Microalgae-Based Oil: A Potential Substitute To Palm Oil

Aside from being a more eco-friendly alternative to cultivating palm trees for plant-based oils or fat, the NTU-developed approach has the potential to reduce greenhouse gas emissions as well as food waste.

Shivani Meena Updated 23 March, 2022 2:59 PM IST

Researchers from NTU Singapore

A group of scientists led by Nanyang Technological University, Singapore (NTU Singapore) has devised a technique for producing and extracting plant-based oils from common microalgae.

Because the oils generated by microalgae are edible and have better characteristics than those found in palm oil, the newly discovered technology would be a healthier and more environmentally friendly alternative to palm oil.

Microalgae Oil: The Potential Alternative with More Health Benefits

When compared to palm oil, microalgae oil contains more polyunsaturated fatty acids, which can help lower 'bad' cholesterol levels in the blood and minimize a person's risk of cardiovascular disease and stroke. The oil derived from microalgae, which was created in partnership with experts from Malaysia's University of Malaya, also includes fewer saturated fatty acids, which have been associated with stroke and other illnesses.

Palm Oil: Statistics & Future market

Palm oil is the most widely used vegetable oil in the world, appearing in over half of all consumer items and playing an important role in a wide range of industrial applications. In 2018, farmers produced 77 million tonnes of palm oil for the world market, which is predicted to increase to 107.6 million tonnes by 2024.

The fast spread of oil palm plantations, on the other hand, is blamed for huge deforestation in various nations, destroying the habitat of endangered native fauna.

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The Methodology behind the research

To make the oils, pyruvic acid, an organic acid found in all living cells, is combined with the algae *Chromochloris zofingiensis* and subjected to UV light to activate photosynthesis. Separately, the NTU team devised a cost-cutting solution to substitute the microalgae growth medium with fermented soybean leftovers while increasing microalgae biomass production.

After 14 days, the microalgae is washed and dried before being treated with methanol to break down the links between the oils and the algal protein, allowing the oils to be extracted.

To create enough plant-based oil to make a 100-gram store-bought chocolate bar, 160 grams of algae would be required.

The algal oil breakthrough represents a potential alternative to oil palm tree farming. It also represents NTU's commitment to reducing our environmental footprint, which is one of four big challenges that the University hopes to solve through its NTU 2025 strategic plan.

The findings of the study were published in the peer-reviewed academic journal Journal of Applied Phycology in February.

According to the researchers, when scaled up, producing plant-based oils with natural sunlight rather than UV lamps would help remove carbon dioxide from the environment by converting it to biomass and oxygen via photosynthesis. The microalgae convert carbon dioxide to biomass at a relatively fast rate as it develops.

The scientists will be refining their extraction processes to increase yield and quality. Several food and beverage partners have expressed interest in the research team, and they may look at expanding their activities over the next two years.