

Nutrient release and ammonia volatilization from biochar-blended fertilizer with and without densification

ABSTRACT

Blending fertilizer with biochar followed by densification to make it into a tablet can enhance the adsorption of fertilizer on the biochar surface and reduce the nutrient loss during handling. However, the nutrient release and ammonia volatilization from biochar-blended fertilizer with and without densification are not well understood. The objectives of this study were to determine the nutrient release and ammonia volatilization from an acid soil applied with biochar-blended NPK fertilizer with and without densification. The nutrient release of biochar-blended NPK was determined using water incubation for 30 days, whereas daily loss of ammonia was measured using a closed dynamic air flow system for 10 days. The densified biochar-blended NPK caused stronger physical binding of the nutrients within the tablet in addition to stronger chemical bondings between the nutrients with the biochar's functional groups. As a result, nutrient release in the water incubation from the biochar-blended NPK fertilizer tablet was slower. However, blending the biochar with the NPK fertilizer increased soil ammonia volatilization relative to the NPK fertilizer alone. This demonstrates that the biochar-blended fertilizer tablet has the potential to serve as a slow release fertilizer for crop cultivation.