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Scientists turn tamarind bark into vehicle fuel

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Scientists turn tamarind bark into vehicle fuel (Photo: NTU

Singapore)

The intense [environmental degradation](#) catalyzed by human activities makes it increasingly urgent to transform scientific discoveries into sustainable innovations. And it was with this goal that Nanyang Technological University in Singapore, Alagappa University in [India](#) , and the University of Western Norway of Applied Sciences came together.

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In an article to be published in the November issue of the journal [Chemosphere](#) , the international team of researchers led by Nanyang Technological University describes how processed tamarind [husks](#) can become a key component in the supply of [fuel](#) to vehicles.

In addition to reducing the human impact on [the environment](#) , the proposal solves a problem of waste caused by tamarind: widely consumed around the world, the tropical [fruit](#) has a peel that is considered agricultural [waste](#) and ends up being discarded in landfills.

On the other hand, this shell is porous and rich in [carbon](#) . Together, the two characteristics make it a good material for carbon nanosheets, which are essential for supercapacitors ([energy](#) storage devices used in automobiles, buses, [electric vehicles](#) , trains and elevators).

"The nanosheets are made of layers of carbon atoms arranged in hexagons linked together, it's like a honeycomb", explains, [in a note](#) , researcher Dhayalan Velauthapillai, from the University of Western [Norway](#) of Applied Sciences. "The secret behind the storage capacity is the porous structure, which results in a large area capable of helping the material to support high electrical charges."



Professor Steve Cuong Dang, School of Electrical and Electronics Engineering, Nanyang Technological University (Photo: NTU Singapore)

According to the study, the nanosheets produced from tamarind bark showed good thermal stability and electrical conductivity, which makes them promising for energy storage and an **ecological alternative** in comparison with the industrial products used today.

To reach this result, the first step was to wash the tamarind husks and dry them at 100 °C for six hours. Then it was necessary to crush them and turn them into powder. Afterwards, the powder was baked at 700°C to 900°C for 150 minutes without **oxygen** so that it could be converted into carbon nanosheets.

Atualmente, um dos materiais mais comuns para fabricação das nanofolhas são **fibras** industriais de cânhamo. No entanto, elas precisam ser aquecidas por 24 horas a 180 °C — durante muito mais tempo e em uma **temperatura** muito superior àquela exigida pelo tamarindo.

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Agora, os pesquisadores estão trabalhando para aprimorar as propriedades eletroquímicas das nanofolhas de carbono feitas com tamarindo e reduzir a quantidade de **energia** usada durante a sua manufatura. No futuro, eles pretendem explorar a produção de nanofolhas de carbonos em larga escala com parceiros do **agronegócio** e utilizar outros tipos de casca para obter resultados similares.

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Fonte – **Galileu**

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