Agrarian SOLUTIONS

Supplementing Select DTX™ to Early-Lactation Holstein Cows Challenged by Mycotoxins Improves Milk Production

Previous research studies have documented the reduced milk production associated with feeding mycotoxin-contaminated diets. Recent research indicates that commonly used mycotoxin protection products are often more effective for binding nutrients than the targeted mycotoxins. In farm conditions for 25 years, dairy professionals have cited the ability of the unique **Select DTX** product to support milk production when cows are challenged by mycotoxins. This study was conducted at a large, high-performing Holstein herd to demonstrate the benefits of DTX when lactating dairy cows are challenged by DON and zearalenone[1].

PROCEDURES

The study was conducted as a randomized controlled trial from August 29, 2022 to May 28, 2023, in New York, at a 3,600-cow commercial dairy farm experienced in conducting commercial feed additive research. After entering the dry pen, Holstein cows were blocked by lactation group, expected calving date and stratified by lactation (1st, 2nd, 3rd+), and then randomized to either a control group (base ration without DTX; control) or a treatment group (base ration with DTX; DTX). The study was conducted with a control premix (no DTX) or a DTX premix (providing a minimum of 9 g DTX/cow/d to the lowest DMI pen (1st lactation, 50 lb DMI/d) with an average DTX intake of 10.34 g/cow/d.

Daily feed mixing, delivery time, weight and daily refusals per pen were according to the Dairy's standard feed mixing protocol and recorded using FeedWatch®. Dry matter intake (DMI) was statistically analyzed for the entire 40-week study even though the trial pens were not full of randomized cows. Samples of each pen's TMR were obtained initially twice per month and then monthly for mycotoxin analyses (Actlabs).

The cows were milked in accordance with the dairy's standard milking routine (3X/d) and daily individual milk weights were recorded using the Afimilk® system. Milk components and quality was evaluated by twice weekly pen level string samples using the QualiTru® sampling system and analyzed by Dairy One Lab.

Reproduction protocols and results are reported in an accompanying technical report.

Statistical analysis was conducted with individual cows as the experimental units for daily milk production, and pen was the experimental unit for measurements such as dry matter intake (DMI), weekly milk components and quality. Continuous variables were analyzed for treatment effect with mixed linear regression models allowing for repeated measurements as needed.

RESULTS AND DISCUSSION

The description of cows by lactation and research group utilized in the study are listed in Table 1.

Table 1. Number of Holstein Cows by Lactation and Research Group.

Lactation Number	Control	DTX
1	133	131
2	118	127
3+	212	205
Total	463	463

The TMR contamination levels of deoxynivalenol (DON) (Figure 1) and zearalenone (Zea) (Figure 2) recorded throughout the study did not differ between the research groups for DON (P=0.60) (1,572 ppb and 1,560 ppb for control and DTX, respectively) or Zea (P=0.08)(150 ppb and 143 ppb for control and DTX, respectively).

[1]Dairy Health and Management Services

Total Mixed Ration Contamination Levels of Deoxynivalenol (Figure 1) and Zearalenone (Figure 2) by Measurement Date.

Figure 1.

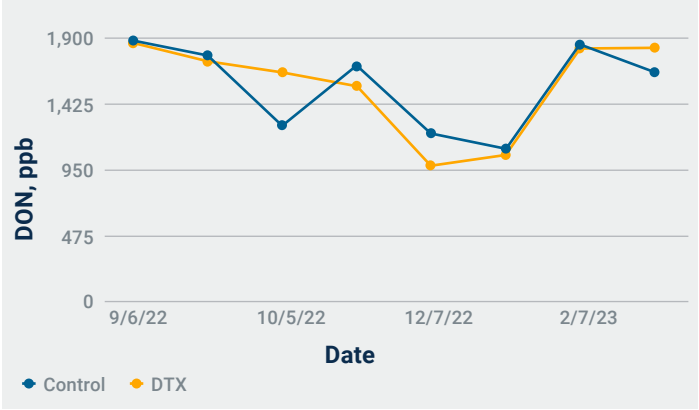
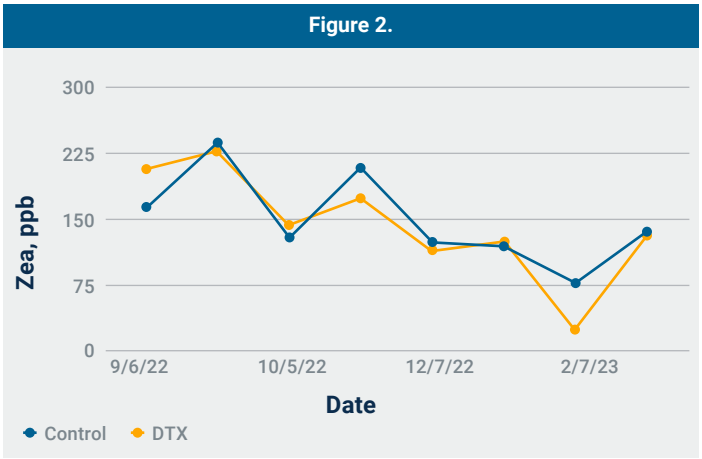
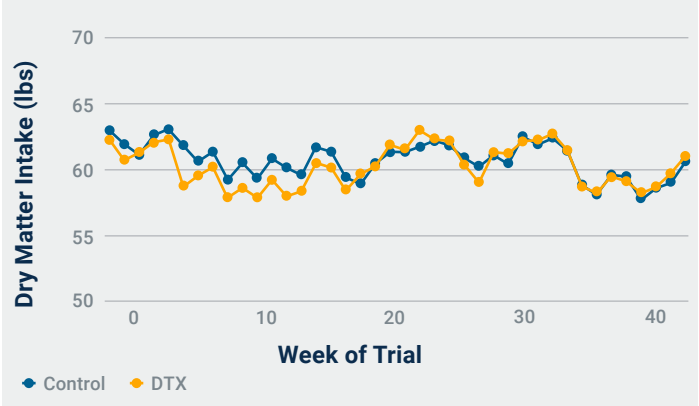


