

THE EFFECTS OF BIOCHAR AS A SOIL AMENDMENT ON SOIL QUALITY AND PLANT GROWTH

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Biochar is a stable form of recalcitrant carbon created by heating biomass in a low or no oxygen environment. When used as a soil amendment, biochar forms a dynamic substrate which provides numerous benefits, including increasing nutrient availability, increasing soil water retention, improving crop yield, and sequestering carbon for hundreds to thousands of years. However, biochar's effectiveness largely depends on the biomass feedstock and the soil to which it is applied. Individual biochars made from different feedstocks perform differently against each other, and the magnitudes of their effects can be dependent on many factors within the soil. Testing different feedstocks under different soil conditions is needed in order to gain a full picture of the potential of biochar. The purpose of this research is to compare the effects of different types of biochar created from individual feedstocks on soil quality and plant growth in soils found in the North Carolina high country region, US. This study used cane sorghum, hardwood chips, Fraser fir, and bone as feedstocks, with mineral and organic aqueous nutrients to determine their effects on plant growth and soil quality in a controlled environment. Fast growing sunflowers were used as a testing plant. By characterizing and testing biochar from different feedstocks, the properties of different types of biochar can be better understood so that beneficial soil amending properties can be optimized.