



Plant Defense Responses for Combating Heavy Metal Stress

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ABSTRACT: Uncontrolled bioaccumulation of heavy metals (HMs) in the environment has led to devastating consequences on living organisms including plants. HMs on reaching a toxic level interacts with several vital cellular biomolecules such as DNA and proteins, and also disturbs various metabolic balances. This disbalance mainly triggers reactive oxygen species (ROS) productions, which leads to oxidative stress. This results in disturbed patterns of growth and development including reduced germination rate as well as observable disturbing effects in the roots, stems and leaves of the plant. In return, the plant exerts a defensive strategy to control this over-coming uptake, by a variety of enzymes and metabolites. The key elements of this approach are some chelating agents that aims to sequester these HM in the vacuolar region and prevent their uptake. This sequestration is guided by Phytochelatins (PCs) or metallothioneins (MTs), the chelating agents that prevent the metal complexes to enter the vegetative part. Plant's self-detoxification mechanism also includes non-enzymatic components like proline, which plays a vital role like enhancing the detoxification capacities of various antioxidant enzymes, promoting embryo/seed evolvment and extending stem length. This study summarizes the various self-defense strategies adopted by the plants in order to combat this abiotic stress and its effects caused by HMs. © 2016 iGlobal Research and Publishing Foundation. All rights reserved.

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