

Advancements in Environmental Biotechnology



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CHAPTER 9

COMBATING BULK AND NANO METAL TOXICITY USING CYANOBACTERIA

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Abstract

Heavy metal toxicity in the ecosystem is a major environmental concern which needs urgent preventive and combating measures. A very common organism found in the aquatic ecosystem is cyanobacterium that tends to accumulate the heavy metals in polluted water bodies. Cyanobacteria ingest the heavy metal ions and either detoxify or metabolize the heavy metals, thus reduce the toxicity from the environment as well as act as a bioindicator to assess the chemical risk to the ecosystem. Cyanobacteria are well adapted to environmental stress conditions and have a robust antioxidant mechanism to fight any reactive oxygen species (ROS) generated due to the biotic or abiotic stress that cause cytotoxicity and oxidative damage. Transcriptome and proteome study of cyanobacteria involved in combating heavy metal toxicity reveals that stress induced proteins are generated that help the organism to adapt to the stress condition. A better understanding of the mechanism employed by cyanobacteria to combat metal toxicity can be delineated through more detailed molecular level study

Keywords: Heavy metal ions, Silver nanoparticles, Abiotic stress, ROS, Cyanobacteria