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Exogenous silicon provides physiological and proteomic improvement during salinity stress in *Rosa hybrida* 'Rock Fire'

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Though silicon (Si) has been reported to alleviate stresses in several plants, reports on the effect of Si against salt stress in roses are limited. To determine mechanism of salinity stress alleviation by Si supplementation, *in vitro*-grown *Rosa hybrida* 'Rock Fire' plantlets were hydroponically treated with NaCl (0-50 mM) for 15 days with or without Si (1.8 mM) supplementation. Growth retardation occurred under the NaCl treatment associated with the oxidative stress was mitigated by Si supplementation. Structure of stomatal guard cells and epidermal layer are affected by the salinity decreased upon Si addition. Moreover, chloroplast, vascular tissue and outer epidermal layer of the leaf damaged by the NaCl stress were also recovered in the Si-added NaCl treatment. Consequently, Si positively regulated the antagonistic effect of NaCl on the photosynthesis and gas exchange. The expressions of antioxidant enzymes such as superoxide dismutase, guaiacol peroxidase, ascorbate peroxidase and catalase analysed by native-polyacrylamide gel electrophoresis (PAGE) and western blot were concordant with their activities. The proteomic analysis by a second dimensional gel electrophoresis (2-DE) followed by the MALDI-TOF MS revealed that proteins involved in biological, cellular, metabolic, biosynthetic, photosynthetic, nutrient transportation and stress-responsive processes decreased under the NaCl stress were induced by the addition of Si. Therefore, the present study illustrated the improved physiology, structure and antioxidant mechanism provided by Si to reduce the deleterious effects of NaCl in rose. The additional proteomics analysis rendered deep insight on the molecular mechanism of salinity stress alleviation by Si in *R. hybrida* 'Rock Fire'.

Biography

Prabhakaran Soundararajan has completed his B.Tech. (Bioinformatics) from Tamil Nadu Agriculture University (TNAU), India at 2010 and MS (Applied Life Science) from Gyeongsang National University (GNU), South Korea at 2012 He has currently, completed the Ph. D (Applied Life Science) course works and involved in the research work on Agrobacterium-mediated transformation in Rosa hybrida 'Rock Fire'. He has authored more than 15 papers in the peer-reviewed journals and has presented about 25 oral/poster presentations in international/national conferences.

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