

Effects of rice husk & wood biochar on maize plant physiological parameters grown on different types of soil



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Abstract: A greenhouse trial study was carried out to determine the effect of using rice husk biochar and wood biochar in improving the growth performance and nutrient uptake by maize grown on neutral, alkaline and acidic soils. Five treatments with three replicates each were prepared. The maize seed were germinated and harvested after 77 days. Results shows that there was variation in term of growth performance of maize plants grown on different soil types and amended with different types of biochar. Increase in the plant height and diameter could be due to Si uptake. Besides that, chlorophyll content reading of maize plant grown on soil amended with rice husk biochar. In short, adding agriculture residue like rice husk biochar and wood biochar is good practices as not only it increases soil fertility, it also a sustainable way of managing waste.

Table 1: Treatment level

Treatment	Acidic	Neutral	Alkaline
T ₀ (Control)	Soil + NPK	Soil + NPK	Soil + NPK
T ₁ (RHB 4 tan ha ⁻¹)	Soil + NPK +RHB	Soil + NPK +RHB	Soil + NPK +RHB
T ₂ (RHB 8 tan ha ⁻¹)	Soil + NPK +RHB	Soil + NPK +RHB	Soil + NPK +RHB
T ₃ (WB 4 tan ha ⁻¹)	Soil + NPK +RHB	Soil + NPK +RHB	Soil + NPK +RHB
T ₄ (WB 8 tan ha ⁻¹)	Soil + NPK +RHB	Soil + NPK +RHB	Soil + NPK +RHB

