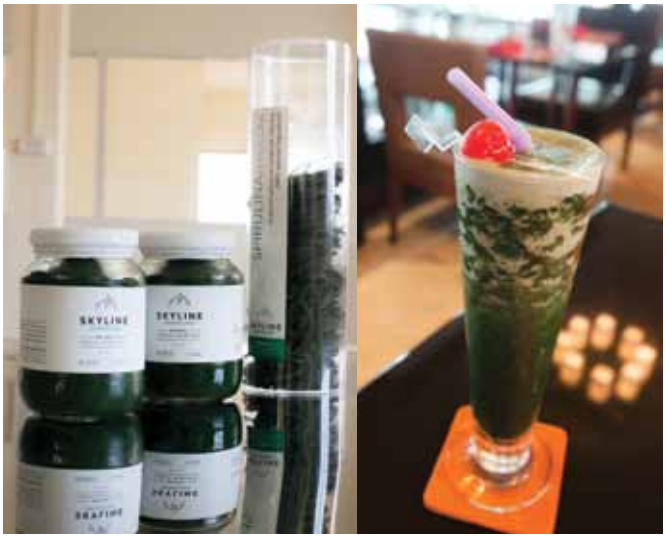


From Labour Intensive to Automated

Spirulina microfarms are a growing movement around the world. People cultivate spirulina in fish tanks, small ponds, and plastic storage containers in their backyards, balconies, and even inside their apartments for their personal and community consumption. Energaia's rooftop spirulina farm is a sort of microfarm, but Saumil also has a much bigger vision for his enterprise. And unlike their spirulina-farming predecessors in Thailand, Saumil and his team have developed a cultivation system that is scalable.

"We're looking to be able to scale to very, very large volumes to tackle the challenge of sustainable food production. So to do that, you want a system that's not very manual. You want to be able to automate pieces of it and have centralised locations to do certain things," Saumil explains.

Energaia now grows its spirulina on urban rooftops, in an interconnected network of plastic water tanks each containing 300 litres of water. The spirulina is pushed through the system by the weight of water and filtered air that is pumped in from an air blower. For all the spirulina in the system to receive equal amounts of sunlight and nutrient, good mixing is required. To achieve this, there is a tube that pulls up the content from the bottom of each tank into the top of the next one. The content at the top then sinks to the bottom and gets sucked up into the top of the next container and so on. Finally, the spirulina is harvested several times a week, washed with saline solution, and spin-dried in a modified washing machine. Energaia had previously used a labour-intensive press-dry method that also broke the spirulina cells and shortened its shelf life. With the new drying method, not only is the process more automated, the spirulina has an even texture and lasts three to four weeks when refrigerated.



From left: Skyline Spirulina's fresh paste and fettucine; spirulina-spiked pineapple shake at Novotel's restaurant

From One Rooftop to Many

Today, about a year after the launch of its fresh paste into the market, Energaia products can be found in several health food stores in Bangkok, such as Sustaina and Arirang. Twist uses the paste in their drinks and helps sell the paste separately. More recently, Energaia has begun exporting to health food distributors in the UK and Poland.

"We are still actively seeking more rooftop space as we have a lot of export demand for our Spirulina products and not enough production," Saumil writes in an email.

The company last year expanded its production facility to the rooftop of Novotel Bangkok on Siam Square, where Resident Manager Manuel Reymondin has made sustainability his policy. Apart from having a green roof, the hotel now uses spirulina in the sauces and drinks for their breakfast, lunch, and dinner buffets. They also sell Skyline Spirulina's fresh paste in the bakery and offer a spirulina facial mask—a product developed by the hotel from Energaia's spirulina—in the spa. This partnership has not only benefitted the hotel commercially, but also its CSR commitment to the environment, Manuel says over the phone. Energaia is in talks with several other properties in Bangkok for use of their rooftops and hopes to begin construction on the rooftop of a new community mall next to Udom Suk BTS station in January.

With more demands in Thailand and abroad, Saumil wants to expand production sites closer to countries that import his products, like in the Middle East or Sub-Saharan Africa for their climate. As demand increases, Energaia is developing ways to be more energy efficient and sustainable. In the future, Saumil hopes to work with tapioca mills—a research he began in Ayutthaya—to utilise their exhaust gas steam instead of the pure air currently used to aid spirulina flow through the system. His research found that this exhaust gas steam, which comes from the burning of wood bark and palm shells, contains more carbon dioxide and no harmful toxins. When used in spirulina cultivation, the spirulina can eat more carbon dioxide and produce more oxygen, thereby reducing Energaia's carbon footprint. The steam can also act as a free organic carbon source, reducing the need for fertiliser.

Saumil admits to having been naive about marketing spirulina in the Thailand, assuming that people here were already familiar with the alga. Breaking into the Thai supermarket continues to be a challenge, but the spirulina pasta has made an impact. In November, Energaia was handing out spirulina ice cream samples at the Spring Epicurean Market, and plans to sell their ice cream mixes at the same market this month.

And that's just the tip of the iceberg.

"We have a 20-year plan," Saumil says, "to make spirulina as common as spinach."