ABSTRACT

Soil acts as a sink for the industrial emissions and waste to accumulate in it. Heavy metal pollution in soil is one of the serious global concern of time because of their high toxicity even at low concentration level. Phytoremediation is more sustainable, eco-friendly and cost-effective strategy. Although phytoremediation has gained more attention among biological methods, toxicity of heavy metals affects plant growth and biomass adversely. Microbe assisted phytoremediation enhanced phytoextraction potential of plants. A novel *Pararhizobium antarctium* was used in this study. The purpose of this research was to assess the remediation potential *Pararhizobium antarctium* and phytoremediation potential of *Pisum sativum*. *P. antarctium* and *P. sativum* were exposed to five different concentrations of Pb i.e., 0 mg/kg, 150 mg/kg, 300 mg/kg, 450 mg/kg and 600 mg/kg. The experiment was conducted in the green house conditions provided in the Botanical Garden of Government College University, Lahore. Plant growth promoting rhizobacteria induced positive increase on plant length, leaf number, leaf surface area, root and shoot biomass. Whereas heavy metal exhibited reduction in photosynthetic content (Chlorophyll a' and b') on dose dependent manner from 0.83 µg/mL to 0.66 µg/mL, 0.59 µg/mL, 0.53 µg/mL and 0.49 µg/mL from control to 150mg/kg, 300mg/kg, 450 mg/kg and 600 mg/kg. Lead content absorbed by root in *P. sativum* was in dose dependent manner 38.89 mg/kg at 150 mg/kg and 121.89 mg/kg at 600 mg/kg of lead. Contrastingly absorption of lead content in shoot was low i.e., 15.04 mg/kg and 22.05 mg/kg for 150 mg/kg of Pb. *Pararhizobium antarctium* exhibited a considerable increase in percentage removal of Pb i.e., 54 % as compare to uninoculated plants with 52 % at 450 mg/kg. Moreover, results indicated that *Pararhizobium antarctium* can effectively improve the rhizoremediation of Pb by pea plant.