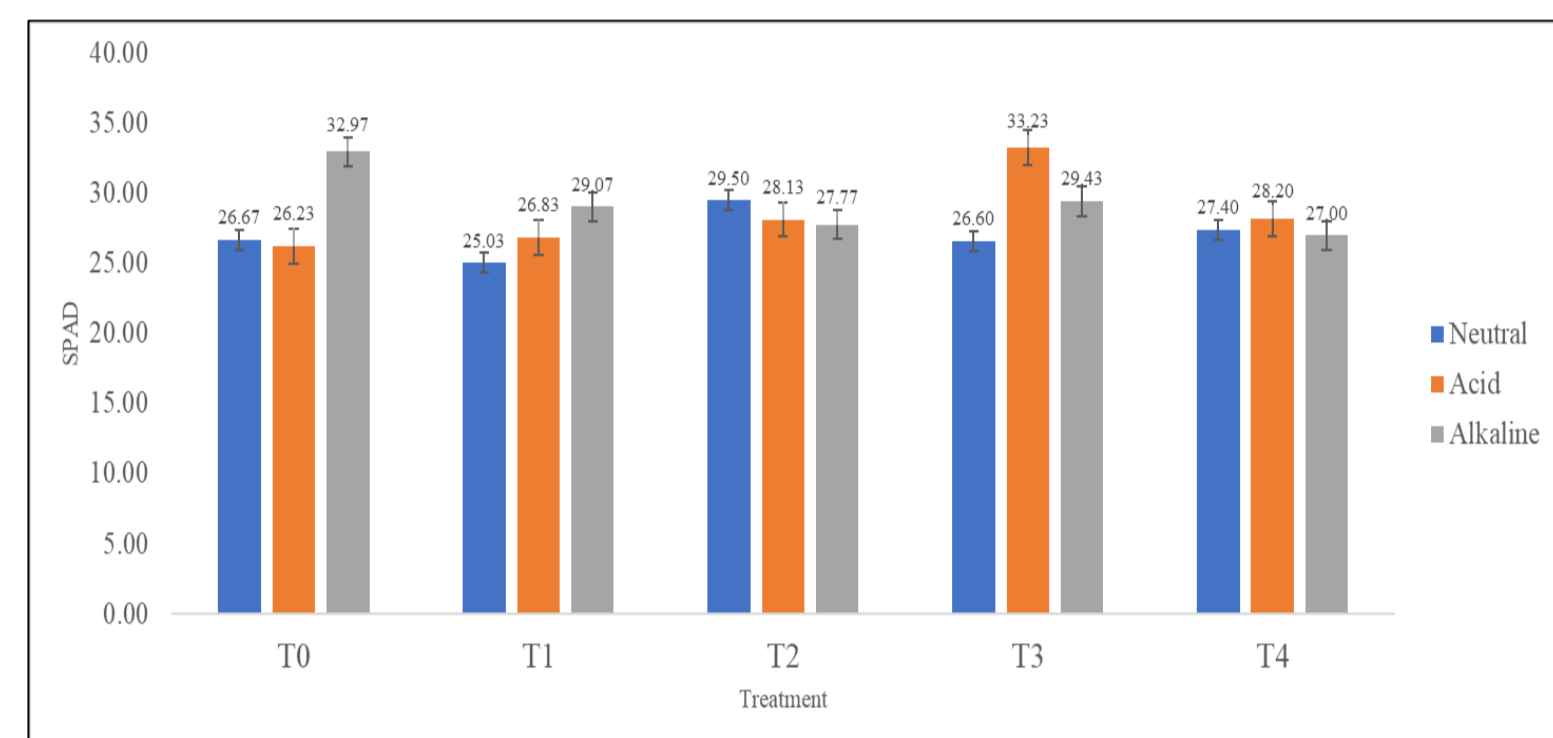


Figure 1. Chlorophyll content measured of the fully expanded corn leaves for each treatment. Different letters indicate significant differences between means across each treatment of acidic, neutral and alkaline soils according to Tukey Test (p<0.05).

