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SOIL APPLICATION OF BIOCHAR. EFFECT ON SOIL NUTRIENT RETENTION CAPACITY

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Abstract
Biochar is a high surface area, highly porous, variable-charge organic material that has the potential to increase soil water holding capacity, cation exchange capacity, surface sorption capacity and base saturation when added to soil. Biochar addition to soil also has the potential to alter soil microbial populations and to shift functional groups and have the potential to reduce soil bulk density. The broad array of beneficial properties associated with biochar addition to soil may function alone or in combination in order to influence soil nutrient transformations and their stability towards leaching. In this study, the effect of biochar produced from maize cob on the N and P retention in an acidic soil is examined using column experiments. Glass columns packed with biochar amended soils that were treated with diammonium phosphate were leached with deionised water, five times the water retention capacity of the soil. The residual N and P content in the leached soil samples were determined and reported as function of biochar and diammonium phosphate application rates. Application of biochar was accompanied by increase in the retention of N and P in the unfertilized soil apparently to an extent determined by the level of biochar application to the soil. It was found that in the diammonium phosphate fertilized soil, whereas biochar application tended to accentuate P leaching from the soil, mobility and leaching of N was markedly hindered. The apparent increase in the amounts of P leached from the fertilized soil following biochar application was explained in terms of the relatively high level of P application to the soil. Soil nutrient leaching retardation via the application of maize cob biochar has been demonstrated and has a prospect in soil management and climate change mitigation applications.