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Scientists turn tamarind bark into vehicle fuel

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 ºC 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 ºC — 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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