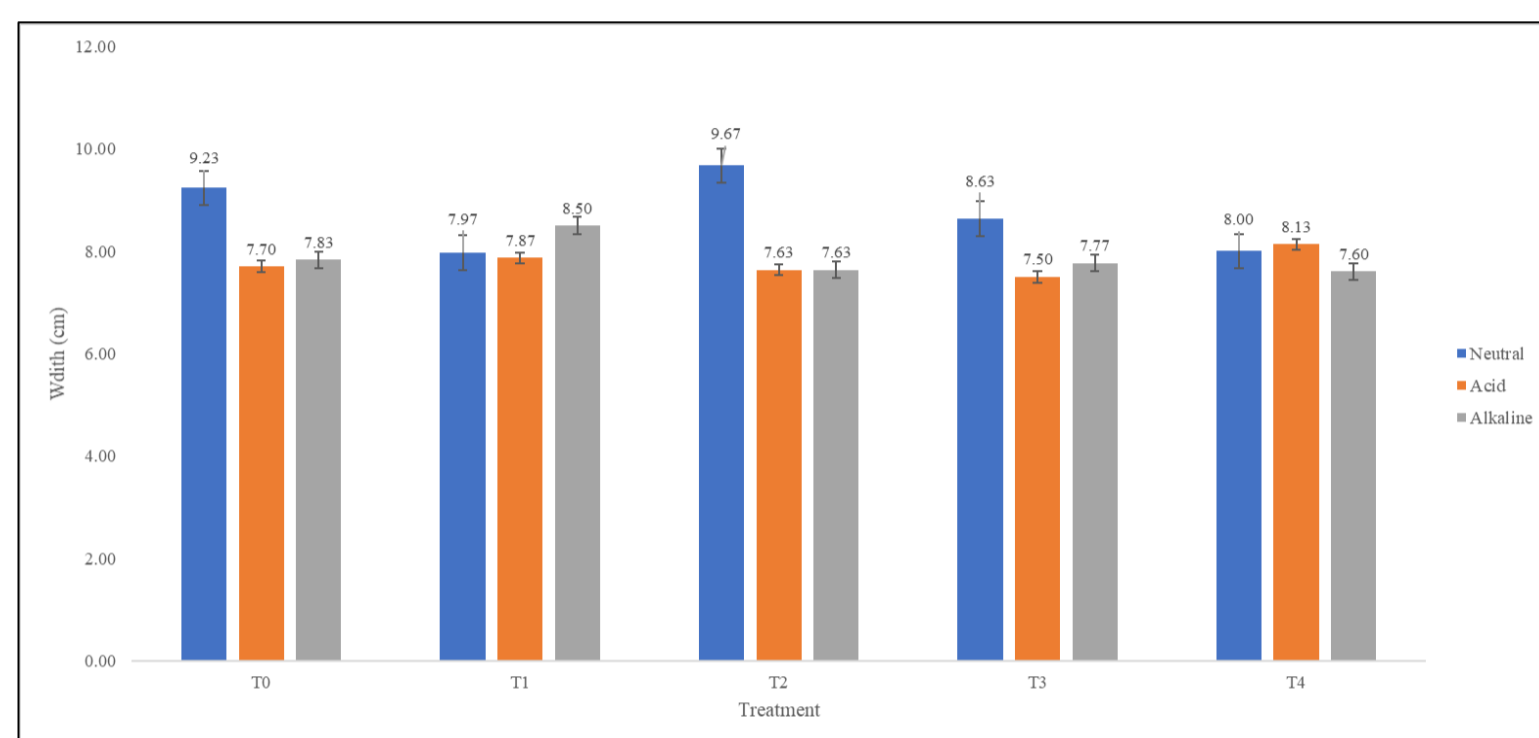


Figure 4. Leaf width of maize after 77 days of planting for each treatment. Different letters indicate significant differences between means across each treatment of acidic, neutral, and alkaline soils according to Tukey Test (p<0.05).

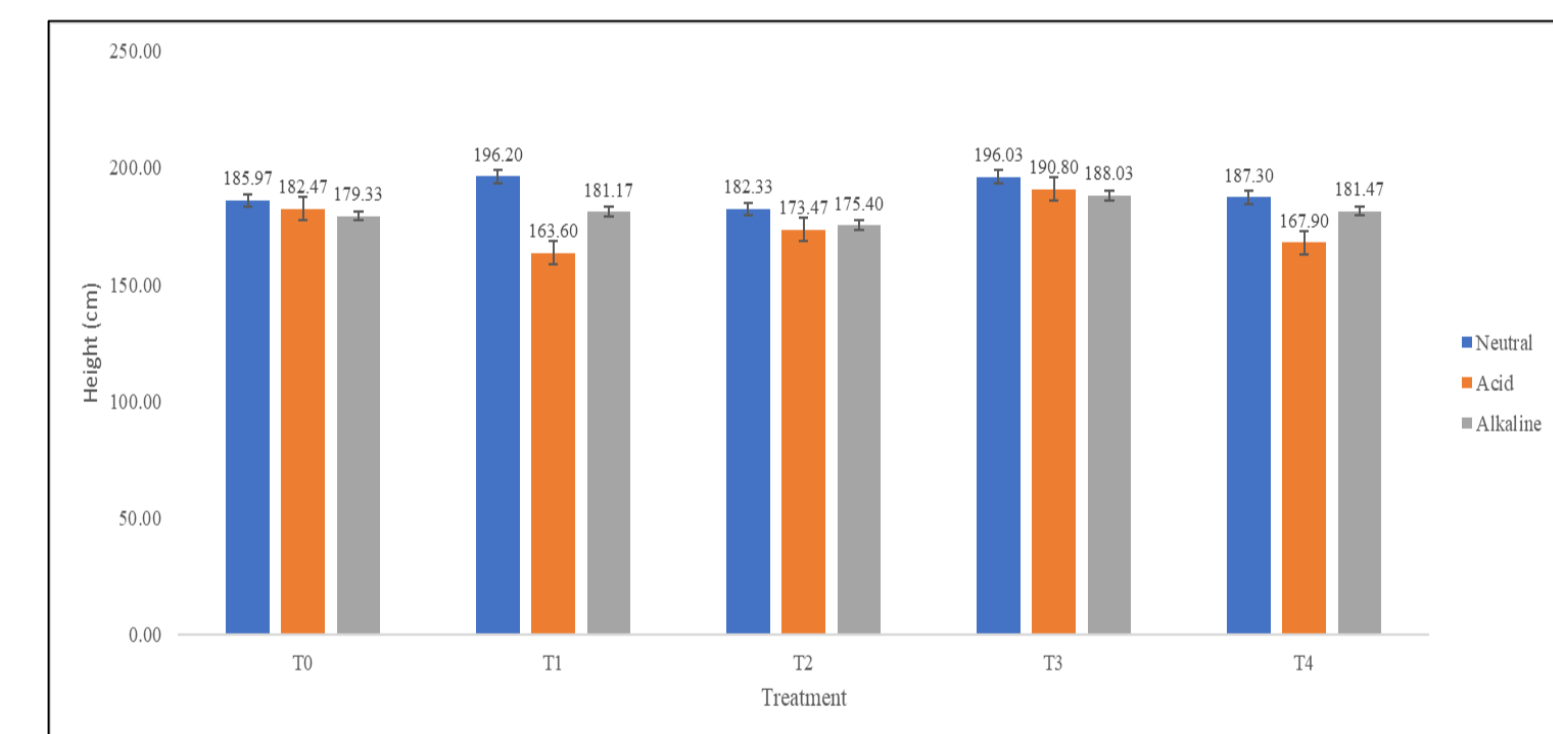


Figure 2. Plant height of maize plant after 77 days for each treatment. Different letters indicate significant differences between means across each treatment of acidic, neutral, and alkaline soils according to Tukey Test (p<0.05).

