

Effect of Silicon in Mitigating Cadmium Toxicity in Maize

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Abstract : Heavy metals are significant pollutants in environment and their toxicity is a problem for survival of living things while Silicon (Si) is one of the most ubiquitous macroelements, performing an essential function in healing plants in response to environmental stresses. A hydroponic experiment was conducted to investigate the role of exogenous application of silicon under cadmium stress in six different maize hybrids with five treatments comprising of control, 7.5 μM Cd + 5 mM Si, 7.5 μM Cd + 10 mM Si, 15 μM Cd + 5 mM Si and 15 μM Cd + 10 mM Si. Results revealed that treatments of plants with 10mM Si application under both 7.5 μM Cd and 15 μM Cd stress resulted in maximum improvement in plant morphological attributes (root and shoot length, root and shoot fresh and dry weight, leaf area and relative water contents) and antioxidant enzymes (POD and CAT) relative to 5 mM Si application in all maize hybrids. Results regarding Cd concentrations showed that Cd was more retained in roots followed by shoots and then leaves and maximum reduction in Cd uptake was observed at 10mM Si application. Maize hybrid 6525 showed maximum growth and least concentration of Cd whereas maize hybrid 1543 showed the minimum growth and maximum Cd concentration among all maize hybrids.

Keywords : antioxidant, cadmium, maize, silicon

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