

JOINT NEWS RELEASE

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NTU Singapore and clean energy incubator Eves Energy collaborate to scale up innovation that produces greener alternative to palm oil from microalgae

An innovation to produce an alternative to palm oil for food applications, developed by scientists at **Nanyang Technological University, Singapore (NTU Singapore)** will be scaled-up for commercial production through a partnership with **Eves Energy**, a research and development company that focusses on scaling up innovations that hold key to clean energy systems.

The innovation¹ developed by a team led by **Professor William Chen, Director of NTU's Food Science and Technology (FST) Programme**, features a method that effectively produces and extracts plant-based oils from a type of common microalgae. As the oils produced from the microalgae are edible and have superior properties as those found in palm oil, the newly discovered method would serve as a healthier and greener alternative to palm oil.

After the oil has been harvested by the algae, the rest of the plant, which is edible, is then converted into algae cake, a nutrient-rich food product that can be converted into supplements, as well as used in food production as seaweed.

The collaboration will see Eves Energy set up a facility in Indonesia in 2024 with 400,000 tanks that could produce 1.2 million metric tons of microalgae oil and 1.2 million metric tons of algae cake within two years. In addition to be a palm oil alternative, the microalgae oil produced from this endeavour could also be a sustainable source of renewable energy.

The two-year strategic plan would also benefit the environment as the production of the microalgae at such a scale would reduce the amount of carbon dioxide in the Earth's atmosphere by a projected 2.6 million metric tons². This is due to the

¹ [Using microalgae to produce an alternative to palm oil](#), NTU Singapore (2022).

² Molecules, Trends on CO2 Capture with Microalgae: A Bibliometric Analysis (2022).

microalgae's reputation as 'carbon sinks', as they grow rapidly and photosynthesise, absorbing the gas and releasing oxygen.

The move to scale up the NTU-developed method to produce an alternative to palm oil reflects NTU's commitment to mitigating our impact on the environment, which is one of four humanity's grand challenges that the University seeks to address through its **NTU 2025 strategic plan**.

Due to its low cost and high yield, palm oil is the world's most popular vegetable oil. It features in about half of all consumer products and plays a central role in a large range of industrial applications. However, widespread deforestation in several countries and the destruction of habitat of endangered native wildlife have been blamed on the rapid expansion of oil palm plantations.

NTU Professor Louis Phee, Vice President (Innovation & Entrepreneurship), said: "NTU's collaboration with Eves Energy that will allow the company to establish an algae oil production facility by leveraging the University's innovation exemplifies our commitment to translating groundbreaking research into tangible industrial outcomes that not only generate profit but also positively impact the world. Sustainability lies at the heart of this transformative venture, aligning seamlessly with NTU's core values. It is our firm belief that innovative solutions can and should be drivers of positive change, addressing pressing global challenges.

"Through this partnership, NTU is dedicated to pioneering sustainable technologies that resonate not only within our institution but also far beyond, leaving a lasting legacy that embodies our dedication to research, sustainability, and global betterment." Prof Phee is also the **Dean of NTU's College of Engineering**.

Dr Lanz Chan, President and CEO of Eves Energy, said: "Scaling up NTU Prof William Chen's algae oil innovation is not just a strategic choice; it is an imperative in our mission to drive change. This innovation offers a transformative pathway, not only to commercial viability but also to address pressing global concerns. We recognise the significant economic potential that algae oil presents, not only in producing biofuels and valuable products but in bolstering our commitment to boosting sustainability. Scaling up this innovation is our way of putting our company at the forefront of change, offering sustainable solutions that not only align with market demands but also shape a more environmentally conscious and prosperous future for all."

'Oiling' the gears of green innovation

To produce the oils, the NTU team's method involves adding pyruvic acid, an organic acid that occurs in all living cells, to a solution with the algae *Chromochloris zofingiensis* and exposed to ultraviolet light to stimulate photosynthesis.