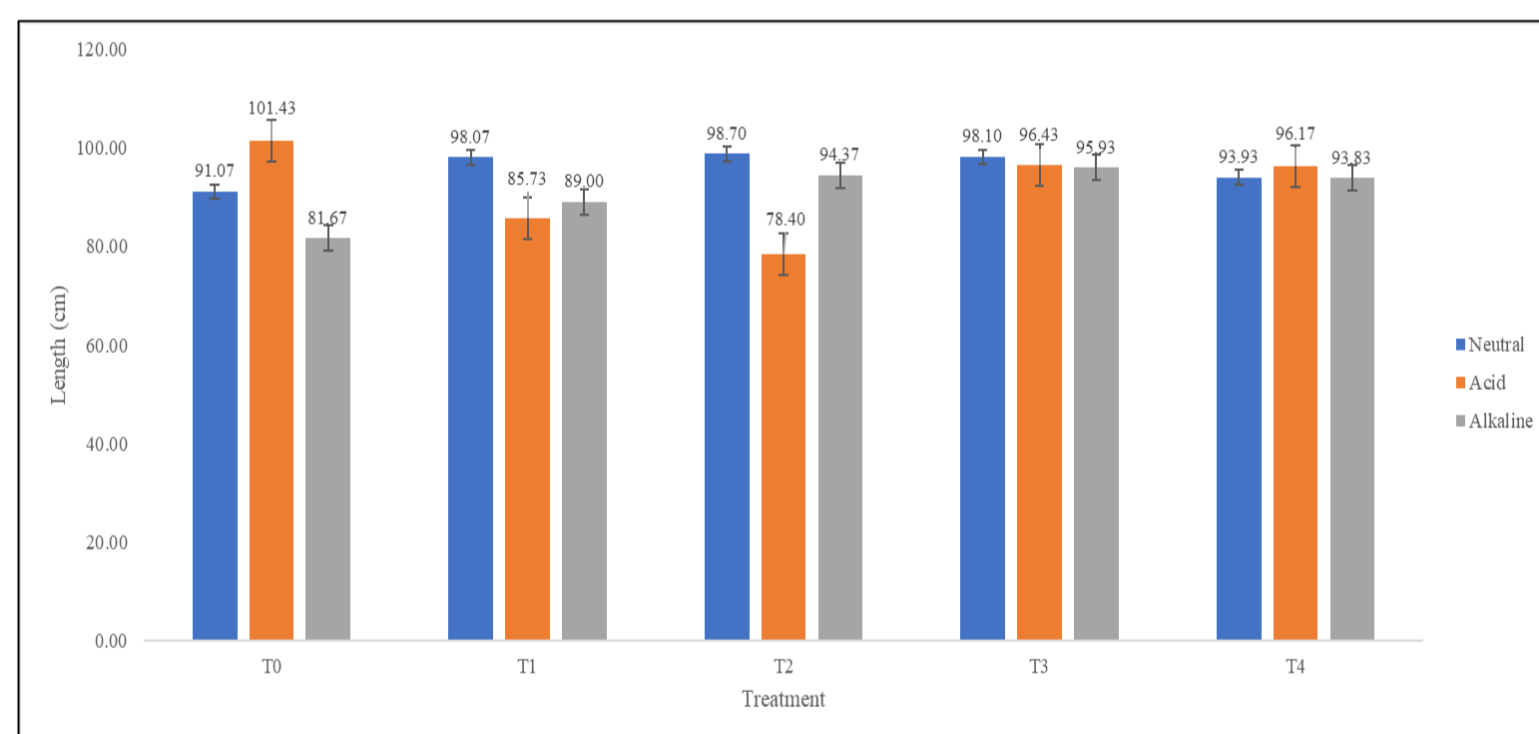


Figure 5. Leaf length. Different letters indicate significant differences between means across each treatment of acidic, neutral, and alkaline soils according to Tukey Test (p<0.05).

