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Biochar, fertilizer application methods, and soil nitrogen

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First author Xiuwen Li collecting soil samples for the laboratory experiment. Photo courtesy of t

First author Xiuwen Li collecting soil samples for the laboratory experiment. Photo courtesy of the University of Tennessee Soil Management Lab.

A large amount of nitrogen fertilizer added to croplands is lost from the soil, leading to economic loss for producers and serious environmental issues. Producers can reduce this loss by co-applying biochar with the fertilizer, but the application method can influence this effect.

New research in the *Soil Science Society of America Journal* found that biochar–urea co-application slowed the mineralization of urea in soil by slowing ammonification, nitrification, and nitrous oxide emission. This effect declined rapidly after 30 days with soil incorporation but remained longer with surface application. Consequently, soil nitrate-nitrogen and cumulative nitrous oxide production under biochar–urea co-application at 60 days were about two times higher with incorporation vs. surface

application.

These results suggest that producers can use surface co-application of biochar and urea as an approach for slow release of nitrogen to soil. In contrast, producers could use the soil incorporation method for crops that need low nitrogen at the beginning of their growth but require a substantial amount of it later. This study recommends that surface co-application of biochar and urea can be a good strategy to reduce soil nitrogen losses by slowing down nitrate leaching and nitrous oxide emission.

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Li, X., Neupane, A., Xu, S., Abdoulmoumine, N., DeBruyn, J.M., Walker, F., & Jagadamma, S. (2020). Application methods influence biochar-fertilizer interactive effects on soil nitrogen dynamics. *Soil Science Society of America Journal*. **https://doi.org/10.1002/saj2.20170**

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