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USE OF BIOCHARS PRODUCED FROM PLANT MATERIALS TO INCREASE PHYSICOCHEMICAL PROPERTIES IN SLOPING LANDS SOILS

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Soil degradation due to improper use of soil or poor soil management affects the productivity of agricultural lands and thereby threatens food security. Biochar has attracted attention for the rehabilitation of degraded soils. This study determined the effect of the application of biochar produced from different plant materials on the physicochemical properties in soils in sloping lands. Randomized Complete Block Design (RCBD) was used with four treatments and four replicates. Land plots were prepared with each type of biochar made from cones of *Pinus pinaster*, barks of *Eucalyptus tereticornis*, wood chips of *Camellia sinensis* and a control. They were incorporated into the soil on top 5 cm at the rate of 250 g/m^2 separately in each plot size of 1.5 m × 1.0 m. Soil samples were collected from top to 30 cm depth (root zone) using a core sampler once in two weeks after applying biochar for three months. Soil samples were analyzed for physicochemical properties such as pH, EC, bulk density, particle density, porosity, soil organic matter, total nitrogen, exchangeable potassium and available phosphorus. Duncan's multiple range test was carried out using SPSS 25.0. Results revealed that the application of biochar significantly increased the soil nutrients, organic matter content (p = 0.0001), total nitrogen (p < 0.0001), available potassium (p < 0.0001), phosphorous (p = 0.0001), porosity (p < 0.0001) and significantly decreased the bulk density (p < 0.0001). Moreover, a desirable range of soil pH (6.5 – 7.3) was obtained after incorporating biochar. The highest level of organic carbon (4.4%) was observed in the soil incorporated with *C. sinensis* biochar. Further, the highest amount of total nitrogen (6.6 ppm), exchangeable potassium (6.6 ppm), and available phosphorus (1.2 ppm) were also observed in soils incorporated with biochar produced from *C. sinensis.* In conclusion, biochar application could increase soil nutrient content and physical properties for tilth increasing in the sloping land soils.

Keywords: Biochar, *Camellia sinensis, Eucalyptus tereticornis, Pinus pinaster*, Sloping lands, Soil physicochemical properties