

New Developments in Ruminant Nutrition: Treatment of Lactating Dairy Cows with BST

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In the past year, a research trial was conducted by Drs. Burton and Macleod at the University of Guelph to evaluate the efficacy of recombinant Bovine Somatotropin (rBST) for lactating dairy cows. BST was administered daily with a subcutaneous injection of 12.5, 25.0, or 50.0 mg/head/day. Control cows received daily injections of sterile saline. Cows started the trial 4 weeks into lactation and were treated for a duration of 266 days. The production responses are summarized in Table 1. BST treatment significantly increased the mean daily milk yield by 14.1-21.1% and 3.5% fat corrected milk yield by 14.2-18.2%. There was no difference in milk yield between the BST treatment groups. Mean daily feed DM intake was not significantly altered by BST treatment indicating that more milk was produced per unit of feed intake. The observation was expressed as the efficiency of milk yield or kg milk/kg DMI. BST treatment increased milk production efficiency by 6.7 to 9.7%. This increase in gross milk production efficiency resulted from a greater utilization of body reserves to support milk synthesis. During the experimental interval of 266 days, the

TABLE 1. Mean Daily Milk Production, Milk Composition, Dry Matter Intake, and Milk Production Efficiency for Cows Receiving Recombinant Bovine Somatotropin (BST)¹.

	BST, mg/cow/day			
	0	12.5	25	50
No. of Cows started	9	10	10	9
Mean daily milk (kg)				
Actual	25.68	29.31	31.11	29.91
3.5 % FCM	26.68	30.47	31.51	30.78
Mean daily feed DM consumption	19.54	19.57	20.50	19.84
Efficiency, actual (kg milk/kg DM)	1.34	1.47	1.43	1.48
Efficiency, FCM (kg milk/kg FCM)	1.38	1.53	1.50	1.55
Mean milk analysis (%)				
Fat	3.79	3.81	3.77	3.83
Protein	3.32	3.16	3.19	3.22
Lactose	4.90	5.00	4.97	4.96

¹ All means are least squares adjusted by covariance analysis. Data from weeks -2, -1, and 0 were used as the covariates. Burton and Macleod (University of Guelph).

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TABLE 2. Average Response to Isoplus Based Upon University Trials.

	Control	Isoacids
Milk (kg/d)	20.5	22.7
Milk fat (%)	3.83	3.59
Milk Protein (%)	3.36	3.33
DMI (kg/d)	17.3	17.5

BST cows gained less body weight than the control cows.

Both milk fat and lactose percentages were unaltered by BST treatment. However, BST treatment did decrease the milk protein percentage by 0.1-0.16 percentage units.

The results of the trial indicate that rBST treatment of dairy cows increases milk production by an average of 17.2%. This occurs concurrently with an increase milk output per unit of DM intake. The results also indicate that BST cows may require extra dietary protein to maintain a high milk protein percentage.

Isoacids

In the last year, the Eastman Kodak has released for commercial use an additive termed "Isoplus". It is the calcium salt of isobutyric, isovaleric, valeric, and 2-methylbutyric acids. Isoacids are considered essential nutrients for cellulolytic bacteria; therefore, supplementation with 86 grams/cow/d tends to increase microbial growth within the rumen. Isoplus was evaluated as feed additive in seven university trials in the United States. The average responses in milk production, milk fat test and DM intake are listed in table 2. Isoplus increased milk yield in these trials by 2.2 kg/cow/d. Milk constituents were unaffected by treatment.

In 54 field trials, Isoplus was also evaluated for a three month period. Results from these trials indicated that it takes up to 3 months of feeding Isoplus before a maximum response in milk yield is reached. One month of feeding Isoplus resulted in an increase of 0.64 kg milk/cow/d. Two months of feeding Isoplus produced an increase of 1.31 kg milk/cow/d, and three months of feeding the additive produced an increase in mean daily milk production by 1.91 kg/cow/d. However, out of the 54 herds tested in the field trial, seven herds actually received a negative response to isoacids. The results of these studies indicate that the response to Isoplus may not always be consistently positive. The maximum responses to feeding Isoplus, however, tend to be with corn/corn silage based rations.