

Abstract

Salinity stress and heavy metal contamination have become most prominent in research because of their tremendous effects on animals and plants. Salt stress in plants causes significant changes like reduce plant growth, increase oxidative stress, lessened termination in plants, and decrease enzymatic activity. Therefore, biochar, silicon nanoparticles and silicon nanoparticles doped biochar were used to minimize the effect of NaCl and heavy metals stress in soil. This experiment was designed to study the combating effects of biochar and silicon nanoparticles and their doping with biochar on growth and antioxidant potential of radish plant. 8 types of experiments were applied by using radish seed in loamy soil namely, biochar, silicon nano and particles, silicon nanoparticles doped with biochar, cadmium and salt stress and their effects were determined using different parameters. Salt and cadmium stress in radish plant usually reduced plant root and shoot growth, total phenolics and protein contents, APX, CAT along with the decrease in chlorophyll *a* and *b*. However, when the combined treatment of NaCl+Cd+biochar+SiNP were applied showed significant results in plant., Similarly cadmium and salinity also minimized the macronutrients in plants like K and Ca in both root and shoot. The combined application of different treatments enhanced the overall plant performance and improve its anti-oxidant potential under salt and cadmium stress.