

PIMT protect antioxidant enzymes to help plants survive stressful environments

By Dr. Bilqeesa Bhat

Team of researchers headed by Dr. Manoj Majee at the National Institute of Plant Genome Research (NIPGR), New Delhi, studied the mechanisms of plant survival under adverse environmental conditions and uncovered how an enzyme called Protein L-Isoaspartyl methyl Transferase (PIMT) enable plants to repair the proteins vital to their own survival. Results indicated that the stressful environments, particularly heat and oxidative stress conditions, triggers formation of a harmful amino acid called isoaspartic acid (isoAsp) residues from normal aspartate and asparagine in proteins.

Across the world agricultural productivity is highly affected by climate change and global warming, and causing a huge risk of future food securities. Therefore, development of climate resilient crops variety of major food crops is an indispensable goal of plant scientists. Dr. Majee's laboratory aims to understand the mechanisms of plant survival under adverse environmental conditions, and then look for potential candidate gene(s) which can be later utilized to develop climate resilient crop variety with unabated productivity and yield even under adverse environments. In the present study, we report a novel role and mechanistic insight of protein repairing enzyme PIMT in plant growth, survival and yield under adverse environmental conditions. The investigation will help in developing climate resilient crop variety with unabated productivity and yield even under adverse environments.

Proteins are essential for the structural and functional maintenances of plant cells. Proteins are highly susceptible to a variety of reversible and irreversible damages under stressful environments. However, Plants have amazing abilities to maintain the structure and functions of proteins in the cell.

Earlier studies from Dr. Majee's lab suggest that enhanced production of PIMT in plants, particularly in seed, significantly improves seed vigor and longevity. "In present study, we

provide evidence that PIMT not only improves seed vigor, seed storage life but also improves plant abiotic stress tolerance and yield by actively repairing deleterious damage in proteins.

The study is promising and this approach could be utilized to develop climate resilient crop plants with improved seed vigor and longevity, and thus this research finding would be highly useful to Agriculture. The study was funded by the Department of Biotechnology and NIPGR, and results were published in the Journal of Biological Chemistry.

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