

TECHNICAL BULLETIN

DAIRY



A NEW RESEARCH: FEEDING MOLASSES-BASED LIQUID FEED IMPROVED TRANSITION DAIRY COW PERFORMANCE

Feeding molasses-based liquid feed supplements to transition cows is known to increase DMI, reduce sorting, and improve milk and metabolic performance. A new published research (Havekes et al. 2020. J. Dairy Sci. 103:5070-5089) from Dr. Trevor DeVries group at University of Guelph investigated the impact of molasses-based liquid feed supplementation in a high-straw dry cow diet on feeding behavior, physiology, and performance of transition cows.

Experimental Design:

Forty mature Holstein cows (lactation ≥ 2) received one of two treatments beginning at 45 d pre-calving. Dry period basal diet was a high-straw TMR with treatments of:

1. No liquid feed (Control: 41% corn silage, 36% wheat straw, and 23% dry cow supplement; n = 20)
2. Supplementation of molasses-based liquid feed at 2.2 lb/cow/d DM (Liquid Feed; 39% corn silage, 33% wheat straw, 22% dry cow supplement, and 6% liquid feed; n = 20)

Post-calving, the same lactating cow ration without liquid feed was fed to all cows, and animals were monitored for 28 d.

Key Findings:

Feed intake

During the dry period, cows fed the liquid feed diet had greater DMI (33.7 vs 29.5 lb/d, $P < 0.001$), tended to have a shorter interval between meals (192.8 vs 216.5 min, $P = 0.06$) and more frequent meals (6.3 vs 5.6 meals/d, $P = 0.06$) compared with cows fed the control diet. As shown in Figure 1, cows fed liquid feed maintained higher level of intake during the final week before calving. Cows with higher level of feed intake are known to have less metabolic issues and better fresh cow performance. Increased meal frequency typically promotes a more consistent feed intake pattern and rumen pH.

Sorting

Cows fed the liquid feed diet sorted less against longest ration particles (93.9 vs. 81.1 % consumed, $P = 0.001$, Figure 2) compared with control. Dry cow diets typically contain a large proportion of forages, such as wheat straw, and are easily sortable. Adequate long particle consumption is important to maintain rumen mat and reduce the incidence of displaced abomasum. Post-calving, despite that all cows were fed the same lactating cow ration, cows previously fed the liquid feed diet showed less sorting activity against long particles (98.5 vs. 96.3% consumed, $P = 0.16$) compared with control.

Figure 1: Cows supplemented with liquid feed had greater dry matter intake in the final week before calving

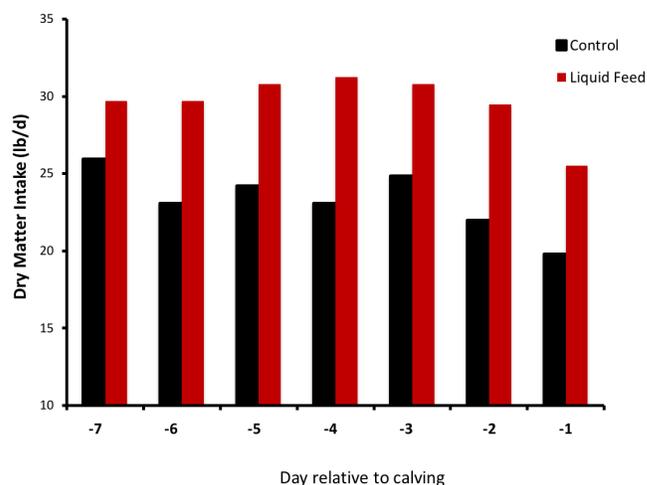
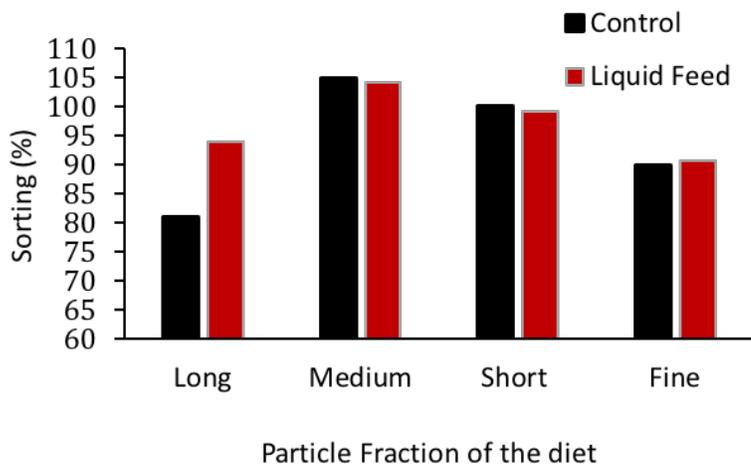


Figure 2: Cows supplemented with liquid feed had less sorting (93.9 vs. 81.1% consumed, $P = 0.001$) against the longest particles during the dry period.



