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Effects of charcoal production on maize yield, chemical properties and texture of soil.

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Abstract The effects of charcoal production on soil textural and chemical properties were investigated in Ejura, Ghana. The aim was to study the effects of heating and charcoal residue on maize yield, soil texture and soil chemical properties. Composite samples were taken from the 0–10 cm layer of soil at charcoal-making sites and from adjacent fields (control). Twelve sites were randomly selected for the study across the range of the *Kotokosu* watershed. Maize was planted in four selected locations on charcoal site soils (CSS) and adjacent field soils (AFS) to assess the impact of charcoal production on crop yield. There was a significant increase in soil pH, base saturation, electrical conductivity, exchangeable Ca, Mg, K, Na and available P in the soil at the kiln sites as compared to the adjacent soils. A relative change of up to 329% was observed in K while organic C and total N decreased by 9.8% and 12.8%, respectively. Organic C and total N were highly correlated ($P < 0.01$) and both parameters significantly ($P < 0.05$) depended on clay minerals in the soils. Soil texture was also modified with a significantly higher sand content and lower clay fraction in the CSS. The grain and biomass yield of maize increased by 91% and 44%, respectively, on CSS as compared to AFS. Further research to ascertain the long-term effects of charcoal production on the soil environment and the fertility of tropical soils is needed.