Advancements in Environmental Biotechnology

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AARGON PRESS

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Integral University, Lucknow (U.P) INDIA

AARGON PRESS

New Delhi

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Published by
Aargon Press
EG-130, Inderpuri,
New Delhi-110012, India
Tel.: +91-11-9958121300
Email: info.aargonpress@gmail.com
Website: www.aargonpress.com

Disclaimer:

ISBN: 978-93-94070-17-2

Printed at: Aargon Press, New Delhi

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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 ingests 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