

Silicon Concentration and Expression of Silicon Transport Genes in Two Thai Rice Varieties

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ABSTRACT

Silicon (Si) is a beneficial element that contributes to increasing the resistance of plants to diseases, pests and lodging, and rice productivity. The objectives of the present study were to explore the relationship between Si concentration and the expression of Si transport genes in different tissues of SPR1 and PTT1 rice varieties. The rice was grown aerobically in sand culture in pots arranged in completely randomized design with 3 independent replications. Variation in Si concentration among growth stages and plant tissues in both rice varieties were detected. The Si concentration in SPR1 was higher than PTT1 in some plant parts up to flowering, but significantly higher in all tissues by maturity, including in the husk which accounts for almost all of the Si in the grain. The consistently higher expression of the genes Lsi1 and Lsi2, detectable only in the roots, was in agreement with higher Si concentration in SPR1 than PTT1 in all tissues at maturity. SPR1 had higher expression of Lsi6 than PTT1 at booting stage, but the difference between varieties was less distinct at flowering stage. Either a varietal difference in the passive Si transport by transpiration or changes in the level of expression of the gene in the period from flowering to maturity or both are suggested by discrepancies between expression of the Lsi6 gene at flowering and the Si concentrations at maturity of the two rice varieties.

Keywords: Rice, Silicon, Uptake, Transportation, Gene expression, *Lsi1*, *Lsi2*, *Lsi6*