



MicroRNA mediated regulation of defense against fungal phytopathogen in plants

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Abstract:

Non-coding RNAs are noticeable modulators of transcriptional and post-transcriptional expression of genes in a wide range of biological processes. However, the inventory and functions of microRNAs largely remains unexplored with respect to defense against fungal phytopathogens. We have performed a comparative small RNA profiling of susceptible (Arka Lohit-AL) and resistant (Punjab Lal-PL) chilli cultivars to identify 35 differentially expressed miRNAs responsive to *Colletotrichum truncatum*, the most belligerent anthracnose pathogen. Excitingly, a novel microRNA can-miRn37a was significantly expressed in PL but reduced in AL genotype post pathogen attack. Overexpression of can-miR37a in transgenic pepper revealed enhanced resistance to *C. truncatum* as evidenced by decreased fungal growth, up-regulated expression of defense-responsive genes and down-regulated expression of the target regulatory genes encoding ethylene response factors (ERFs). Furthermore, knock-out analysis of the ERF transcription factors revealed their role in fungal colonization and immune suppression in chilli. Overall, the present study authenticates the role of potential miRNAs in engineering resistance response against fungal phytopathogens.

Biography:

Raj Kumar Joshi is Associate Professor at the Dept. of Biotechnology, Rama Devi Women's University, India where he teaches graduate level courses on Plant Genomics and Genetic Engineering. He also serves as the Group Leader of the Plant Functional Genomics Group, and in that capacity he supervises the overall research activities on the functional aspects of molecular plant-microbe interactions. He has been awarded with the prestigious SERB early career grant and SERB extramural grant from the Dept. of Science and Technology, Govt. of India and CREST award from Dept. of Biotechnology, Govt. of India. Dr. Joshi is currently running a successful programme on the delineation of molecular networks in the interaction between plants and fungal phytopathogens.



His recent forays into genome editing and precise base editing towards improvement of these crops has been highly productive.

Publication of speakers:

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2. Joshi, Rajkumar & Kumar, Parveen & Kumar, Satyendra & Hashmi, Athar Adil. (2008). Structural and antimicrobial studies of potassium hydrotris(2-mercaptobenzothiazolyl)borate and its organotin(IV) derivatives. *Journal of Coordination Chemistry - J COORD CHEM*. 61. 2437-2448. 10.1080/00958970801914801
3. Joshi, Rajkumar & Kumar, Parveen & Kumar, Vikrant & Hashmi, Athar Adil. (2008). Organotin(IV) oxo-homoscorpionate: Preparation, spectroscopic characterization and antimicrobial properties. *Journal of Coordination Chemistry*. 61. 1283-1293. 10.1080/00958970701573152.
4. Joshi, Rajkumar & Sharma, Guruaribam & Kumar, Vikrant & Hashmi, Athar Adil & Kumar, Satyendra & Achila, R. & Hussain, Dr. Mohammed. (2006). Synthesis, spectral and biological studies of organotin(IV) complexes of heteroscorpionate. *Applied Organometallic Chemistry*. 20. 740 - 746. 10.1002/aoc.1114.

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