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EFFECT OF PLANT GROWTH PROMOTING RHIZOBACTERIA ON *Zea mays* DEVELOPMENT AND GROWTH UNDER HEAVY METAL AND SALT STRESS CONDITION

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Abstract

Plants, being sessile organisms are exposed to a variety of biotic and abiotic stresses. Bacteria, living in the rhizosphere of the plants can be beneficial, exhibiting plant growth promotion effect and inducing the stress tolerance of the plant. Therefore, studies regarding the role of plant growth promoting rhizobacteria (PGPR) in the stress management of the plants have received increasing attention. In the present study, we studied the stress tolerance and beneficial trait maintenance of 30 PGPR strains under stress condition. From a total of 17 heavy metal and salt stress tolerant bacterial strains, two Cd and Zn tolerant PGPR strains *Viridibacillus* sp. (BP13) and *Deftlia acidovorans* (BP12) as well as two salt tolerant strains *Pantoea agglomerans* (8G/3) and *Serratia fonticola* (BB17) were selected for plant experiments. When heavy metal and salt stress were applied, the beneficial effect of PGP bacterial inoculation on maize plant growth and development was confirmed only sporadically. Stress mitigation was observed in the case of *Viridibacillus* sp. (BP13) and *Deftlia acidovorans* (BP12) strains (0.1 mM Cd treatment), *Serratia fonticola* (BB17) (until 3 g/L NaCl) and *Pantoea agglomerans* (8G/3) (5 g/L NaCl). Despite the sporadically observed beneficial effect of the PGP bacterial inoculation on plant growth and development; a higher guaiacol peroxidase (GPOX) activity observed under *Viridibacillus* sp. (BP13) bacterial inoculation in the presence of heavy metal stress, as well as *Pantoea agglomerans* (8G/3) and *Serratia fonticola* (BB17) inoculation in the case of salt stress revealed that PGP bacterial strains increased the plant tolerance to abiotic stressors.

Keywords: abiotic stress, maize, plant growth, plant growth promoting rhizobacteria (PGPR)

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