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Factors alleviating cadmium toxicity in white rot fungus

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Abstract

Environmental co-contamination with heavy metals and PAHs poses a challenge for bioremediation. In order to degrade metal-PAH mixtures, the biodegrading organism needs to be in a metabolically active state to degrade PAH while being able to tolerate the co-contaminant metal(s). In view of this, tolerance studies were carried out using cadmium (Cd) and individual PAH separately as well as together. The model white rot fungus, *Phanerochaete chrysosporium* known to have the ability to degrade PAHs was used in this study and the xenobiotic toxicity was assessed in terms of growth inhibition by measuring the mycelial dry weight. Cd at concentrations beyond 0.1 mM showed inhibition of fungal growth in a dose-dependent manner, while the test PAH showed inhibitory effect in the concentration range of 10-25 ppm depending on the PAH type. The pattern of growth inhibition followed the order Pyrene> Phenanthrene>B(a)P. Both the pollutants at their respective inhibitory concentrations led to changes in growth pattern of the organism with compact bead like shape. Interestingly, co-exposure with PAH, alleviated the Cd toxicity, indicating a protective effect of the PAHs. On the other hand, chemical depletion of glutathione increased the Cd toxicity suggesting an important role of in conferring tolerance to Cd in *P. chrysosporium*.

Biography

Kuber Bhainsa, Ph.D., is a Visiting Scholar at the Department of Environmental Health (DEH), University of Cincinnati College of Medicine (UC-COM), sponsored by DBT-CREST AWARD, DBT, Government of India.