

Abstract

The current research was carried out to analyze the impact of chromium tolerant bacteria on germination and growth of *Zea mays* L. cv. DK-6714 to prevent the plants from noxious effects of chromium. Chromium resistant Bacteria were isolated from chromium contaminated soil of Kasur by observing their growth on nutrient broth medium treated with different concentrations of Potassium chromate salt ranging from 100ppm to 20000ppm. The effect of isolated bacteria on Maize plants was tested for germination and growth of Maize by treating the plants with six varying concentration of potassium chromate stock solution (control, 50ppm, 100ppm, 150ppm, 200ppm and 250ppm) respectively. In germination set-up inoculation of chromium resistant bacteria caused increase in germination % which was 66.6% and reduction in germination % was 50% in the absence of chromium resistant bacteria at 250ppm concentration of K_2CrO_4 . The % increase in radicle and plumule length was 20% and 28.5% respectively with the inoculation of chromium tolerant bacteria while % decrease in radicle and plumule length was 86.4% and 80% respectively without inoculation of chromium tolerant bacteria as compared to control plants. The %age increase in fresh weight of plumule, fresh weight of radicle, dry weight of plumule and dry weight of radicle were 23.07%, 28.57%, 33.3% and 50% respectively at 250ppm salt concentration as compared to control. While %age decrease at 250ppm in fresh weight of plumule, fresh weight of radicle, dry weight of plumule and dry weight of radicle were 79%, 57%, 50% and 71% respectively. In experimental set-up bacterial inoculum enhanced the vegetative growth of Maize and % increase in height and number of leaves at 250ppm was 11% and 66.6% while the % decrease in absence of chromium resistant bacteria was 23.46% and 28.57% respectively. After mid harvest, at highest salt concentration the % increase in shoot length, root length, fresh weight of shoot, fresh weight of root, dry weight of shoot, dry weight of root, total chlorophyll contents, photosynthetic rate, rate of transpiration and stomatal conductance was 81.79%, 91.6%, 183.933%, 45.6%, 204.8%, 500%, 143.1%, 14.5%, 380% and 350% respectively in presence of chromium tolerant bacteria while % decrease in absence of chromium resistant bacteria was 21.5%, 76%, 76%, 64%, 46%, 87%, 62%, 89.8%, 89.4% and 95.1% respectively as compared to control. After final harvesting, at highest salt concentration the % increase in dry weight of shoot, dry weight of root, cobs length, number of grains, weight of grains and weight of 1000

grains was 4.76%, 100%, 70.3%, 55.51%, 69.23% and 4.91% respectively in presence of chromium tolerant bacteria while % decrease in absence of chromium resistant bacteria was 27.5%, 85%, 51.7%, 46%, 64% and 21% as compared to control. Chromium content was determined in roots, shoots and grains of Maize. At highest salt concentration the percentage increase in roots, shoots and grains was 42.38%, 24.16% and 59.93% respectively as compared to control in absence of chromium tolerant bacteria. It was concluded that, all studied parameters were significantly affected by increasing chromium concentration in the absence of Cr tolerant bacteria but the effect was ameliorated by using chromium tolerant bacteria.