

CUJ researchers develop solar cell using Gulabbas flower dye

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Researchers at the Central University of Jharkhand (CUJ) have developed a dye-sensitised solar cell using extracts from the Gulabbas or Four O'Clock flower, a plant commonly found across Jharkhand and other parts of India.

The research was conducted by the Department of Energy Engineering at CUJ using petals of *Mirabilis jalapa L.*, locally known as Gulabbas, Sandhya Malati or Sandhya Phool. The extract was used as a sensitizer in Dye-Sensitised Solar Cells (DSSCs), also known as Grätzel cells, which convert sunlight into electricity.

The study, titled "Harnessing natural dyes from *Mirabilis Jalapa* flower for dye-sensitised solar cells: A combined experimental and theoretical approach," has been published

in the *Journal of Power Sources*.

The research team included Prashant Kumar, Anshu Kumar, Ayushi Pareek, Enamul Haque and Anik Sen under the supervision of Dr Basudev Pradhan.

According to the researchers, the petals were collected during evening hours when the flower blooms. The extracted dye was used to prepare the photoactive layer of the DSSC.

Dr Pradhan said the team achieved a power conversion efficiency (PCE) of 0.61 per cent with stability of up to 250 hours under experimental conditions.

"We analysed the dye and its components to understand their correlation with photovoltaic performance. Quantum chemical calculations of six major dye components showed theoretical efficiency ranging from 13.9 per cent to 20.8 per cent for individual components," he said.