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Role of calcium in reducing accumulation of heavy metal cadmium in seeds of chickpea and mung bean

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Chickpea (*Cicer arietinum* L. cv. Himachali chana II) and mung bean (*Vigna radiata* L. Wilczek cv. mung 666) genotypes were subjected to varying levels of heavy metal stress (Cd 0.2-0.4 mM) to assess their tolerance towards cadmium induced metal toxicity, its uptake behavior and accumulation in seeds. Chickpea cultivar was affected more due to stress sensitivity towards heavy metal cadmium in comparison to mung bean cultivar in respect to number of seeds and their weight per plant. It was observed that, accumulation of cadmium was much more in the leaves of mung bean in comparison to chickpea, may be due to more leaf surface area of mung bean. Chickpea seeds were found to be hyper-accumulators of cadmium (approximately 100 times) in comparison to mung bean depending upon the heavy metal induced toxicity. Calcium (1.0-2.0 mM) play a significant role in lowering accumulation of cadmium in both leaves and seeds probably affecting its absorption at the surface of roots and its further uptake to above ground parts. Higher calcium treatment was more effective in lowering Cd accumulation in leaves (29-36% chickpea and 42-64% mung bean) and seed (10-15% chickpea and 15-36% mung bean). An interaction of Ca and Cd ions increased number and weight of seeds per plant. Cadmium toxicity can be checked with application of calcium to reduce accumulation levels of the heavy metal. Hence, the interaction was more effective in mung bean cultivar in reducing cadmium accumulation in comparison to chickpea. The efficacy of calcium was more when used in higher concentrations.

Biography

Kamal Jit Singh has completed his PhD from Panjab University and Post-doctoral studies from Panjab University, India. He is a Professor in the Department of Botany and Curator of PNM Botanical Garden of the Institute. He has published 33 research papers in reputed journals and has also guided students for PhD and MPhil degree. The priority areas of his research work are: Physiological and biochemical studies related to nitrogen fixing efficacy of root nodules under abiotic stress conditions aiming at extending their functional life span; heavy metals affecting growth profile and reproductive biology of legume crops; role of polyamines, Ca+2 and Zn+2 in ameliorative studies of heavy metal Cd induced toxicity.

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