

Yeast culture may support greater feed efficiency

BROOKINGS, S.D. — Dairy producers are looking for means to increase feed efficiency, and improvements in feed efficiency can positively affect herd profitability even when changes in production or feed intake or both may be slight.

Yeast culture has improved dry matter intake (DMI) and milk production in some research studies. Other studies have looked at the timing of using the product — for example, from before parturition through peak lactation and during heat stress.

Recently, D.J. Schingoethe et al. evaluated the use of yeast culture in the diets of mid-lactation dairy cows.

Materials, methods

Thirty-eight Holstein cows averaging 105 days in milk (DIM) were paired based on DIM, parity and pre-treatment milk production. One cow from each pair was randomly assigned to a control or yeast culture diet (60 g per cow daily added to the total mixed ration [TMR] at the time of feeding). TMRs (Table 1) were formulated to meet or exceed National Research Council requirements.

Cows were housed in the northwest pen of a four-pen curtained free-stall barn for 160 cows. The barn contained 91 cm-diameter fans over the feeding alleys every 15 m and misters over the feeding alleys. The misters were operated according to temperature to aid in cooling during hot weather.

Cows were fed individually. They were placed in the free-stall area and assigned a feeding door two weeks before the start of the 12-week experiment. The experiment ran from June 12 to Sept. 3, 2002.

Milk yield, milk composition and feed intake data during the two-week pretreatment period were used for covariate adjustment of data. Cows were individually fed the respective TMR once daily at 10 a.m. for *ad libitum* consumption with continuous access to feed except during milking. Amounts fed and refused were recorded daily.

Cows were milked daily at 6 a.m., 2 p.m. and 9 p.m. Milk was sampled from all three milkings during one day each week, and daily composites were ana-

| TABLES | | | | |
|-----------------------------------------------|---------|--|--|--|
| 1. Ingredient content of diets ¹ | | | | |
| Ingredient | % of DM | | | |
| Alfalfa hay | 21.0 | | | |
| Corn silage | 28.0 | | | |
| Corn, ground shelled | 19.3 | | | |
| Whole cottonseed | 8.0 | | | |
| Soybean meal (44%) | 8.8 | | | |
| Dried distillers grains with solubles | 7.7 | | | |
| Pork meat and bone meal | 1.3 | | | |
| Fish meal, menhaden | 0.3 | | | |
| Liquid protein/energy supplement ² | 2.5 | | | |
| Rumen-protected fatty acid supplement | 0.9 | | | |
| Limestone | 0.7 | | | |
| Sodium bicarbonate | 0.5 | | | |
| Salt | 0.5 | | | |
| Magnesium oxide | 0.15 | | | |
| Trace mineral/vitamin premix ³ | 0.25 | | | |
| Zinc methionine complex | 0.05 | | | |
| Vitamin E ⁴ | 0.05 | | | |

¹Yeast culture diet contained 60 g of yeast culture per cow daily added at the time of feeding.
²Contained 4% crude protein and 19% fat, as-fed basis.
³Magnesium, 10.0%; zinc, 2.6%; manganese, 1.7%; iron, 4,640 ppm; copper, 4712 ppm; iodine, 398 ppm; cobalt, 119 ppm; selenium, 140 ppm; vitamin A, 544,000 IU/kg; vitamin D, 109,000 IU/kg; vitamin E, 2,177 IU/kg.
⁴Contained 44,000 IU/kg.

| 2. Milk yield and composition, DMI, bodyweight and BCS | | | | |
|--------------------------------------------------------|----------------|---------------|------------|------|
| Item | -----Diet----- | | Std. error | P |
| | Control | Yeast culture | | |
| Milk, kg per day | 34.9 | 35.4 | 1.13 | 0.75 |
| 4% FCM, kg per day | 31.2 | 32.0 | 1.23 | 0.64 |
| ECM, kg per day | 33.4 | 34.2 | 1.24 | 0.62 |
| Milk components | | | | |
| Fat, | | | | |
| % | 3.34 | 3.41 | 0.09 | 0.57 |
| kg per day | 1.16 | 1.21 | 0.05 | 0.49 |
| Protein, | | | | |
| % | 2.85 | 2.87 | 0.04 | 0.57 |
| kg per day | 0.98 | 1.01 | 0.04 | 0.72 |
| Lactose, | | | | |
| % | 4.83 | 4.80 | 0.03 | 0.36 |
| kg per day | 1.66 | 1.69 | 0.06 | 0.76 |
| SCC, 10 ³ /mL | 166 | 492 | 218 | 0.27 |
| DMI, kg per day | 23.1 | 22.1 | 0.82 | 0.38 |
| FCM/DMI | 1.39 | 1.49 | 0.03 | 0.04 |
| ECM/DMI | 1.49 | 1.59 | 0.03 | 0.04 |
| Bodyweight, kg | 629 | 616 | 9.9 | 0.34 |
| BCS | 3.00 | 3.04 | 0.10 | 0.77 |

lyzed for fat, protein, lactose and total solids.

Data were analyzed using the mixed procedures of SAS. Fixed effects were treatment, pair, parity, week and treatment x week. Random effects were cow within pair. Repeated measures within cow were analyzed using the first-order auto-regression structure.

In general, inclusion of the covariate period in the model did not make a difference in treatment means or standard errors, so it was dropped from the model.

Model effects were considered significant at $P < 0.05$, with trends noted at $P < 0.20$.

Results

DMI, milk yield and milk composition (Table 2) were similar with or without yeast culture in the diet. Bodyweights and body condition scores (BCS) were similar with or without yeast culture in the diet. All of the above parameters differed by week ($P < 0.01$) except for somatic cell count (SCC; $P = 0.62$). As expected, some parameters differed by parity, but no treat-

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ment x parity interactions approached significance. Treatment x week interactions were not different ($P > 0.15$).

Feed efficiency, as indicated by production of fat-corrected milk (FCM) and energy-corrected milk (ECM) per kilogram DMI, was higher ($P < 0.05$) when yeast culture was fed.

This improvement in feed efficiency reflected slight trends ($P = 0.25$ and 0.16 , respectively, for FCM and ECM) toward higher production

coupled with a trend ($P = 0.16$) toward lower DMI when cows were fed yeast culture. However, treatment x week interactions for the two feed efficiency calculations were not significant ($P > 0.92$), and there was no indication of greater differences between treatments during the weeks of hot-test weather.

These results tended to support field reports and results that indicate tendencies for improved response of lactating

cattle when fed yeast culture.

The mode of action by which yeast culture may improve feed efficiency of heat-stressed dairy cows is not yet known. Improved ration digestibility is a possible explanation, but diet digestibilities were not evaluated.

Conclusions

Supplementing yeast culture in the diet of mid-lactation dairy cows can improve feed efficiency, even when under heat stress. ■