Science Societies

Predicting plant-available nitrogen from organic fertilizers

April 22, 2020



Picture of poultry litters, composts, and fertilizers prior to characteristic analysis used in the incubation study.

Organic farmers rely on a wide range of materials to supply plant nitrogen needs. These materials can be commercial organic fertilizers (composed of animal and plant byproducts), composts, and/or fresh manures. Unlike inorganic fertilizers, these materials must undergo mineralization to become plant-available inorganic nitrogen. With the rate and amount of mineralization dependent on material characteristics and field conditions, it is difficult to synchronize nitrogen availability with plant demand.

In a recent article published in the *Soil Science Society of America Journal*, researchers determined nitrogen mineralization from organic fertilizers, composts, and poultry litters using long-term incubation studies. Mineralized nitrogen in 99 days ranged from 25–93%, 10–55%, and 1–5% of the organic nitrogen applied from the fertilizers, litters, and composts, respectively. The mineralized nitrogen could be predicted using the initial total nitrogen of the materials. By grouping the products and their rates, accurate predictions of release were determined using first-order kinetics.

Better predictions for how much and when plant-available nitrogen is released from these materials can aid farmers in using more precise applications, potentially saving time and money while reducing the potential for runoff. Fieldwork will help determine how these rates are affected by environmental conditions.

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Cassity-Duffey, K., Cabrera, M., Gaskin, J., Franklin, D., Kissel, D., & Saha, U. (2020). Nitrogen mineralization from organic materials and fertilizers: Predicting N release. *Soil Science Society of America Journal*, *84*. **https://doi.org/10.1002/saj2.20037**

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