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## Phytoremediation potential of nickel by *Cyperus rotundus* along with its rhizospheric fungi

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The interaction of *Cyperus rotundus* (obtained from the fields of TIFR, Mumbai) and its pathogen *Dreschlera* sp. was analyzed in Nickel contaminated water. Nickel is one of the most commonly found heavy metals in contaminated water and soil. The nickel phytoremediation ability of *Cyperus rotundus* which is maximum at 14mg/l and decreased from 16mg/l, was analysed spectrophotometrically (1.814 and 1.564 respectively at 445nm) and by atomic absorption spectroscopy, was found to be enhanced in the presence of its fungal pathogen *Dreschlera* sp. Infection by *Dreschlera* sp. spores was found to cause a rapid increase in rate of *Cyperus* root and shoot formation and hence increase its phytoremediation potential. This increase appeared to be more on infection of the plant with fungal spores than the fungal exotoxin. The phytoremediation potential of the plant in its place of inhabitation near nickel contaminated water bodies was analyzed and compared to that in standard ion containing Knop's solution and in ion free water. In all the cases, infection by the *Dreschlera* sp. spores and even by the fungal exotoxin caused a marked increase in the phytoremediation capacity of the plant (2.328 in 14mg/l nickel contaminated water in *Dreschlera* infected plant). Methanolic extract of the plant was screened for its total phenolic and flavonoid content which was enhanced upon infection with *Dreschlera* sp. The IC50 value of the *Dreschlera* infected plant extract was found to be more than that of the uninfected plant. The variation in the antioxidant property of the infected and uninfected plant in the presence of nickel was analyzed. Results indicated that the remarkable antioxidant property in the presence of 12mg/l nickel (0.382 at 517nm) was comparable to that of Gallic acid which is a standard antioxidant (0.442 at 517nm). The MIC of the methanolic plant extract was analysed against a range of Gram positive and Gram negative bacteria such as *Staphylococcus aureus* and *Escherichia coli* respectively. Further, the antifungal activity of the plant extract was analyzed and it was observed that the antibacterial and antifungal property against fungal pathogens other than *Dreschlera* sp. appeared to be enhanced in case of *Dreschlera* sp. infected *Cyperus* samples. These truly reflect a multi-dynamic consequence of the fungal infestation in *Cyperus rotundus*.

**Key words:** *Cyperus*, *Dreschlera*, Knop's solution, nickel, phytoremediation

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