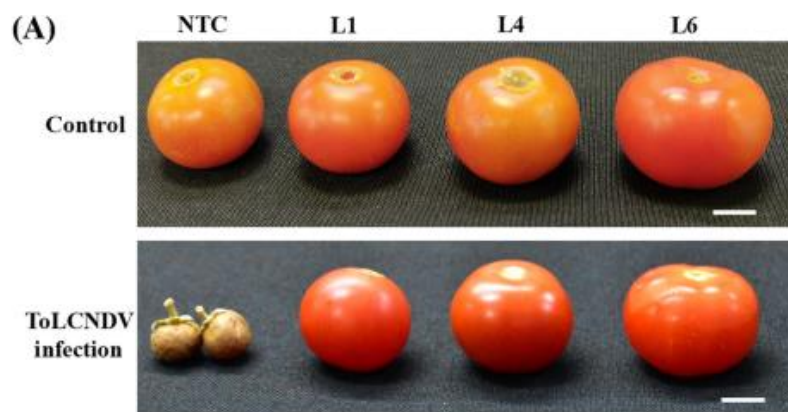


Silencing AC1 of tomato leaf curl virus using artificial microRNA confers resistance to leaf curl disease in transgenic tomato

Scientists at DBT's National Institute of Plant Genome Research (DBT-NIPGR), New Delhi engineered transgenic plants expressing artificial microRNAs (amiRNAs) - based system against ATP binding domain of AC1 from Tomato leaf curl New Delhi virus (ToLCNDV) using the endogenous precursor, miR319a. The AC1 - amiR was found to regulate the abundance of AC1, and the transformants showed resistance up to 80% against ToLCNDV.



The yield of transgenic plants was significantly higher upon ToLCNDV infection as compared to the non-transgenic plants. Although the natural resistance resources against ToLCNDV are not available, this work streamlines a novel amiRNA-based mechanism that may have the potential to develop viral resistance strategies in tomato. To our best knowledge, the use of host-derived amiRNA to suppress the AC1 gene of ToLCNDV has not been reported for any plant species to date.

Team has filed an Indian patent of this work [Sharma N, Prasad M (2020) *Nucleic Acids Encoding Artificial RNA against AC1 Gene and Methods of Developing Tolerance against ToLCNDV Infection*; Application number: 202011008729]. The field trials for the amiRNA over-expressing plants are under process, and we hope we will be able to provide something beneficial for virus tolerance.

Leaf curl disease caused by *Tomato leaf curl virus* (ToLCV) is a key constraint to tomato cultivation worldwide. ToLCV is a begomovirus belonging to the family, Geminiviridae. In India, the bipartite ToLCNDV is noted for its predominant destruction of tomato cultivation and important crops, including the plants belonging to the Solanaceae family. It causes partial

to complete yield loss depending on the stage of plant development during the initiation of infection.

Link: <https://link.springer.com/article/10.1007/s00299-020-02584-2>

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