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Guest editorial:

CAN BACTERIUM UD1023 LESSEN THE UPTAKE AND BIOACCUMULATION OF HEAVY METALS IN PLANTS? AN UPDATE

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Abbreviations: Ni – Nickel; Cd – Cadmium; TL – Thallium; As – Arsenic; DEHP - Di-(2-ethylhexyl) phthalates; DBP - Di-n-butyl phthalates; AMF - Arbuscular mycorrhizal fungi; MHB - Mycorrhizal helping bacteria; PGPR - Plant growth promoting rhizobacteria; ↑ - Increased; ↓ - Reduced

Pollution of water and soil with heavy metals highlights one of the most important public health threats. Soil and plants are polluted with heavy metals like nickel (Ni), cadmium (Cd), thallium (Tl) and arsenic (As) which mostly comes from the irrigation system, chemical industry, agrochemicals, and pesticides in the environment. The plant root signifies the first barrier to the selective accumulation of ions and heavy metals present in the soil. Kinetic data, uptake for nutrient ions and chemically related nonnutrient analogs suggest that metabolic processes associated with root absorption of nutrients regulate both rate of absorption and the affinity of specific nonnutrient ions. Differnet detailed kinetic studies of Ni, Cd, and Tl uptake by intact plants demonstrate multiphasic root absorption processes over a wide range of concentration (Cataldo and Wildung, 1978). For example, wheat and some vegetables have been reported to bio-accumulate heavy metals more than WHO/FAO permissible level. In addition, excessive application of pesticides and herbicides in the agriculture for the protection of plants from diseases and high production is also a threat to humans (Bahadar et al., 2014). Some of the trace elements (phosphorus, nitrogen, potassium) are necessary for the plant growth, but with that plants also take noxious metals and metalloids. The metals concentrations are different among various plants species and body parts. A study conducted in the Hamadan Province, Iran proves that metals (copper, zinc, iron and magnesium) accumulation depends on different factors like metals concentration, pH, electrical conductivity, nutrients in the subsoil (substrata). The results showed that zinc and copper concentration in aboveground and underground tissues plants were significantly positive related to their total subsoil amount and soil phosphorus had negative affectson copper, iron and zinc