

BIO-CHAR AS A SOIL AMENDMENT ON GROWTH OF YOUNG TEA

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A soil amendment is a material that can improve soil physically or chemically, making it more suitable for plant growth. Bio-char, which is obtained from the thermo-chemical conversions of biomass in an oxygen-limited environment, can be used as a soil amendment. Refuse tea, a waste product generated from tea manufacturing process, is the raw material used to produce bio-char. A pot experiment was conducted to study the effect of bio-char with other nutrients on soil plant nutrient status and growth parameters of young tea. Eighteen pots were filled with 4 kg of prepared soil. Bio-char was mixed with soils at the rate of 1%. There were six treatments, having different combinations of bio-char and chemical fertilizer in three replicates. Six month old tea seedlings (cultivar 4771) of similar weight were transplanted in each pot and arranged according to the Randomized Complete Block Design (RCBD) in the glasshouse at the Tea Research Institute, Talawakelle. The data was analyzed using one way analysis of variance (ANOVA) in Statistical Analysis System (SAS). Bio-char applied pots showed higher pH values and higher soil organic carbon level than others ($p < 0.05$). Soil Cation Exchange Capacity (CEC), available N, available P, exchangeable K and available Mg levels of the soil significantly varied, among treatments. Higher leaf N contents were observed in pots where chemical fertilizer was applied with and without bio-char. There was no significant difference ($p < 0.05$) in leaf P, K and Mg content among tested treatments. Leaf number and shoot dry weights were significantly higher ($p < 0.05$) in biochar applied treatments compared to the control. The study revealed that bio-char may increase availability of organic carbon and major macro nutrients such as available N, P, exchangeable K and Mg in the soil. However, the long-term field investigations should be carried out to confirm the results.

Keywords: Bio-char, Refuse tea, Soil amendment