

Effect of Bacillus Pumilus Strains on Heavy Metal Accumulation in Lettuce Grown on Contaminated Soil

Authors : Sabeen Alam, Mehboob Alam

Abstract : The research work entitled "Effect of Bacillus pumilus strains on heavy metal accumulation in lettuce grown on contaminated soil" focused on functional role of Bacillus pumilus strains inoculated with lettuce seed in mitigating heavy metal in chromite mining soil. In this experiment, factor A was three Bacillus pumilus strains (sequence C-2PMW-8, C-1 SSK-8 and C-1 PWK-7) while soil used for this experiment was collected from Prang Ghar mining site and lettuce seeds were grown in three levels of chromite mining soil (2.27, 4.65 and 7.14 %). For mining soil minimum days to germinate noted in lettuce grown on garden soil inoculated with sequence. Maximum germination percentage noted was for C-1 SSK-8 grown on garden soil, maximum lettuce height for sequence C-2 PWM-8, fresh leaf weight for C-1 PWK-7 inoculated lettuce, dry weight of lettuce leaf for lettuce inoculated with C-1 SSK-8 and C-1 PWK-7 strains, number of leaves per plant for lettuce inoculated with C-1 SSK-8, leaf area for C-2 PMW-8 inoculated lettuce, survival percentage for C-1 SSK-8 treated lettuce and chlorophyll content for C-2 PMW-8. Results related to heavy metals accumulation showed that minimum chromium was in lettuce and in soil for all three sequences, cadmium (Cd) in lettuce and in soil for all three sequences, manganese (Mn) in lettuce and in soil for three sequences, lead (Pb) in lettuce and in soil for three sequences. It can be concluded that chromite mining soil significantly reduced the growth and survival of lettuce, but when lettuce was inoculated with Bacillus.pumilus strains, it enhances growth and survival. Similarly, minimum heavy metal accumulation in plant and soil, regardless of type of Bacillus pumilus used, all three sequences has same mitigating effect on heavy metal in both soil and lettuce. All the three Bacillus pumilus strains ensured reduction in heavy metals content (Mn, Cd, Cr) in lettuce, below the maximum permissible limits of WHO 2011.

Keywords : bacillus pumilus, heavy metals, permissible limits, lettuce, chromite mining soil, mitigating effect

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