Abstract

Unplanned industrial and metropolitan development is the main reason of environmental pollution that abandon the significance of healthy environment. These types of activities encouraged heavy metal pollution which highly disturb the natural balance. Rhizoremediation is a cost efficient, environment friendly and green technology because its removal is without chemical and have little or no side effects. A novel bacterium *Parahizobium sphaerophysae* was used in this study. The objective of the research is to evaluate the potential of *P. sphaerophysae*, phytoremediation potential of *Pisum sativum*. *P. sphaerophysae* and *P.sativum* were utilized for five different concentration of Cr. Plant growth promoting rhizobacteria induced positive increase on plant length, leaf number, leaf surface area, root and shoot biomass. However, as chlorophyll(a,b) decreases with concentration increases, whereas heavy metal exhibited reduction in photosynthesis content in *Pisum sativum* compare to *Parahizobium sphaerophysae*. Cr content was highly absorbed by this manner roots > shoots> leaves. Roots absorbed 37%, shoot absorbed 27% after bacterial inoculation while leaves show 25% removal efficiency. *Parahizobium sphaerophysae* exhibited a considerable increase in percentage removal of Cr at 400 mg/kg i.e., 84% as compared to uninoculated plants which was 50% at 400 mg/kg, while percentage removal of bacterial treatment alone shows 69% at 200 mg/kg. Moreover, *Parahizobium sphaerophysae* nov. can effectively improve the rhizoremediation of Cr by pea plant. It would be interesting to identify the genes involved in chromium tolerant *Pararhizobium sphaerophysae* nov. and organic amendment or biochar should be highly utilized to tackle the fastest remediation of HMs.