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SHORT TERM IMPACTS OF BIOCHAR INCORPERATED SOIL ON EARLY GROWTH OF SELECTED PERENNIAL AND ANNUAL CROPS

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Biochar is a fine-grained, highly porous charcoal substance which is used as a soil amendment. Many studies report that the effects of biochar depend on the source of raw material, pyrolysis temperature and particle size of biochar chips.

Thus, a series of experiments were conducted to test the impact of three types of biochar, and commonly used compost on selected soil properties, earthworm attraction, germination of bean (*Phaseolus vulgaris* L), root and shoot growth of both beans and tea *Camellia sinensis* L. (O.) Kuntze and nodulation of *Sesbania sesban* plants, using a glass house bioassay technique. The statistical analysis was conducted using a general linear model procedure in the SAS statistical software and mean separation was done by least squares means procedure.

The earthworms in the biochar and compost mixed soils were over 50 %, indicating their preference to biochar, which indicated the non toxicity of the added treatments on biological organisms. However, the selected biochar materials and compost had no beneficial impact on germination of bean seeds. In contrast, it had a significantly positive impact on shoot growth rate, root depth and root elongation rate of tea. In beans, biochar treatments positively enhanced leaf area, total root length and root: shoot ratio. Biochar also had a significant positive impact on root nodulation in *Sesbania sesban*, but not in terms of increasing the active nodules per plant. Biochar had a significant short term impact on altering soil chemical properties, however a beneficial impact was not observed in terms of soil biological properties and moisture contents of the amended soils.

It is concluded that the application of biochar has a significantly positive impact on shoot and root growth of tea and bean crops and nodulation of *Sesbania sesban* in short term. In contrast, it is a good soil amendment, which improves soil chemical properties within a short period.

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