After 14 days, the microalgae are washed, dried, and then treated with methanol to break down the bonds between the oils and the algae protein, so that the oils can be extracted.

Cultivating microalgae for their oil stands out as a more sustainable and environmentally responsible alternative to palm oil production as it significantly reduces deforestation, as they can be grown in controlled environments, thus preserving critical ecosystems and habitats. The rapid growth cycle of algae facilitates quicker and more efficient oil production compared to the years required for palm trees to mature.

Prof William Chen who led the study behind the innovation, said: “Scaling up our innovation to produce millions of tons of algae oil as a viable and sustainable alternative replace palm oil in the food industry has a profound impact by promoting environmental sustainability, mitigating deforestation, and offering healthier product options. This transition aligns with consumer preferences for eco-friendly and nutritious choices while ensuring compliance with evolving regulations and reducing supply chain vulnerabilities. Furthermore, it fosters innovation and resilience in the food sector, enhancing its long-term sustainability and addressing the pressing need for more responsible and health-conscious food production.”

Besides its two-year plan to launch a facility in Indonesia, Eves Energy is also in the process of merging with a Special Purpose Acquisition Company (SPAC) that is already listed on the Nasdaq Stock Market (NASDAQ). This merger represents a significant step in consolidating and strengthening Eves Energy's position in the market.

Dr Chan added: “By aligning with a SPAC on a reputable exchange like NASDAQ, Eves Energy gains access to a larger pool of potential investors and a platform for raising funds, which can be instrumental in furthering their business objectives. This move not only solidifies the company's standing but also positions it for potential growth and expansion in the industry.”

The NTU FST programme is also planning on developing other innovations that are adjacent to their method to produce edible plant-based oils from microalgae.

Prof Chen added: “Our solution is a three-pronged approach to solving three pressing issues. We are capitalising on the concept of establishing a circular economy, finding uses for would-be waste products and re-injecting them into the food chain. In this case, we rely on one of nature’s key processes, fermentation, to convert that organic matter into nutrient-rich solutions, which could be used to cultivate algae, which not only reduces our reliance on palm oil, but keeps carbon out of the atmosphere.”

Mr Argun Boldkhet, Vice President and COO of Eves Energy added: “This partnership also benefits the research and innovations by NTU’s Prof William Chen, as it allows his team to access a larger international market, giving them a platform to further scale-up their solutions and cater them to different markets including renewable energy.”

The NTU team will be exploring adding the microalgae oil to plant-based meats to improve their texture and nutritional properties. They also hope to explore pharmaceutical and cosmetic uses in products such as topical creams, lipsticks, and more.

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Notes to Editor:

The research paper titled “[Screening and effect evaluation of chemical inducers for enhancing astaxanthin and lipid production in mixotrophic *Chromochloris zofingiensis*](#)” was published in *Journal of Applied Phycology* in Feb 2022. DOI 10.1007/s10811-021-02618-6

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About Nanyang Technological University, Singapore

A research-intensive public university, Nanyang Technological University, Singapore (NTU Singapore) has 33,000 undergraduate and postgraduate students in the Engineering, Business, Science, Medicine, Humanities, Arts, & Social Sciences, and Graduate colleges.

NTU is also home to world-renowned autonomous institutes – the National Institute of Education, S Rajaratnam School of International Studies and Singapore Centre for Environmental Life Sciences Engineering – and various leading research centres such as the Earth Observatory of Singapore, Nanyang Environment & Water Research Institute and Energy Research Institute @ NTU (ERI@N).

Under the NTU Smart Campus vision, the University harnesses the power of digital technology and tech-enabled solutions to support better learning and living experiences, the discovery of new knowledge, and the sustainability of resources.

Ranked amongst the world's top universities, the University's main campus is also frequently listed among the world's most beautiful. Known for its sustainability, NTU has achieved 100% Green Mark Platinum certification for all its eligible building projects. Apart from its main campus, NTU also has a medical campus in Novena, Singapore's healthcare district.

For more information, visit www.ntu.edu.sg.