

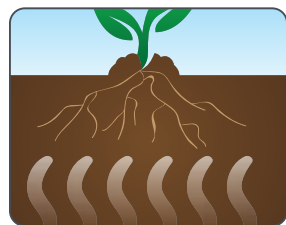
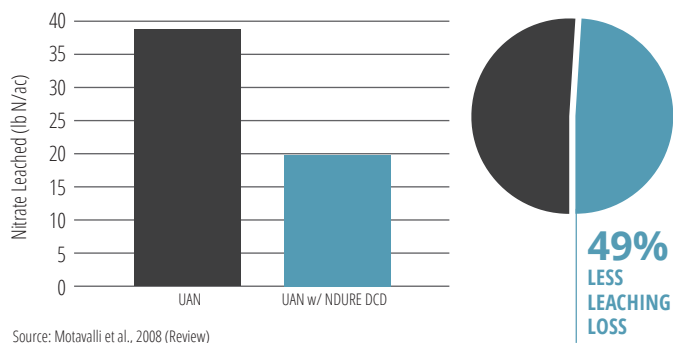
Protect Your Nitrogen Investment



Carl Bruice // National Nutrition Technical Manager

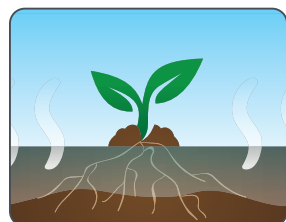
The Nitrogen Cycle in soils is a very leaky system, meaning nitrogen can be lost to the environment by several mechanisms, and losses can be significant (up to 40+%). These losses reduce Nitrogen Uptake Efficiency (NUE) and return on fertilizer investment, which is of serious concern when fertilizer costs are high. Nitrogen losses can also result in reduced production. Two of these loss mechanisms include leaching and denitrification.

EFFECT OF NDURE® DCD ON NITRATE LEACHING



NITRATE LEACHING

This form of nitrogen loss happens when negatively charged nitrate is moved below the plant's root zone by percolating water. Leaching tends to be more prevalent on sandy soils, but it can happen on all soil types.



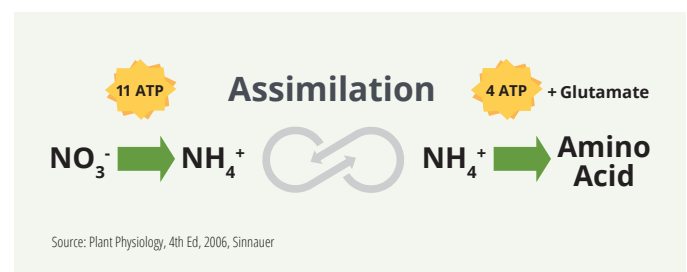
DENITRIFICATION

This is a nitrogen loss process where microbes convert nitrate into a gas that will escape into the atmosphere and be lost from the soil. Denitrification occurs when soil pores are filled with water instead of air, such as in poorly drained soil conditions.

Only nitrate-nitrogen can be lost to leaching and denitrification—ammonium cannot. In most soils, the conversion of ammonium to nitrate occurs rapidly. Losses can be minimized by including NDURE DCD nitrogen stabilizer in your nitrogen fertility program. NDURE DCD contains DCD (Dicyandiamide), a proven nitrification inhibitor that keeps nitrogen in the ammonium form longer, preventing losses of nitrate-nitrogen from either leaching and/or denitrification.

Not only does NDURE DCD improve NUE, but it also can lead to energy savings by the plant. When plants take up nitrate-nitrogen, they must expend a great deal of energy to convert it back to the ammonium form, as seen in the diagram below.

