

## **Serine-rich protein is a novel positive regulator for silicon accumulation in mangrove**

### **ABSTRACT**

Silicon (Si) plays an important role in reducing plant susceptibility against a variety of different biotic and abiotic stresses; and also has an important regulatory role in soil to avoid heavy metal toxicity and providing suitable growing conditions for plants. A full-length cDNAs of 696 bp of serine-rich protein was cloned from mangrove plant (*Rhizophora apiculata*) by amplification of cDNA ends from an expressed sequence tag homologous to groundnut (*Arachis hypogaea*), submitted to NCBI (KF211374). This serine-rich protein gene encodes a deduced protein of 223 amino acids. The transcript titre of the serine-rich protein was found to be strongly enriched in roots compared with the leaves of two month old mangrove plants and expression level of this serine-rich protein was found to be strongly induced when the mangrove seedlings were exposed to SiO<sub>2</sub>. Expression of the serine-rich protein transgenic was detected in transgenic *Arabidopsis thaliana*, where the amount of serine increased from 1.02 to 37.8 mg/g. The same trend was also seen in Si content in the roots (14.3%) and leaves (7.4%) of the transgenic *A. thaliana* compared to the wild-type plants under Si treatment. The biological results demonstrated that the accumulation of the serine amino acid in the vegetative tissues of the transgenic plants enhanced their ability to absorb and accumulate more Si in the roots and leaves and suggests that the serine-rich protein gene has potential for use in genetic engineering of different stress tolerance characteristics.

**Keyword:** Serine amino acid; Silicon; Mangrove (*Rhizophora apiculata*); Transgenic *Arabidopsis thaliana*; Serine-rich proteins