Insights in Aquaculture and Biotechnology

Biochar increases ^{15}N fertilizer retention and indigenous soil N uptake in a cotton-barley rotation system

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Abstract: Biochar amendments can modify fertilizer nitrogen (N) availability in soil and crop N uptake. However, hobiochar addition affects crop N uptake and fertilizer N recovery under various N levels is not yet well understood. To address this question, we conducted a two-season [cotton (*Gossypium hirsutum* L.) -barley (*Hordeum vulgare* L.) rotation] pot experiment that included four N fertilizer rates (0, 75, 150, and 300 kg N ha^{-1}, supplied as urea-^{15}N) combined with two straw-biochar rates (0 and 15 t ha^{-1}). Soil properties, plant root morphology, N uptake, and biomass yield were studied. Biochar addition decreased soil inorganic N content but increased urea-N retention at cotton harvest, leading to 32% of the applied urea-N accumulating in soil compared with 27% without biochar, averaged across fertilizer N rates. Use of ^{15}N fertilizer showed that biochar increased plant uptake of indigenous soil N, not fertilizer N. An obvious decrease in urea-^{15}N recovery induced by biochar was observed at 75 kg N ha^{-1}, but not at 150 or 300 kg N ha^{-1}. The efficiency of urea-^{15}N recovery by plants (^{15}NRE, 34-45%), measured using the tracer method, was much lower than that measured using the traditional non-isotope method (NRE, 67-96%). At barley

Biography: Wang zhi will finished his PhD degree at Nanjing Agricultural university, Collage of agriculture in 2020, June. He has published the paper titled

Publications:

1.Evaluating the Mechanical Properties of Admixed Blended Cement Pastes and Estimating its Kinetics of Hydration by Different Techniques
2. Genetic Diversity Using Random Amplified Polymorphic DNA (RAPD) Analysis for Aspergillus niger isolates
3. Au–Ag–Cu nanoparticles alloys showed antifangal activity against the antibiotics-resistant Candida albicans
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Abstract Citation: Biochar increases ^{15}N fertilizer retention and indigenous soil N uptake in a cotton-barley rotation system February 17-18, 2020 Osaka, Japan