

(12) PATENT APPLICATION PUBLICATION

(21) Application No.202511095645 A

(19) INDIA

(22) Date of filing of Application :06/10/2025

(43) Publication Date : 05/12/2025

(54) Title of the invention : A BIOTECHNOLOGY METHOD FOR ENGINEERING DROUGHT-RESISTANT CROP VARIETIES

(51) International classification	:C12N0015820000, C12N0007000000, C12N0009220000, C07K0014415000, G06Q0010063700	(71) Name of Applicant : 1)NOIDA INSTITUTE OF ENGINEERING & TECHNOLOGY Address of Applicant :19, Knowledge Park-II, Institutional Area, Greater Noida – 201306, Uttar Pradesh, India. Uttar Pradesh India
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(86) International Application No	:	
Filing Date	:01/01/1900	
(87) International Publication No	: NA	
(61) Patent of Addition to Application Number	:NA	
Filing Date	:NA	
(62) Divisional to Application Number	:NA	
Filing Date	:NA	

(57) Abstract :

The invention relates to a biotechnology method for engineering drought-resistant crop varieties integrating transcriptomic analysis (101), gene editing unit (102), promoter engineering (103), plant transformation system (104), and validation framework (105). The method enhances water-use efficiency, yield stability, and drought resilience through CRISPR-based modification and synthetic promoter regulation. It provides adaptable, scalable, and biosafe solutions for cereals, legumes, and vegetables, ensuring improved productivity under water-deficit conditions. The invention represents a climate-smart agricultural advancement, addressing food security and sustainability challenges.

No. of Pages : 14 No. of Claims : 6