NITROGEN UPTAKE AND ENERGY BUDGET



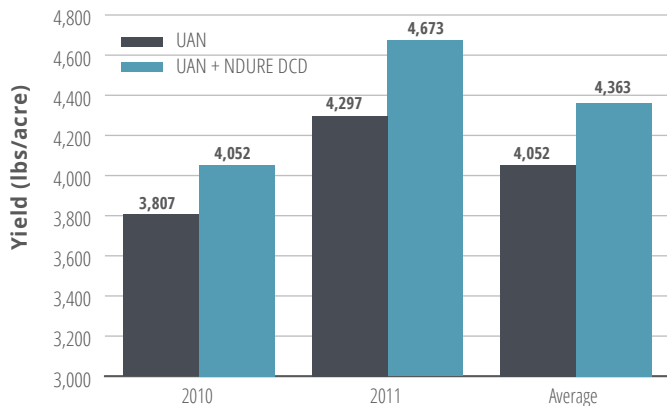
ATP (Adenosine Triphosphate) is an energy-rich molecule used as fuel to power chemical reactions in all living cells. Keeping nitrogen in the ammonium form longer enhances ammonium uptake saving the crop from expending energy that should otherwise be used to fuel growth and increase yields.

Putting all three mechanisms together can lead to increases in crop production through:

- Improved nitrogen uptake efficiency
- Reduced nitrogen losses
- Improved energy budget

ALMOND YIELD BENEFIT | CALIFORNIA

A two-year study on flood-irrigated almonds in Kern County compared surface-applied UAN alone to surface-applied UAN plus endure DCD. Seventy-five pounds of nitrogen were applied postharvest and 125 pounds of N were applied in the spring in each of the test years. Treated UAN resulted in an average yield gain of 311 pounds of nut meat per acre compared to the UAN alone treatment.



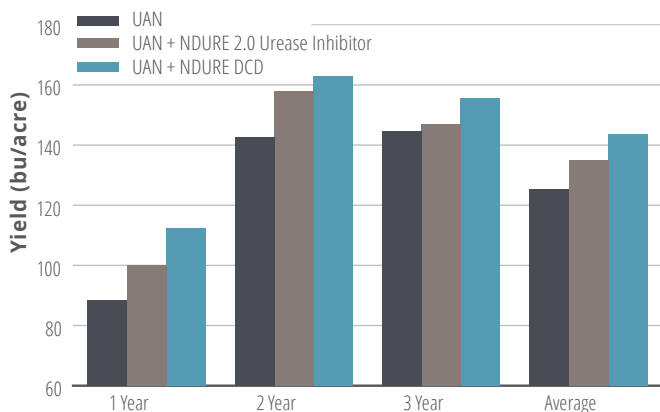
- Nitrogen rate of 200 lbs N/acre (75 lbs applied in the fall and 125 lbs applied in the spring)
- Treatments were surface applied
- Flood irrigated
- Kern County, CA

The underlying data was provided by Zaccaria Agriculture Consulting and neither Zaccaria Agriculture Consulting nor the individual researchers referenced, endorse, or recommend any product or service.

CORN YIELD BENEFIT | ILLINOIS

On average, NDURE 2.0-treated UAN resulted in a higher yield compared to untreated UAN, indicating the value of a urease inhibitor to protect the nitrogen from ammonia volatilization leading to optimized yield potential.

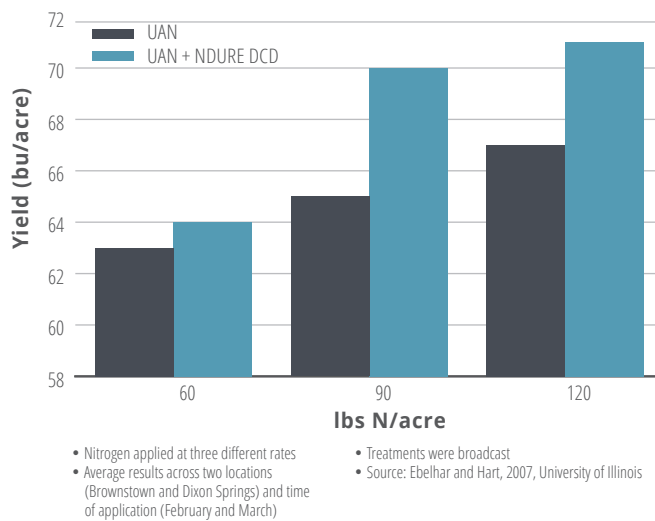
NDURE DCD-treated UAN resulted in a higher yield compared to untreated UAN and NDURE 2.0-treated UAN. The study indicates a nitrification inhibitor to protect against nitrate leaching and denitrification was needed to gain the highest yield.



