

A Quick-Test for Biochar Effects on Seed Germination

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Biochar is being globally evaluated as a soil amendment to improve soil characteristics (e.g. soil water holding, nutrient exchange, microbiology, pesticides and chemical availability) to increase crop yields. Unfortunately, there are no quick tests to determine what biochar types are most effective at improving soil characteristics amenable for higher crop yields. Seed germination is a critical parameter for plant establishment and may be a quick indicator of biochar quality. We adapted Oregon State University Seed Laboratory procedures to develop a “quick-test” for screening the effects of biochar on seed germination. We used 11.0 cm rectangular x 3.5 cm deep containers fitted with blotter paper. The paper was premoistened with reverse-osmosis water, followed by placement of seeds (25 in a uniform 5 x 5 vacuum-assisted pattern, and biochar mixtures). A Norfolk and Coxville soil series from South Carolina were used. A total of 18 biochars were evaluated that were produced from 6 feedstocks (pine chips, poultry litter, swine solids, switchgrass, and two blends of pine chips and poultry litter); with biochar from each feedstock made by pyrolysis at 350, 500 and 700 °C. Crops were cabbage, cucumber, onion, ryegrass and tomato. Preliminary results from the test indicated differences in seed germination due to soil type and possibly soil x biochar feedstock interactions. Other measurements including shoot dry weight per plate and pH of the soil+ biochar mixtures will be evaluated. Additional research will be conducted to determine biochar %, and amount of soil plus biochar for optimal germination responses. The test can also be used for a rapid evaluation of the effects of soils, and other soil treatments in addition to biochar such as pesticides and toxic materials, seed germination, and seed-mycorrhizal fungi relationships.