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Title: “Heavy metal stress induced enzymes in Cyanobacteria”

ABSTRACT

Cyanobacteria of commercial value are characterized by the presence of their characteristic active principles, the concentrations of which are altered by changes in environmental conditions such as stresses caused by the biotic or abiotic factors. Cellular adaptation to environmental stress is a major process that protects organism from deleterious effects of various stresses like Salt, temperature, pesticide, heavy metals etc. Cyanobacteria are known to survive in a wide range of environmental stress through changes in growth rate as well as qualitative and quantitative changes in their cell constituents that may be of biotechnological significance. Their fast growth and shorter life cycle is an added advantage.

H.fontinalis-339 has great commercial importance due its medicinal quality. A novel chlorine- and isonitrile-containing indole alkaloid which is responsible for most of the antialgal, antibacterial, antiviral, antifungal, and antimycotic activities (Moore *et al.* 1987; Vaillancourt & Albizati 1993; Fukuyama & Chen 1994) associated with cytotoxic, neurotoxic or hepatotoxic action (Cohen 1999; Kreitlow *et al.* 1999; Legrand *et al.* 2003). In context to the background *H.fontinalis-339* has been

selected to study the effect of environmental pollution Heavy metal (Pb, Cd and Hg)] on the growth and environmental stress adaptation mechanism of the *H.fontinalis-339*, along with its potentiality to remediate heavy metals from the polluted water.

The present study investigates the impact of Lead (Pb), Cadimum (Cd) and Mercury (Hg) stress induced oxidative stress on antioxidants, biochemistry, growth, free radical generation of oxidative stress or the status of toxicity, growth performance, osmolyte synthesis in terms of proline, cellular antioxidants and other non-enzymatic contents of Cyanobacteria may help in developing a strategy to improve cyanobacteria tolerance so that these may be used to reclaim the environmental stress.

Protein profiling by SDS PAGE

Exposure to Heavy metals results in a qualitative and quantitative regulation of individual proteins in *H.fontinalis-339* Synthesis of a wide spectrum of proteins is either curtailed or enhanced, and in addition, synthesis of a specific set of proteins is coordinately induced *de novo*. New protein bands were appeared in *H.fontinalis-339* under heavy metal stress. Changes in protein profiling and newly formed proteins might be helping Cyanobacterium to tolerate adverse conditions.