

CRISPR/CAS9 TECHNOLOGY FOR CROP IMPROVEMENT: A NEW WEAPON FOR INDIAN AGRICULTURAL THREATS

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Abstract:

Agriculture is the primary source of livelihood for about 58 per cent of India's population. Agriculture is important in India for the obvious reason of its centrality, given that it accounts for a large share in GDP (gross domestic product) (16%), and an even larger share in employment (49%). Perhaps it is even more important because, as the experience of the last few years illustrates, it has the potential to hold back Indian development. Climate change and agriculture are interrelated processes, both of which take place on a global scale. Global warming affects agriculture in a number of ways, including through changes in average temperatures, rainfall, and climate extremes adversely affect the growth of crop plants, yield and quality of agriculture products. Pest outbreak and increased abiotic stresses due to climate change pose a high risk to tropical crop production. Although conventional breeding techniques have significantly increased crop production and yield but new approaches are required to further improve crop production in order to meet the global growing demand for food. Genome editing technologies such as Zinc Finger Nucleases (ZFNs), Transcription Activator like Effector Nucleases (TALENs) helps to target gene of interest but these methods are expensive and time consuming. CRISPR(Clustered Regularly Interspaced Short Palindromic Repeats)proves as a powerful tool in this aspect, it is versatile, easy to design and cost effective tool for development of non-transgenic genome edited crop plants to overcome abiotic stress due to drastic climate change and to ensure food security as well as to enhance the Indian agriculture based economy in future. This review article discusses the molecular mechanism of CRISPER/Cas9 technology and its application in crop improvement.

Key Words: CRISPER/Cas9, biotic/abiotic stress tolerance, crop improvement

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