Figure 2.



The DMI by week of trial did not differ between the research groups, and there were no individual weeks with a statistical difference between the treatments (Figure 3). The median DMI throughout the study was 61.2 lb for the control and 60.5 lb for the DTX pens.

Figure 3. Effect of DTX Supplementation on Daily Dry Matter Intake by Lactating Holstein Cows.



For 1st-lactation cows, the control (82.1 lb/d) and DTX (81.8 lb/d) groups did not differ (P=0.33) in daily milk production (Figure 4). Supplementing DTX (117.8 lb/d) increased (P=0.0001) daily milk production for 2nd- and greater-lactation cows compared to the control (115.3 lb/d) group (Figure 5). Weekly feed efficiency at the pen-level did not differ (P=0.99) between the control (1.53) and the DTX (1.52) pens.

Figure 4. Effect of DTX Supplementation on Daily Milk Production by First-lactation Holstein Cows.

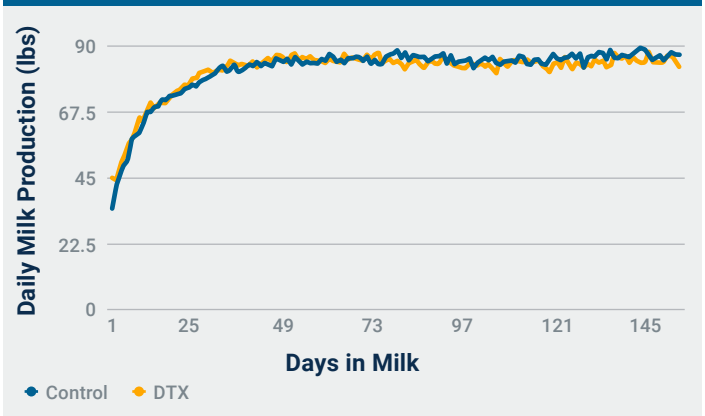
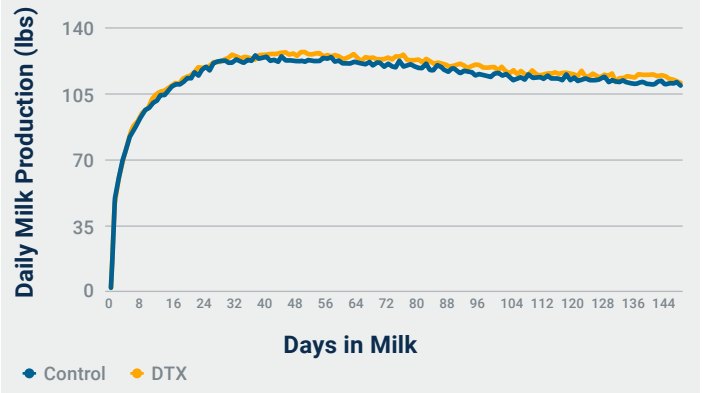


Figure 5. Effect of DTX Supplementation on Daily Milk Production by 2nd-and Greater-lactation Holstein Cows



Pen-level milk fat (P=0.75), protein (P=0.94) and solids non-fat (SNF) (P=0.54) did not differ between the research groups (Table 2). The SCC was higher (P=0.02) for DTX cows than control cows. Milk components and quality was not determined for individual cows in the research groups.

Table 2. Effect of DTX Supplementation on Milk Components and SCC for Lactating Holstein Cows.

	Control	DTX	*P* - value
% Fat	4.15	4.12	0.75
% Protein	3.16	3.17	0.94
% SNF	5.82	5.82	0.54
SCC (x1000)	143.04	161.29	0.02

CONCLUSIONS

Supplementing DTX to lactating Holstein cows when consuming a mycotoxin-contaminated diet during the first 150 DIM resulted in greater milk production for multiple-lactation cows.