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Seed fortification to improve seed yield and quality of cluster bean (*Cyamopsis tetragonoloba* (L) Taub)

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Cluster bean (*Cyamopsis tetragonoloba*) popularly known as *Guar* is a drought hardy, deep-rooted, annual legume, grown for feed, fodder, green manure, vegetable and seed.Of late, the crop has assumed great industrial importance because of occurrence of 'Guar-gum' in its endosperm and hence, the area under cluster bean is increasing every year. The means to fortify seeds for better seed yield and quality has become important and emphasized. A field experiment was conducted to determine the effects of seed fortification on seed yield and quality of cluster bean. The treatments included were T1-control (unfortified seed served as control), T_2-water, T_3-gibberellic acid (200 ppm), T_4- silicic acid (2ml) (silicic acid is a beneficial element which is source of silicon with the chemical formula SiH_4O_4), T_5-KNO_3 (2%), T_6-$MgSO_4$ (1%), T_7-$ZnSo_4$ (1%), T_8-*Pongamia* leaf extract (1%), T_9-Cow urine (10%, prepared by mixing 10 ml of fresh cow urine in 90 ml of distilled water) with a soaking duration of 3 hours. The results revealed that seed fortification with 1% $MgSO_4$ recorded higher plant height, minimum days to 50% flowering and maturity, higher number of clusters per plant, number of pods per plant, number of seeds per pod, dry matter accumulation, 100 seed weight and seed yield compared to control. The percent improvement in seed yield due to $MgSO_4$ fortification was 22.21 than unfortified seeds. Hence, seed fortification with 1% $MgSO_4$ could be recommended for cluster bean as a pre-sowing seed invigorative treatment to improve the plant growth, seed yield and quality.

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Protein L-isoaspartyl (D-aspartyl) methyltransferases (PIMTs) are differentially regulated during seed development in rice and provide seed vigour and longevity

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Protein L-Isoaspartyl (D-aspartyl) methyltransferases (PIMT or PCMT EC 2.1.1.77) recognize and repair L-isoaspartate and D-aspartateresidues in damaged proteins. In dicots PIMT was shown to provide seed vigour and longevity. But the role of PIMT in during seed maturation and desiccation in orthodox seeds is largely unknown. Current study of PIMT from monocot model plant rice revealed coordinated role of PIMT isoforms during different stages of plant development and especially during seed maturation and drying. Study showed that PIMT in rice was primarily accumulated in dry seed followed by flower, leaf, stem and root. Detailed analysis of PIMT protein during seed development showed a gradual increase in its accumulation toward the end of maturation phase, retained in dry mature stage and decreased upon germination. Also we observed coordinated interplay of PIMT isoforms during seed developmental stages. Molecular analysis showed that rice codes for two PIMT genes (OsPIMT1 and OsPIMT2) which produced multiple transcripts, out of which three transcripts produced biochemically active enzymes (OsPIMT1, OsPIMT2 and ΔOsPIMT2 i.e., OsPIMT2 without N-terminal domain). We identified few biochemically inactive isoforms whose specific function is not clearly known. Ectopic expression of OsPIMTs in *Arabidopsis* demonstrated that all three isoforms improve seed vigour and longevity by restricting isoaspartate accumulation which was clearly evident from controlled deterioration treatments. This study elucidates in clear detail the interplay and coordinated function of various PIMTs in rice providing deeper insights into its role in germination, stress, aging and seed development especially during seed maturation and desiccation.

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