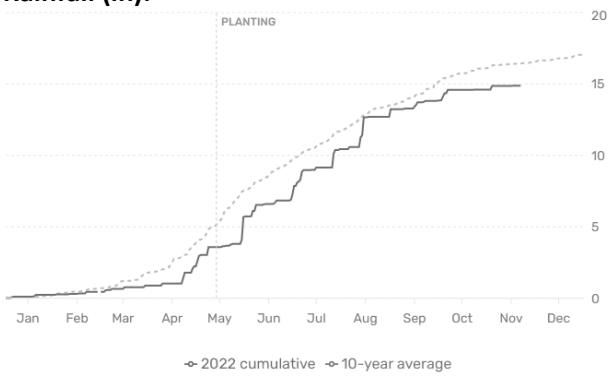
Impact of CENTURO® and MicroSource® DCD Inhibitors with UAN Application

Study ID: 0015013202201
County: Box Butte
Soil Type: Alliance loam 0-1% slopes; Alliance loam, 1-3% slopes; Rosebud loam 1-3%
Planting Date: 5/13/22
Harvest Date: 11/8/22
Seeding Rate: 30,000
Row Spacing (in): 30
Hybrid: Stine® 9319-10
Reps: 4
Previous Crop: Sugarbeet
Tillage: Strip-till
Herbicides: ***Pre:*** Roundup® and Banvel® ***Post:*** Status®
Foliar Insecticides: None
Foliar Fungicides: None

Fertilizer: 36.5 gal/ac of 32% UAN (130 lb N/ac), 3.47 gal/ac 12-0-0-26s (5 lb N/ac), and 4.54 gal/ac 10-34-0 (5 lb N/ac) strip-till on 4/28/22; 20 lb P/ac, 1 lb Zn/ac, and 2 lb Mn/ac starter at planting on 5/13/22; 50 lb N/ac fertigated on 8/1/22
Note: Harvested the center 8 of the 12 treated rows.
Irrigation: Pivot, Total: 10-11"
Rainfall (in):



Baseline Soil Samples, 0-8" (January 2022)

		OM LOI	Nitrate – N	Bray P1	Sulfate-S	-------Melich lll-------				CEC	Zn	Mn	Fe	Cu
	pH	%	ppm N	ppm	ppm S	K	Ca	Mg	Na	me/100g	(DTPA PPM)			
Sample	7.4	1.7	13	34	14	573	2507	314	87	17	1.9	3	10	0.5

Introduction: CENTURO® by Koch™ Agronomic Services LLC and MicroSource® DCD by Microsource LLC, are products with known efficacy for inhibiting nitrification. The chemical compound in CENTURO® is pronitridine, whereas the chemical compound in MicroSource® DCD is dicyandiamide (DCD). Both products inhibit populations of the bacteria that convert ammonium to nitrite (*Nitrosomonas*) and nitrite to nitrate (*Nitrobacter*). These compounds protect against both denitrification and leaching by retaining fertilizer N in the ammonium form. Ammonium (NH_{4+}) is a positively charged ion (cation) that can be held on negatively charged exchange sites in soils (such as in clays and organic matter); in comparison, nitrate (NO_{3-}), which is negatively charged, can be converted to N_2O or N_2 gases in waterlogged conditions, or can leach below the root zone with rain in well drained soils. You can learn more about nitrogen inhibitors at https://cropwatch.unl.edu/2019/nitrogen-inhibitors-improved-fertilizer-use-efficiency.

The goal of this study was to evaluate these two nitrification inhibitor products. Nitrogen was applied in a strip-till application on April 28, 2022, at 8-10" depth. Products in the strip-till application include: 36.5 gal/ac 32% UAN (130 lb N/ac), 3.47 gal/ac 12-0-0-26S (5 lb N/ac), and 4.54 gal/ac 10-34-0 (5 lb N/ac). To evaluate the inhibitor products, one treatment applied Centuro® at a rate of 2.5 gal/ton of 32% UAN and another treatment applied MicroSource® DCD at a rate of 1 gal/ton of 32% UAN. The inhibitor treatments were compared to an untreated check. Additional N fertilizer was applied as starter at planting consisting of 20 lb P/ac, 1 lb Zn/ac, and 2 lb Mn/ac and through a fertigation of 50 lb N/ac on August 1, 2022. Total N applied was 190 lb N/ac. Corn was planted on May 13 directly on the strip-till band. Crop yield was measured by harvesting the center 8 rows of the 12-row plots.

Results:

	Early Season Stand Count (plants/ac)	Moisture (%)	Test Weight (lb/bu)	Yield (bu/ac)†	Marginal Net Return‡ ($/ac)
Check	28,598 A*	15.7 B	57 A	218 A	1,432 A
DCD	30,122 A	16.4 A	57 A	216 AB	1,405 A
CENTURO®	28,598 A	15.9 AB	57 A	210 B	1,359 B
P-Value	0.201	0.077	0.643	0.072	0.020

*Values with the same letter are not significantly different at a 90% confidence level.
†Bushels per acre corrected to 15.5% moisture.
‡Marginal net return based on $6.57/bu corn, $10.60/ac for DCD, and $21/ac for CENTURO® .

Summary:

- There were no differences in stand counts between the inhibitor treatments and untreated check.
- Grain moisture was statistically different between the treatments with the DCD treatment 0.7% wetter than the untreated check.
- There were no differences in test weight.
- Yield for the check treatment was 8 bu/ac higher than the yield for the CENTURO® treatment. The DCD treatment did not differ in yield from the check or the CENTURO® treatment.
- Marginal net return for the CENTURO® treatment was lower than the marginal net return for the DCD and Check treatment.
- This is the second year this producer has evaluated DCD, CENTURO® , and an untreated check. In 2021, there were no differences in yield or net return between the inhibitors and the untreated check.

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