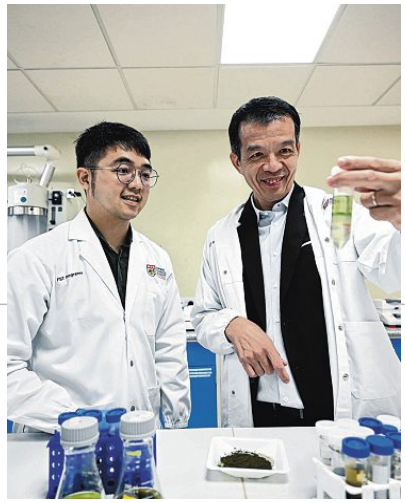

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NTU partners S'pore firm to produce microalgae oil

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A palm-oil alternative from microalgae developed by Nanyang Technological University (NTU) will be produced in bulk through a partnership with Eves Energy, a Singapore company specialising in scaling up sustainable innovations that is eyeing a listing on Nasdaq in the United States.

The production facility spanning 3,000 sq km will be located on Indonesia's Seram Island, the main island of Maluku province, said Eves Energy chief executive officer and president Lanz Chan.

The company will start with 400,000 tanks that can produce 1.2 million tonnes of microalgae oil and another 1.2 million tonnes of algae cake by the end of 2026.

Algae cake, a by-product of the oil extraction, is a nutrient-rich food product that can be used to beef up protein content in burger patties, for instance.

Based on the initial production volume, the project will be able to remove an estimated 2.6 million tonnes of carbon dioxide (CO_2) from the atmosphere. This is due to the microalgae's ability to capture CO_2 and emit oxygen through photosynthesis.

The facility also has the potential to reduce haze in the region, said Dr Chan. Unlike the manufacture of the microalgae oil, the haze-generating slash-and-burn method is used to clear land for plantations in Indonesia.

Eves Energy's facility can also provide farmers with an alternative source of income, said Dr Chan.

"Indonesia has been trying its best to eradicate the slash-and-burn method in agriculture. But it's difficult to monitor."

He pointed out that microalgae can absorb 400 times more CO_2 than trees, are a good source of edible oils and protein, and can double in mass every few hours. Despite such well-established benefits, previous attempts to create a similar process to grow microalgae and extract oil from them have been costly.

Producing the oil involves adding pyruvic acid, an organic acid that occurs in all living cells, to a culture medium solution with the alga, *Chromochloris zofingiensis,* which is then exposed to ultraviolet light to stimulate photosynthesis.

PhD student Aaron Li (left) with Professor William Chen, director of NTU's Food Science and Technology Programme. The method of producing the microalgae oil was developed by a team led by Prof Chen. ST PHOTO: AZMI ATHNI

The method was developed by a team led by Professor William Chen, the director of NTU's Food Science and Technology Programme, and announced in March 2022. The oil extraction process now takes less than an hour in the laboratory and work is under way to refine the process on an industrial scale.

While the algae oil can also be used in food, Dr Chan said that the extracted oil will be used in sustainable aviation fuel (SAF), where profit margins are the largest.

He estimates the crude algae oil and the dry algae cake can be sold at US$600 (S$824) per tonne.

According to the International Air Transport Association, jet fuel traded at US$957.12 per tonne as at Oct 13, 2023. Alton Aviation Consultancy director Joshua Ng said there will be significant demand for microalgae oil based on Dr Chan's wholesale pricing.

Mr Ng said: "There's strong demand for SAF, with demand outstripping supply, given aviation's push towards net-zero (carbon emissions) by 2050."

He added that apart from the need for significant investments to be made, SAF is expected to be more expensive to produce than fossil fuels due to the cost of feedstock and the production process. There is a lack of both feedstock and refining capacity to make SAF globally, and significant investments need to be made.

Eves Energy is currently in discussions for a reverse listing by merging with a special purpose acquisition company on the Nasdaq stock market.

NTU's oil extraction method will be licensed to Eves Energy, said Prof Chen, who will be a consultant on the project.

Phase two of the project is being planned to accelerate the growth of the microalgae through another innovation developed by Prof Chen. It involves using food waste to feed the microalgae in a fermenter.

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