A Delicious Indian Berry Contains A Crucial Ingredient for Creating Cheap Solar Cells

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More than just a fruit. Rajesh Dangi/Wikimedia

By Manu Balachandran

A species of berries indigenous to south Asia may have what it takes to make solar panels far less expensive than they are now. It may even provide a lasting solution to India's chronic power shortage.

A group of researchers at the Indian Institute of Technology (IIT), Roorkee, have found that a pigment found in jamun (*Syzygium cumini*) absorbs large amounts of sunlight. The IIT scientists have been experimenting with the pigment, called anthocyanin, and believe that using it for mass production could bring down solar panel costs.

"We were looking at why the jamuns are black," said Soumitra Satapathi, assistant professor at IIT-Roorkee. "We extracted the pigment using ethanol and found that anthocyanin was a great absorber of sunlight." Anthocyanin is also found in fruits such as blueberries, cranberries, raspberries, and cherries.

Jamun trees grow upto 30 metres and can live for more than 100 years. Across large swathes of India, the fruit—long known for its nutritional and medicinal value—is often sold at a low price on pavements and at traffic junctions.

Most solar cells today are made of either single crystal silicon or polycrystalline silicon. While polycrystalline is more efficient, it is also more expensive. Satapathi is using the jamun pigment for a new kind: dye-sensitised solar cells (DSSCs). The results of the study were published in the Journal of Photovoltaics.

Solar cells work on a simple principle. Photons from the sun strike a solar cell, which contains electron-rich silicon or dye, and knock out the electrons to create electricity. The more efficiently a solar cell can absorb the many photons striking it, the more electricity it can produce.

India is looking to increase its solar-power generation capacity from 10 gigawatts to 100 gigawatts by 2022—with a target of attracting a staggering $100 billion into the sector during that time. Much of that is because the country constantly grapples with a power shortage.

Though silicon is abundant on Earth, manufacturing silicon cells is quite expensive. By using naturally occurring dyes like the jamun pigment, Satapathi hopes that if he can make his dye-sensitised solar cell more efficient, it could bring down the cost of a solar panel by 40%.

There's a long way to go. Satapathi's cell current efficiency is only 0.5% compared to commercial solar cells that provide more than 15% efficiency. Though dye-sensitised cells were invented in 1988, there are no large commercial suppliers of solar panels that use this technology today because of the poor efficiency of the cells.

Akshat Rathi contributed to this report.

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