

EFFECT OF BIOCHARS VARYING IN PHYSICO-CHEMICAL PROPERTIES ON WATER
HOLDING CAPACITIES OF TWO TROPICAL SOILS WITH CONTRASTING TEXTURE

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ABSTRACT

There is a growing interest in biochar for use in sustainable agricultural production systems. Water management has become a key priority as climate change exacerbates imbalances between water demand and availability. Eight biochars of different properties were applied to two soils with contrasting texture to investigate the effect of biochar on water holding capacities. Two different addition rates were applied, 2% and 4% (w/w), and compared to a zero-biochar control. All biochars showed a significant effect in water holding capacities in both soils. In the sandy soil higher addition rate always led to higher water retention, while in the clayey soil, higher addition rate of some biochars led to decreased water holding capacities. Gasification biochar generally led to the greatest improvements, showing 38.5% and 31.5 % increase in the sandy and clayey soil, respectively. Variable results of some biochars indicated that biochar's ability to increase water retention also depended on to which soil it was added. No significant relationships were found between volatile matter and ash content of biochars and changes in water retention. More research is needed on surface area measurements to test the hypothesis that water holding capacities are directly related to surface area of biochars.