

Category	: International Rice Research Conference
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Title of Entry	: PROTEIN L-ISOASPARTYL METHYLTRANSFERASE (PIMT) IS IMPLICATED IN SEED DESICCATION TOLERANCE AND SEED LONGEVITY IN RICE
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Abstract : PROTEIN L-ISOASPARTYL O-METHYLTRANSFERASE (PIMT) is a protein repairing enzyme and catalyzes the conversion of spontaneously modified isoAsp to Asp in proteins. The present study in rice demonstrates that PIMT activity sharply increases at maturation phase retains in dry seed and then rapidly decline upon completion of germination. Likewise, deleterious isoaspartyl accumulation also increases during seed maturation and is highly abundant in dry seed but decreases upon imbibition. Transcript and western blot analyses clearly demonstrated distinct tissue and seed development stage-specific accumulation of these PIMT isoforms, indicating their participation and specific contribution in seed desiccation in rice. Immunolocalization studies reveal distinct isoform expression in embryo and aleurone layers. For further analysis, we raised transgenic lines for each isoform and the data reveals the distinct roles of each OsPIMT isoform in restricting deleterious isoAsp and age induced ROS accumulation to improve seed vigor and longevity. It also raises the intriguing possibility that PIMT repairs antioxidative enzymes and proteins which restrict ROS accumulation, lipid peroxidation, etc. in seed particularly during aging thus contributing to seed vigor and longevity. Collectively, these data imply that PIMT mediated protein repair mechanism initiates during the course of seed development in rice and each PIMT isoform plays a distinct yet coordinated role in maintaining seed vigor and longevity by restricting deleterious isoAsp and ROS accumulation in tissue and development stage specific manner.

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