Abstract

Spinach (*Spinacia oleracea* L.) belongs to family "Amarantheceae" and is known to have high contents of Iron. Lead (Pb) contamination in soils is reported to influence growth factors, cell metabolism and intake of macronutrients and micronutrients in many plant species. The application of biochar increases the adsorption of ions and reduces the uptake of toxic heavy metals by plants. current study was conducted to evaluate the effects of Pb on the growth and physiological parameters of the *S. oleracea* plants in wheat and bamboo biochar amended soil, and to calculate the adsorption capacity of biochar by using Freundlich & Langmuir isotherm models. In the experiment, sandy loam soil was used to grow *S. oleracea* plants in small pots with 5 mM Pb and 1% w/w of each wheat biochar and bamboo biochar in factorial design. The results showed that application of biochar (wheat and bamboo) significantly enhanced the fresh weight of roots and shoots, catalase (CAT) activity and total root phenolics in shoot of *S. oleracea* plants. Tissue macronutrients concentrations, i.e. K, Ca and Mg were increased in plants grown in biochar amended soils under Pb less. The adsorptive capacities (meq L^{-1}) of wheat and bamboo biochars were found to be 3.68 and 3.28, respectively. These experiments imply that wheat and bamboo biochar amendments in lead contaminated soils promoted the growth of *S. oleracea* plants by enhancing the physiological activities and uptake of essential nutrients.