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Expression analysis of candidate genes present in the QTL regions for both iron and zinc in the F7 RILs of Madhukar x Swarna

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Micronutrients are necessary for both plant and human survival. Rice is the staple food for fifty percent of the world's population. However, the polished grain, also known as white rice, contains nutritionally insufficient concentrations of iron (Fe) and Zinc (Zn) to meet the daily requirements in diet leading to adverse effect on human health. Identification of candidate genes in major QTLs and their transcriptome analysis will be useful in gene discovery for biofortification. Genome-wide maps showed 14 QTLs for iron and zinc concentration in unpolished rice grains of F7 recombinant inbred lines from Madhukar x Swarna. Five candidate genes (*OsNAS3, OsNRAMP1, OsHMA, OsAPRT and OsZIP8*) which encode for both Fe and Zn and underlie four major QTLs on chromosomes 7 and 12 were used for expression analysis. Three leaf stage (32- days old) green house grown plants showed ≥2.15 & ≥1.8 fold expressions of *OsNAS3* and *OsHMA* respectively compared to Madhukar. When 7- days old seedlings were transferred to hoagland solution supplemented with Fe (0.18 mM) and Zn (0.26 mM) and grown for 25- days, all high iron zinc lines (HL) and 75 percent of low iron zinc lines (LL) showed increased expression of *OsZIP8* (≥2.2 fold) while other genes were down regulated. Omission of Fe and Zn resulted in stunted growth with reduction in chlorophyll, primary root length and number of roots. In omission of Fe and Zn, showed high transcript levels in all HLs and one LL-270(M) with *OsNRAMP1*, *OsHMA* compare to sufficient conditions. Sequence analysis of *OsHMA* in HL and LL showed variations at 32nd and 37th positions where valine is replaced by alanine and arginine with cystein respectively in 75 percent LL.

Biography

Sai Vishnu Priya has completed her PhD in 2004 from Sri Venkateswara University and worked as Post-doctoral studies at Directorate of Rice Research, and International Crops Research Institute for Semi-Arid Tropics (ICRISAT), Hyderabad. She is now working as Project Investigator (PI) (DST, WOS A) at Centre for Cellular and Molecular Biology, Hyderabad.

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