

Nitrogen stabilizer can boost yields while reducing greenhouse gases

By John Hassell, Agrotain International

Cap-and-trade legislation may be stalled in the U.S. Senate, but proposed administrative rules would allow the Environmental Protection Agency to regulate greenhouse-gas emissions. Amid the uncertainty, however, recent research by the USDA shows at least one way in which growers and retailers are already reducing agricultural emissions—while increasing yields at the same time.

Agriculture reportedly accounts for nearly 80 percent of all nitrous oxide emissions in the United States, and USDA researchers set out to measure this in a multi-year, multi-state research project. A focus of this research has been the out-gassing of nitrous oxide produced by nitrogen volatility. Nitrous oxide, as a greenhouse gas, has a potential that is 300 times greater than carbon dioxide.

“It is important to study it, because we’re going to see increasing pressures to reduce the amount of nitrogen that’s applied on our agricultural lands,” said Jerry Hatfield, Ph.D., of the USDA Agricultural Research Service and director of the National Laboratory for Agriculture and the Environment. “As we face that pressure, we’re going to have to make each pound of nitrogen more efficient.”

Although the objectives of the research were simply to study exactly how much nitrous oxide is lost to the air through typical practices, researchers eventually discovered they might be learning how certain nitrogen practices could reduce environmental impact while also maintaining or even improving yields.

“Changing the forms of nitrogen and their availability has tremendous impacts on crop production,” he said. “Typically, farmers put their nitrogen on before planting, and some of that nitrogen may escape into the air, and some of it may leach. But if they keep it in place, then it ends up being captured by that plant when the plant really needs it.”

The study demonstrated the positive benefits of

nitrogen stabilizers, with Agrotain standing out in trials involving urea applications in corn.

“One thing that has surprised us the most as we’ve looked at this research is how beneficial nitrogen stabilizers are to maintaining the green leaf area of a plant,” Hatfield said. “One of the things we find is the faster a plant goes through senescence and leaves lose their color, the lower the yield. So, anything that we can do to maintain that green leaf area longer translates into yield.”

When urea is applied to the soil, the enzyme urease converts it into a nitrogen form that can easily be volatilized into the atmosphere. However, if Agrotain nitrogen stabilizer is applied with the urea, the urease enzyme remains in its original form, stays in the soil and is available throughout the season through the processes of mineralization and mobilization. More than a decade of research by Agrotain International backs up these findings.

“This plant has a real hunger for nitrogen at this time of the year, because nitrogen is critical for us to create a high yield,” he said. “As we add stabilized materials like Agrotain, it means we can basically produce more crop with less amounts of nitrogen applied.”

Reducing emissions while increasing yields is a win-win for farmers and the environment, Hatfield said. “By understanding how we can control nitrous oxide emissions,” he said, “we preserve that nitrogen in the soil that the crop can use while eliminating the adverse effect of having greenhouse gases emitted into the atmosphere.”

The USDA shared its groundbreaking research with farmers at the 2010 Farm Progress Show. The results show once again that doing things right helps not only the environment but the bottom line as well.

“What’s important for the general public to understand is that as agriculturalists, we are doing everything we can to not only increase our food security but also protect the environment at the same time,” Hatfield said. **AG**

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