ABSTRACT

Soil salinity has been created challenges in the agricultural field due to their devastating and deteriorating effects on plants and environment. Salinity increases the oxidative stress in plants and lead to the increased production of reactive oxygen species, decreases the production of antioxidant enzymes, lowers the rate of plant growth and imposes a negative impact on the health of plant root and shoot. The study was to contribute in Pakistan's economy by utilizing the saline sodic land with a salt tolerant cash crop 'saffron'. However, the purpose of present study was to evaluate the efficacy of iron enriched biochar on saffron growth, physiology and yield under NaCl stress. Saffron (*Crocus sativus*) plants were grown in the botanical garden GCU, Lahore under different treatments with three replications; T1=Control, T2=0.5% w/w FeDBc, T3=20mM NaCl, T4=60mM NaCl, T5=20mM NaCl + 0.5% w/w FeDBc, T6=60mM NaCl + 0.5% w/w FeDBc. Plants were harvested after 124 days. The salinity effects were observed on different parameters of Saffron like; ascorbate peroxidase, catalase, Chlorophyll content, total phenolics and total proteins of saffron leaf. The uptake of micro/macro nutrients was also determined in roots and leaves of saffron plants. Wheat straw Iron doped biochar proved to be the most effective in T5 treatment. The treatment T5 showed improvement in following parameters chl a (20%), chl b (33%), CAT activity (8%), total leaf protein content (7%), and (24%) decrease in MDA activity as compared to treatment T3. The significant improvements were also observed in micro/macro nutrient's status under wheat straw iron doped biochar. The application of biochar significantly reduced the sodium concentration in T5 (11%) relative to T3. Therefore, it was concluded that the application of Iron-doped biochar could enhance plants resistance against saline soil by mitigating the salinity stress.