

EFFECT OF PLANT GROWTH PROMOTING RHIZOBACTERIA (PGPRS) ON PHYTOREMEDIATION OF CD BY CORN (*ZEA MAYS L.*)

Abdolreza Akhgar, Elham Ahmadinia, Hosein Shirani, Mohsen Hamidpour

Soil Science department, Vali-e-Asr University of Rafsanjan, Rafsanjan, Iran

Abstract: Cadmium is of great importance because of potential hazard to humans and the environment. Today, plant growth promoting rhizobacteria (PGPRs) are used in increasing the bioavailability of heavy metals in polluted soils. The main objective of this research was to test the efficacy of PGPRs in increasing the ability of corn in the phytoremediation of Cd from a polluted soil through a greenhouse study. The experimental design was a completely randomized factorial experiment with two factors namely (i) four levels of bacteria (without bacteria (P0), and inoculation with three Cd-tolerant fluorescent *Pseudomonads* including isolates of P1, P169, P108) and (ii) time after implant (3, 6, 9 and 12 weeks). The Cd-tolerant bacteria were isolated from rhizosphere of plants grown in polluted soils. In order to perform the greenhouse test, a soil was artificially polluted with a fixed concentration of Cd (13 mg kg^{-1}) in the form Cd (NO_3)₂. Then corn seeds with and without PGPR treatments were planted on soils. Three months after planting, plants shoot and root were collected and some growth parameters and Cd concentration in plants were measured. The results showed that the inoculation of corn with isolates increased leaves number, plant height, shoot and root dry weights. The isolates significantly increased Cd uptake in both shoot and root compared with control. The maximum uptake of Cd was in shoots and roots of plants inoculated by P1 and P169, 9 and 12 weeks after implantation, respectively. In conclusion, phytoremediation with PGPR inoculation is a feasible and cost-effective remediation technique.

KEYWORDS: CADMIUM, CORN, PGPR, PHYTOREMEDIATION

A. R. Akhgar
Associate Professor
Department of Soil Science
Faculty of Agriculture
Vali-e-Asr University
Rafsanjan, Iran.
Tel: +98 34 31312029
Fax: +98 391 3202042