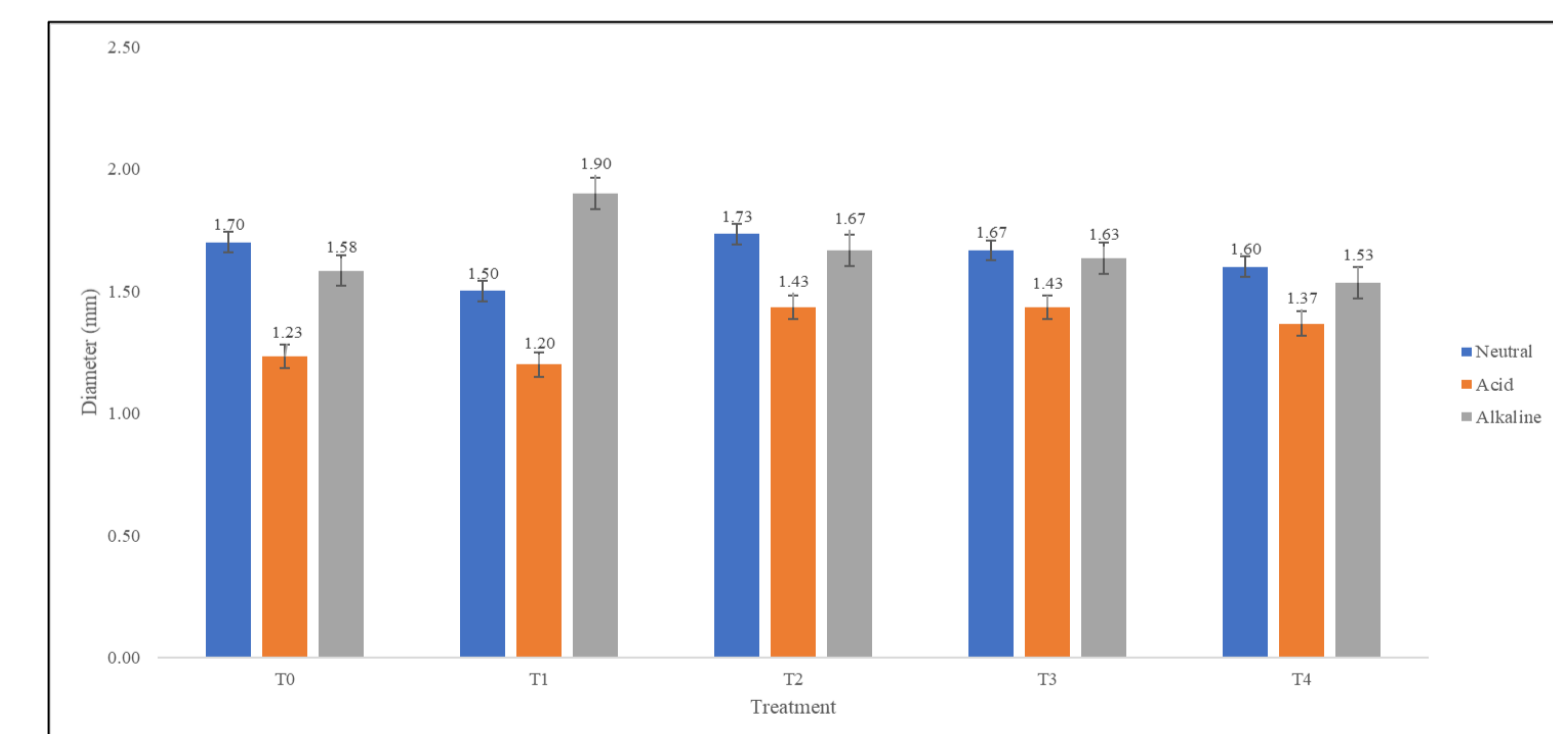


Figure 3. Diameter of maize plant after 77 days of planting for each treatment. Different letters indicate significant differences between means across each treatment of acidic, neutral, and alkaline soils according to Tukey Test (p<0.05).



Conclusion

Adding biochar to the soil does helps in improving the soil properties as it increases nutrient retention and nutrient uptake. The obvious improvement of available Si in the soil was more visible on the chlorophyll content of maize plant grown on soil mixed with rice husk biochar as compared to wood biochar. High Si content in the rice husk biochar helps in making the maize plant leave become turgid and thus allowing better photosynthesis process to occur.