

Biochar Application Affects Water Content, Lipid Peroxidation and Antioxidant Capacity in Wheat Roots Grown in a Cobalt-Contaminated Soil

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Aim of the study: Biochar (charcoal) is the solid co-product of pyrolysis, the thermal degradation of biomass in the absence of oxygen. Biochar has attracted widespread attention because of its potential use as a soil amendment to improve soil quality, sequester carbon, and enhance immobilization of potentially hazardous chemicals. Therefore, application of biochar in contaminated soil could be a potential management strategy for agricultural sustainability and food security. The information is unknown about the effects of biochar on alleviating the harmful effect of cobalt (Co) stress on antioxidant defense system in *Triticum aestivum* roots. The present study is aimed to study the effects of biochar on water content, proline content (Pro), hydrogen peroxidase (H₂O₂), activities of some antioxidant enzymes and lipid peroxidation (TBARS) were investigated in roots of Co-stressed wheat.

Material and Methods: For this, three-weeks-old wheat plants were treated with 150 and 300 μ M Co stress with/without biochar (10% and 20%) treatments for 7 days.

Results: A decrease in activities of superoxide dismutase (SOD), catalase (CAT) and peroxidase (POX) were observed in response to increasing levels of Co concentration. These changes were observed more pronounced in 300 μ M Co stress-treated wheat roots. However, in Co-stressed wheat, biochar application resulted an alleviation on water content and a decline in H₂O₂ content. Also, when comparison to the plants treated with stress alone, biochar application to Cd-stressed wheat significantly decreased TBARS content and significantly enhanced the activities of SOD, POX and ascorbate peroxidase (APX). It could be concluded that exogenous biochar may have the application possibility for a future practical trial of stress reduction leading to mitigated heavy metal toxicity and improved the water content and the antioxidant enzyme activities in wheat roots.

Keywords: Antioxidant enzyme, Biochar, Cobalt, ROS, *Triticum aestivum*