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CRISPR/Cas9-Mediated Knockout of Susceptibility Genes for Blast Resistance in Pusa Basmati Rice

Rice blast, caused by Magnaporthe oryzae, poses a major threat to yield and quality in Pusa Basmati rice. Conventional breeding for blast resistance is challenged by limited resistance sources and pathogen variability. This study applies the CRISPR/Cas9 genome editing system to precisely disrupt blast susceptibility genes. Guide RNAs were designed targeting conserved functional domains, and CRISPR constructs are being prepared for Agrobacterium-mediated transformation of Pusa Basmati. Mutations will be validated by Sanger sequencing, and edited plants will undergo blast resistance screening under greenhouse and field conditions. The objective is to develop blast-resistant lines without compromising the distinctive grain quality and aroma of Basmati rice. By eliminating susceptibility genes, this approach offers durable resistance and a faster, more targeted alternative to conventional breeding, contributing to sustainable rice production.

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