



## Effects of amendment of different biochars on soil physical and biological properties related to carbon mineralization

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Biochar addition to soils potentially affects various soil properties, and these effects are dependent on biochars derived from different feedstock materials and pyrolysis processes. The objective of this study was to investigate the effects of amendment of different biochars on soil physical and biological properties. Biochars were produced with dairy manure and woodchip at temperatures of 300, 500, and 700°C, respectively. Each biochar was mixed at 5% (w/w) with a forest soil and the mixture was incubated for 180 days, during which soil physical and biological properties, and soil respiration rates were measured. Results showed that the biochar addition significantly enhanced the formation of soil macroaggregates at the early incubation time. The biochar application significantly reduced soil bulk density, increased the amount of soil organic matter, and stimulated microbial activity and soil respiration rates at the early incubation stage. Biochar applications improved water retention capacity, with stronger effects by biochars produced at higher pyrolysis temperatures. At the same suction, the soil with woodchip biochars possessed higher water content than with the dairy manure biochars. Biochar addition significantly affected the soil physical and biological properties, which resulted in different soil carbon mineralization rates.