Science Societies

Reducing Nutrient Loss with Struvite Fertilization

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Top: Granules of struvite produced from wastewater streams in Chicago. Photo by Kay Shipman. Bottom: Soybeans emerging at a central Illinois field site under struvite versus MAP fall-applied treatments. Photo by Patricia Leon.

Fall application of highly water-soluble ammonium phosphate fertilizers is a common practice in the United States Corn Belt, but the added nitrogen (N) and phosphorus (P) is susceptible to loss to the environment before crop uptake in the following spring, potentially polluting water bodies. Struvite is a low-solubility ammonium phosphate fertilizer generated from wastewater that may reduce losses relative to highly soluble ammonium phosphates such as diammonium phosphate or monoammonium phosphate (MAP).

Researchers at the University of Illinois at Urbana-Champaign conducted field trials under soybean in central and southern Illinois to test if fall-applied struvite would decrease N and P losses compared with MAP. Leached N was twofold lower and leached P was 10-fold lower under struvite compared to MAP. On a yield-scaled basis, struvite reduced N and P losses by 51% at the central Illinois site and by 10% at the southern Illinois site.

These trials suggest that substituting struvite for highly soluble P fertilizers like MAP can reduce N and P losses from fall fertilization, increasing availability of fertilizer-derived N and P for crop uptake in spring and mitigating negative impacts on water quality.

Adapted from

Leon, P., Nakayama, Y., & Margenot, A. J. (2023). Field-scale evaluation of struvite phosphorus and nitrogen leaching potential relative to monoammonium phosphate. *Journal of Environmental Quality*. https://doi.org/10.1002/jeq2.20522
