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Scientists at IIT-M engineer plant cells to increase production of anti-cancer drug Camptothecin

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Paving the way for effective and efficient commercial production of Camptothecin



The Indian Institute of Technology Madras (IIT-M) and IIT Mandi researchers have metabolically engineered the plant cells of *Nothapodytes nimmoniana* to increase the production of Camptothecin, which is used to treat cancer.

The researchers from the Plant Cell Technology Lab of IIT-M have developed a genome-scale metabolic model for N. nimmoniana plant cells using computational tools.

This can be a major boost to produce cancer-treating drugs as Camptothecin, the third most in-demand alkaloid, is commercially extracted in India from Nothapodytes nimmoniana, which is an endangered plant.

Camptothecin (CPT) is an important anti-cancer drug lead molecule for high-value drugs like Topotecan and Irinotecan. It is a potent topoisomerase I inhibitor extracted mainly from - Camptotheca acuminata (native to Eastern Asia) and Nothapodytes nimmoniana (native to India). However, the conjunction of climate change and extensive deforestation undertaken for CPT extraction has pushed these plants into the endangered species category.

Prof. Smita Srivastava, Bhupat and Jyoti Mehta School of Biosciences, Department of Biotechnology, IIT Madras, said, “Integration of metabolic engineering with bioprocess engineering principles can ensure enhanced and sustainable production of Camptothecin, to continuously meet its increasing market demand in minimum time and cost in addition to natural resource conservation.”