

ABSTRACT

Present study was carried out during 2011 growth season at the Botanic Garden, GC University, Lahore using three vegetable plants (Okra, Bottle ^{Botanical name} Gourd and Brinjal) and the impact of different concentrations of hexavalent chromium (viz.,) was assessed on the germination potential, vegetative growth, biomass, chlorophyll contents, physiological attributes, nutritional status and uptake of the heavy metals in all the vegetables grown in the experiment. It was found that germination was hindered in all the vegetable plants with reduced vigour index and tolerance index in the higher chromium treatments. Vegetative growth in terms of plant height was reduced by around 40%, number of branches per plant by 80%, green leaves per plant and leaf area by 50% in treated vegetables at higher chromium levels. Plant fresh biomass was decreased by more than 60% while dry biomass was less by almost 80% in higher treatments than control ones. Chlorophyll contents were reduced in the range from 50-60% and 60-80% approximately. Reduction in the physiological attributes was highly significant in highest chromium levels in all vegetable plants than control (50-95% in photosynthesis rate and transpiration; 30-55% in stomatal conductance). Nutritional parameters in leaves were also significantly reduced, for instance 75-90% nitrogen, 45-75% phosphorous, 40-45% potassium and 75-90% proteins in chromium treatment plants than non-treated ones. Chromium uptake was highly increased in leaves (8691-11436%), shoots (4273-5556%) and roots (5753-6288%) of chromium treated vegetable plants than that of their counterparts grown in control plants.

Present research work has clearly demonstrated that hexavalent chromium is highly mobile from soil to plants and it has by no means uncertain that it is highly toxic heavy metal. Upon consumption, it can cause serious irreversible diseases in the living organisms. This research has opened many avenues for academicians and researchers about the harmful effects of this metal on some of the highly consumed vegetables of the region.