Green

Algae Market Potentially Worth $320 Billion Draws Honda, Eneos

- Microalgae could be used as biofuel in cars and planes
- Group plans to source algae from a new farm in Malaysia

An algae cultivation facility in Malaysia.*Source: Sarawak Biodiversity Centre*

By Erica Yokoyama January 24, 2022, 5:00 AM GMT+8*Updated onJanuary 24, 2022, 10:42 PM GMT+8*

Oil refiner Eneos Holdings Inc. and Honda Motor Co. are among a group of more than 35 Japanese companies and institutions that have banded together to try to tap the potential of microalgae to help replace fossil fuels and to provide an array of food and consumer goods products.

By banding together under an initiative called Matsuri (Microalgae Towards Sustainable & Resilient Industry), the group is hoping to create enough demand for the phytoplankton to make a large-scale algae farm viable in Malaysia.

The growing facility would be built by Singapore-headquartered Chitose Bio Evolution Pte. Ltd., which is constructing a 5 hectare (12 acre) trial farm on the Malaysian part of Borneo Island, with financial support from Japan's New Energy and Industrial Technology Development Organization.

Startups and companies around the world have been investing in microalgae because of its potential to replace biomass fuels such as corn and soybeans, that are part of the global food supply. One commonly used algae genus, Chlamydomonas, can absorb about 8.7 times more carbon dioxide than soybeans, according to Takanori Hoshino, an executive officer at Chitose Laboratory Corp.

The problem has been to grow and process algae at a scale that would be commercially competitive. Dozens of algae-fuel startups around the world have gone bust or retreated from trying to make biofuel over the past decades. By banding together, the Japanese group hopes to use their combined demand to make a large-scale farm viable.

Chitose is negotiating with the local Sarawak state government to secure land to expand its facility to 2,000 hectares by around 2027, and is looking to raise 200 billion yen ($1.8 billion) for the project. Chitose said it is also considering other locations in Southeast Asia and Middle East to build the facility.

The farm initially would use carbon dioxide from a local thermal power plant to feed the algae and produce 140,000 tons of microalgae a year. After the planned expansion, it would be one of the world's largest purpose-built algae farms, according to Rebecca White, executive director of the U.S.-based Algae Biomass Organization. At full capacity, the company expects 100 billion yen in annual sales from algae.

The site in the Malaysian state of Sarawak was chosen because of its more intense tropical sunshine, low risk of natural disasters and easy access to markets in Asia, said Tomohiro Fujita, chief executive officer of Chitose.

A sample of oil made from algae.

Source: CHITOSE GROUP

“Creating a business is within the realm of imagination,” said Fujita. “But we are creating an industry, which is something extraordinary.”

Natural algae have been harvested for centuries in Asia as a food source and began to gain popularity in the West in the 1970s with the development of a market for the cyanobacteria spirulina as a so-called superfood. To date, most production has come from harvesting natural sources in lakes and oceans for use as food additives for humans, fish and livestock, or as fertilizer.

What on Earth?

The Bloomberg Green newsletter is your guide to the latest in climate news, zero-emission tech and green finance.

Algae products in the food, feed, fuel and chemical sectors could have a combined annual market of $320 billion in 2030, according to the Center for Climate and Energy Solutions, and the past decade has seen a boom in cultivated products, typically by adding sugar to tanks of water to feed the algae. While most projects are focused on food and cosmetic ingredients, the big prize is to find a cost-effective way to make auto and jet fuel.

Eneos, which has been working on bio-jet fuel for more than 15 years, aims to begin commercial production of algae-based biofuel once Chitose starts operation in 2025.

Honda said it is still at the research stage for possible uses for algae and is also conducting its own investigation into cultivation. “We are mainly expecting to use algae as a fuel for aviation, which is hard to electrify, as well as resin autoparts,” the company said in an email.

The Matsuri consortium also includes half a dozen chemical companies, including Mitsui Chemicals Inc., which is considering using algae as an alternative to naphtha, a feedstock used to make fuels, solvents and plastics.

“By replacing chemical-based naphtha with a bio-based one, we can reduce carbon dioxide emissions and also convert many household products to biomass-derived products,” said Vice President Hideki Matsuo.

Other group members are investigating using the algae in applications as varied as printing, food, cosmetics and medical industries.

Still, the major hurdle is cost. Fujita predicts that Chitose will be able to produce algae for about 300 yen per kilogram once its expanded site is up and running.

“If the price drops to the 100 yen per kilogram level, many more companies will consider replacing their petroleum-based products with microalgae-based alternatives,” said Motonari Shibakami, senior researcher at National Institute of Advanced Industrial Science and Technology.

Taberumo’s ice-flake Spirulina.

Source: Taberumo Corporation

A key market needed to produce the scale to drive down the price is food. Microalgae offer an alternative protein source to crops such as soybeans. Spirulina, for example, is about 70% protein, and can produce as much as 14 times the output per unit area than soybeans, using less water, according to Toshiya Sasaki, chief operating officer of Chitose’s food startup Taberumo.

In an interview in Tokyo, Sasaki serves up a green-colored algae-filled meal, with pasta, mayonnaise, frozen dessert and guava and pineapple-flavored juice. He says the number of packets it has sold of flaked raw Spirulina, the company’s principal product, has increased 14-fold since April 2020.

“We want to establish the culture of eating algae,” Sasaki said.