

Heavy Metal Tolerance in Fungi Isolated from Soil Contaminated with Wastewater

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Abstract—Metal resistance is defined as the ability of an organism to survive metal toxicity by means of a mechanism produced in direct response to metal species concerned. Heavy metals are indicated to be harmful pollutants in soils and can exert harmful effects in many ways, depending on environmental factors and metal species. They can also influence soil fungi by changing fungal morphology and physiology, can affect the growth rate, reproduction process and enzyme production. Currently, bioremediation techniques are being developed which make use of micro organisms for degradation, accumulation or removal of pollutants. Microbial strains isolated from contaminated sites have this ability and hence can be developed as agents for bioremediation of heavy metal pollutants in soil. Considering this fact, the present study was undertaken to check the metal tolerance potential of indigenous filamentous fungi. Five fungal strains were isolated and purified from samples of sludge and untreated industrial effluents of various regions in Lucknow. These fungal cultures were maintained at 25°C at pH 7. Liquid suspension of the fungal cultures (Spore count: 1×10^7 spores /g) was inoculated in broth supplemented with varying concentrations, i.e. 25, 50, 100, 150, 200, 250 and 300 ppm concentration of Nickel (Ni), Chromium (Cr), Cadmium (Cd) and Copper (Cu) and for minimum inhibitory concentration (MIC) by growing on potato dextrose agar plates amended with varying amounts of Ni, Cr, Cd and Cu. After microscopic examination, the fungal strains were given the accession numbers PR-01, PR-02, PR-03, PR-04 and PR-05 respectively. Results revealed that PR-04 could tolerate upto 250 ppm of Chromium salt, followed by 200 ppm of Nickel salt. Considering the fact that use of fungi in bioremediation is a convenient, cost effective and ecofriendly technology, hence, advancements should be made for exploring metal microbe interaction and role of fungi for metal detoxification.

Keywords: Detoxification, Bioremediation, Heavy metals, Fungi.