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From tamarind shells, energy storage materials in electric vehicles

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From food waste such as tamarind shell a really interesting prospect of producing materials for superconductors of electric vehicles

In addition to batteries, many electric cars now use supercapacitors to quickly deliver power when accelerating. New research has derived a key component of such devices from tamarind shells.

While not particularly common in places like North America and Europe, the tamarind fruit is consumed in large quantities. *And in many places, too. Both in Asia and in other regions.* And even though the shells of its pods are compostable, most of the time they simply end up in a landfill. A truly huge waste.

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From tamarind carbon nanosheets

Seeking a high-value use for tamarind shells, an international team of scientists has begun using them as a starting material for carbon nanosheets, which store electrical charge inside supercapacitors. The project is led by **Nanyang Technological University in Singapore**, which also involved researchers from Indian and Norwegian universities.

Scientists started by washing tamarind shells made from food industry waste. The shells were dried at a temperature of 100 °C (212 °F) for approximately six hours. Subsequently, the washed and dried shells were ground, and reduced to a powder. Finally, the powder was cooked in a furnace at 700-900 °C (1.292 to 1.652 °F) for 150 minutes, in the absence of oxygen.



Il prof. Cuong Dang mostra gli scarti di tamarindo usati per realizzare i nanofogli di carbonio

Ottime prestazioni

Il team ha convertito la polvere ottenuta dai gusci di tamarindo in nanofogli ultrasottili di carbonio. I gusci di tamarindo erano particolarmente adatti al compito, poiché sono entrambi ricchi di carbonio e porosi nella struttura: la porosità aumenta la superficie del carbonio nei nanofogli, consentendogli di immagazzinare più elettricità.

Inoltre, i nanofogli di carbonio di tamarindo hanno mostrato una buona conduttività elettrica e stabilità termica. Ancora, il processo di produzione è meno dispendioso in termini di energia rispetto alla procedura richiesta per realizzare nanofogli con fibre

di canapa comunemente usate. In quel caso, le fibre inizialmente devono essere riscaldate a oltre 180 °C (356 °F) per 24 ore prima di essere cotte in una fornace.

Ora i ricercatori stanno cercando di ridurre il fabbisogno energetico della loro tecnica, e studiare altri modi per renderla più ecologica.

Un documento sullo studio, condotto dal Prof. Cuong Dang, è stato recentemente pubblicato sulla rivista Chemosphere