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METAL BIOACCUMULATION IN NATIVE PLANTS FROM A COAL FLY ASH DUMP IN AN ABANDONED OPENCAST COAL MINE

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Abstract

Green cover establishment on barren coal fly ash deposits has been an imminent issue since decades. Naturally growing species are most efficient colonizers of any degraded habitat due to their potential to sustain the hostile conditions present therein. Keeping this idea on focus, field studies were carried out on a fly ash dump present in an abandoned quarry of an opencast coal mine. The study identified the potential invasive species as per the standard protocols and consequently, *Saccharum spontaneum* L., *Cynodon dactylon* (L.) Pers., *Plectranthus ovatus* Benth, *Senna tora* (L.) Roxb were selected based on their high importance value indexes. Root biomass of the grasses represented 40% of the total biomass. The increased available nitrogen content in the vegetated fly ash compared to the bare fly ash could be correlated to the root biomass of these grasses. Analysis of metals in the rhizospheric fly ash samples revealed their relative abundance in the order: Mn > Ni > Cr > Zn > Cu > Pb > Cd. The plants illustrated phytoremediation potential towards toxic metals such as Cd which with a bioaccumulation factor >1 in *S. tora* roots. High bioaccumulation of Cr was also observed in the shoots of the grasses. Translocation factor value was also greater than 1 for Cr, Pb, Ni, Cd in the plants and this unfurls their phytoextracting potential. Highest translocation factor was observed for Pb in *S. tora* followed by Cr in *S. spontaneum*. These experimental values depict that these plant species can be used for restoration of fly ash dumps and establish an initial green cover with added advantage of enhanced carbon sequestration, erosion control and commercial end uses.

Key words: bioaccumulation factor, natural colonizers, phytoextraction, translocation factor

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