Milk production

Although liquid feed was fed only during the dry period and not after calving, cows supplemented with liquid feed during the dry period had numerically greater milk yield (86.2 vs. 83.2 lb/d; Liquid Feed vs. Control, $P = 0.23$), and energy corrected milk (ECM) (109.8 vs. 103.6 lb/d; Liquid Feed vs. Control, $P = 0.19$) during the first 28 d of lactation. This numerical difference was not driven by feed intake, as DMI was similar between the two groups during the fresh period (43.3 vs. 44 lb/d; Liquid Feed vs. Control, $P = 0.62$). We can speculate that if cows in treatment group were supplemented with liquid feed continuously throughout the fresh period, their milk yield would be much higher than control cows.

There also appears to be positive influence of dry period liquid feed supplementation for milk protein production. Cows fed molasses-based liquid feed in the dry period had similar production of milk fat compared to Control cows, and tended ($P = 0.12$) to produce more milk protein (+0.2 lb/cow/day). This may be result of greater rumen efficiency during the pre- and post-calving periods. Sugar supplementation, increased consumption of long particles, and higher rumen pH help to enhance forage digestion and microbial protein production. This provides more metabolizable protein supply to the cow, to help improve production of milk protein.

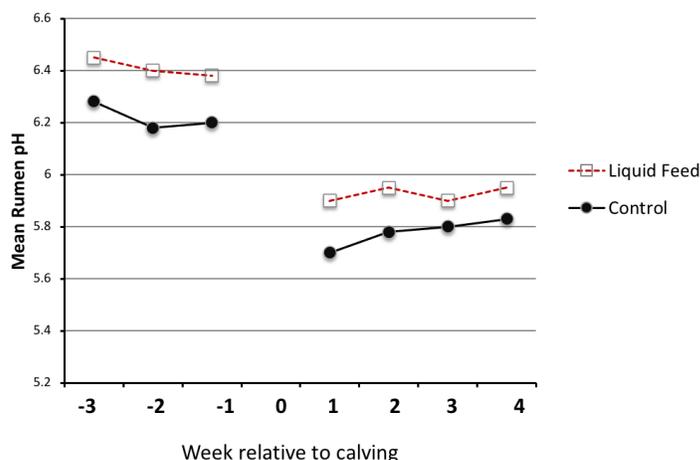
Table 1: Effect of molasses-based liquid feed supplementation during the dry period on milk production in the first 28 d of lactation. Note liquid feed was not fed after calving.

	Treatment		P-Value
	CON	Liquid feed fed at the dry period	
Milk, lb/d	83.2	86.2	0.23
Fat, %	5.1	5.2	0.56
Fat, yield, lb/d	2.2	2.2	0.31
Protein, %	3.4	3.4	0.58
Protein, yield, lb/d	1.3	1.5	0.12
Energy-corrected milk, lb/d	103.6	109.8	0.19
Milk efficiency ECM/DMI	2.5	2.7	0.37

Rumen pH

As shown in Figure 3, cows fed the liquid feed diet had higher rumen pH in the dry period (6.4 vs 6.2, $P = 0.03$). Rumen pH was higher for liquid feed cows in the first week after calving (5.8 vs. 5.7, $P = 0.04$), and tended to be higher in the second week after calving (5.9 vs. 5.7, $P = 0.09$). These results are consistent with the data that cows fed the liquid feed diet had less sorting against the long particles during the transition period. Higher rumen pH in lactating cows is typically associated with improved fiber digestion and milk components.

Figure 3: Cows supplemented with liquid feed had greater daily rumen pH throughout the transition period.



Summary

In short, this study found that molasses-based liquid feed supplementation in a dry cow diet resulted in greater dry matter intake, less sorting, more frequent meals, and a higher level of intake the week before calving. Post-calving rumen pH was improved and milk yield was numerically higher for cows previously fed a dry cow diet with molasses-based liquid feed supplementation.