

ABSTRACT

The present study was designed to check the amelioration effect of Cd resistant plant growth promoting rhizobacteria (PGPR) on growth, physiological parameters, yield and metal content of barley (*Hordeum vulgare* L. cv. Jao-97) under Cd stress. The Cd resistant PGPR were isolated from the tanneries industry effluents and screened for the Cd resistance. The bacterial strain was found resistant to a concentration of 1250 ppm. These Cd resistant PGPR were inoculated to the plant in an amount of 10 mL. Cd stress was applied at six different concentrations including T₀, T₁, T₂, T₃, T₄, T₅ and T₆ (control, 25ppm, 50ppm, 57ppm, 100ppm, 125ppm and 150ppm of Cd respectively). The Cd resistant PGPR improved the growth, physiological parameters, chlorophyll content and yield effectively and Cd content was significantly decreased in those plants that were inoculated with Cd resistant PGPR as compared to those which were not inoculated under T₆. The radicle length was improved more than the double in bacterial inoculated plants as compared to those that were not inoculated. Plumule length, radicle fresh weight, plumule fresh weight, radicle dry weight and plumule dry weight was increased to a percentage of 71%, 50%, 95%, 70% and 43% respectively of Cd resistant PGPR inoculated plants as compared to the non-inoculated plants at T₆ (150 ppm). The Cd resistant PGPR increased the shoot length, root length, shoot fresh weight, root, shoot dry weight and root dry weight at a percentage of 73%, 84%, 114%, 38% and 84% respectively in plants that were inoculated with Cd resistant PGPR as compared to un-inoculated plants at T₆ (150ppm). Cd resistant PGPR improved the Chl a Chl b, total chlorophyll, photosynthetic rate, transpiration rate and stomatal conductance to a percentage of 21.5%, 16.3%, 18.4%, 61%, 57% and 71% respectively in contrast to the plants that were not inoculated at T₆ (150ppm). The Cd resistant PGPR increased the number of ear per plant, number of grains per ear, number of grains per plant, weight of grains per ear, weight of grains per plant, weight of 1000 grains, total straw weight and weight of root per plant were increased in significant amount almost become doubled as compared to those plants that were not inoculated with Cd resistant PGPR at T₆ (150ppm). Cd tolerant bacteria decreased the Cd content in root, shoot and seeds effectively to 36.5%, 36% and 83% at T₆ as compared to those plants that were not inoculated with Cd resistant PGPR at T₆. Bioaccumulation factor and translocation

factor also decreased in Cd resistant PGPR inoculated plants to 8% and 36.5% respectively as compared to the un-inoculated plants at T₆(150ppm).