- Nitrogen rate of 120 lbs N/acre
- Source: Ebelhar and Hart, 2009, University of Illinois
- Treatments were broadcast at pre-plant

SOFT RED WINTER WHEAT YIELD BENEFIT ILLINOIS

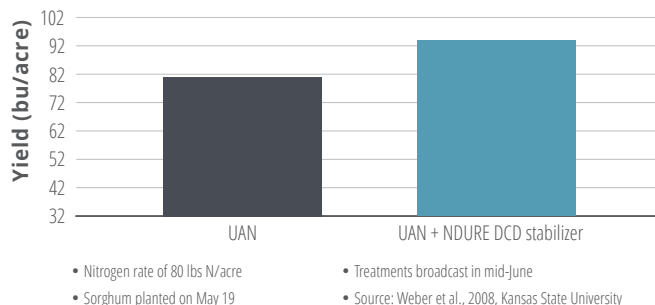
Across all three nitrogen rates, UAN-treated with NDURE DCD stabilizer resulted in higher yields compared to untreated UAN.



- Nitrogen applied at three different rates
- Average results across two locations (Brownstown and Dixon Springs) and time of application (February and March)
- Treatments were broadcast
- Source: Ebelhar and Hart, 2007, University of Illinois

SORGHUM YIELD BENEFIT | KANSAS

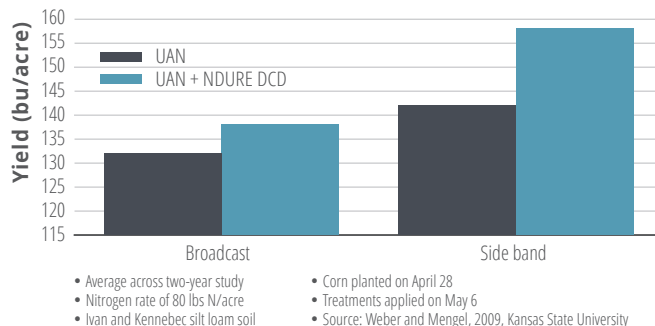
NDURE DCD-treated UAN resulted in a 13 bu/acre yield advantage compared to untreated UAN.



- Nitrogen rate of 80 lbs N/acre
- Sorghum planted on May 19
- Treatments broadcast in mid-June
- Source: Weber et al., 2008, Kansas State University

CORN YIELD BENEFIT | KANSAS

In both broadcast and side-band applications, UAN-treated with NDURE DCD stabilizer resulted in higher yields compared to untreated UAN.



- Average across two-year study
- Nitrogen rate of 80 lbs N/acre
- Ivan and Kennebec silt loam soil
- Corn planted on April 28
- Treatments applied on May 6
- Source: Weber and Mengel, 2009, Kansas State University

Introducing TILL-IT® N-POWER™ and TILL-IT N-POWER S Containing the Proven Nitrification Inhibitor in NDURE DCD

Enjoy the convenience of NDURE DCD pre-mixed with UAN for ready-to-use simplicity.



TILL-IT N-POWER is a 27-0-0 liquid fertilizer derived from UAN containing DCD as a pre-mix and 0.8% humic acid for the added benefit of enhanced nutrient uptake.



TILL-IT N-POWER S is a 26-0-0-3S derived from UAN and ammonium thiosulfate containing DCD as a pre-mix and 0.8% humic acid for the added benefit of enhanced nutrient uptake.

NDURE DCD, TILL-IT N-POWER, AND TILL-IT N-POWER S FOR



Improved nitrogen uptake efficiency



Reduced nitrogen losses



Improved energy budget



Higher yields

DIRECTIONS FOR USE

Apply TILL-IT N-POWER using recommended rates and directions with your nutrient management plans for nitrogen. Apply via broadcast, banding, or through irrigation on all row crops and permanent crops. Placement 2-4 inches below and to the side of seed placement is recommended, do not apply directly on seed.

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