

Technical Bulletin

The Benefits of Enterosorbents in Dairy Cows

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The dairy cow's immune system and clinical health respond to constantly changing stresses and disease challenges. The stresses and disease challenges include parturition, weather, disease, farm management, quality of feeds, feed ingredients and forage, etc. When the stress and disease challenge level is above the threshold that a cow can handle, clinical symptoms will occur. However, if stress and disease management technologies are employed on a daily basis, it will reduce the stress and disease challenge below the cow's tolerance threshold, therefore clinical signs will not occur and the performance of the cow will improve.

Based on the hypothesis above, we conducted a 12 month feeding trial (between 2005 and 2006) involving over two hundred and eighty lactating cows. The cows were fed commercial feeds with or without 0.3% addition of calcium montmorillonite enterosorbent in concentrated feeds.

The Feeding Trial

A total of 280 Holstein cows were used in the study initially. Cows were continuously added to or removed from the study based on standard farm practices. The 280 lactating cows were divided into two groups (4 houses with 70 cows per house) according to their age and milk yield. All cows were fed one of the two diets, based on their milk production, and evenly distributed into the two groups, addition of either 0% or 0.3% of calcium montmorillonite enterosorbent in concentrate feed. Cows were fed three times a day (6:00, 13:00, and 20:00) and milked three times a day (7:00, 14:30, and 20:45). The compositions of rations are shown in the Table 1.

TABLE 1: Ration Compositions

Ingredients, LB/d	High Producing Cow	Medium Producing Cow
Hay	6.6	6.6
Alfalfa	12.1	11.0
Silage	22.0	22.0
Brewer By-Product	15.4	15.4
Concentrate Feed*	32.0	26.4
Cotton Seed	4.4	2.2
Others	6.2	6.2
Total	98.8	90.0

*Compositions of concentrate feeds were different between high and medium producing cows and calcium montmorillonite enterosorbent was added into concentrate feed at levels of either 0% or 0.3%.

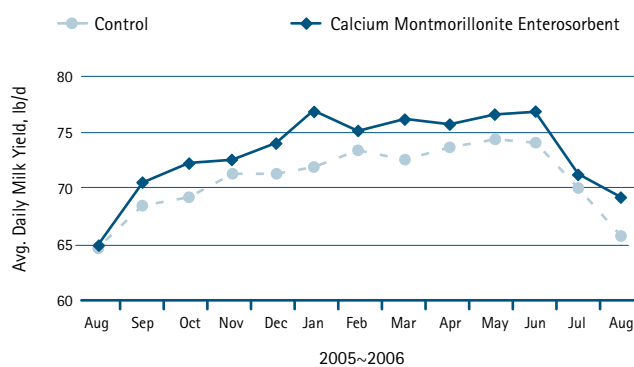
Feeding Enterosorbents Significantly Increased Milk Yield

Milk production over the 12 months feeding period is shown in the Figure 1. Milk production between the two groups were similar at study initiation; however, cows that received the ration containing calcium montmorillonite enterosorbent showed increased milk production after one month of feeding. Cows fed the ration containing calcium montmorillonite enterosorbent had an average daily milk production of 73.04 lb over the study period, while cows fed the control diet produced an average daily milk yield of 70.63 lb during the same feeding period. The difference in average daily milk yield was statistically significant ($P = 0.04$).

In both groups, milk production was increased after August 2005 and remained high over the winter

and spring months, and then decreased in July 2006. The change was mainly due to environmental temperature and not because of different lactation stages. Feed consumptions between high and medium producing cows were different (Table 1). However, feed consumption between cows fed rations with or without the addition of calcium montmorillonite enterosorbent were not different. This indicated that the increased milk production was not due to changes of feed intake. Therefore, the efficiency of converting feed to milk was significantly improved by adding calcium montmorillonite enterosorbent in the ration.

FIGURE 1: Milk Production*



* P < 0.05

Feeding Enterosorbents Did Not Alter Milk Compositions

No differences in average milk fat and milk protein were observed between two treatments (Table 2).

TABLE 2: Average milk fat and milk protein with or without the addition of calcium montmorillonite enterosorbent in rations.

	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Milk Fat, %													
Control	4.39	4.52	4.75	4.88	4.85	5.04	4.75	4.76	4.90	4.47	4.09	4.29	4.78
Entero.	4.31	4.36	4.54	4.79	4.90	4.84	4.78	4.58	4.38	4.25	4.18	4.01	4.49
Milk Protein, %													
Control	3.05	3.15	3.25	3.17	3.15	3.18	3.20	3.12	3.16	3.14	3.04	3.07	3.10
Entero.	2.99	3.13	3.25	3.21	3.10	3.23	3.17	3.13	3.33	3.16	3.16	3.09	3.20

Feeding Enterosorbents Improved Dairy Cow Health

Table 3 lists disease incidence, by cause, over the 12 month feeding period. Cows that did not receive rations containing calcium montmorillonite enterosorbent showed a 180% increase in abortions and a significant increase (30-50%) in digestion, leg, respiration, and udder problems within the 12 month period. No differences were found with metabolism and reproduction problems between the two treatments.

TABLE 3: Disease occurrence within the 12 month feeding period, with or without the addition of calcium montmorillonite enterosorbent in the ration.

Disease/Problem	Occurrence of Disease (times)		
	Calcium Montmorillonite Enterosorbent	Control	Treatment Difference* (%)
Abortion	5	14	180
Digestion	141	209	48
Leg	33	49	48
Metabolism	45	49	9
Reproduction	256	250	-2
Respiration	14	21	50
Udder	107	139	30

*Increased incidence without using calcium montmorillonite enterosorbent

Conclusions

The study proved that calcium montmorillonite enterosorbent used on a daily basis provided significant benefits to the dairy operation. Use of 2 to 4 ounces per cow per day improved general health and milk production. Cows fed the ration containing calcium montmorillonite enterosorbent for 12 months showed benefits:

- Greater milk production (P < 0.05)
- Lower milk somatic cell counts (P < 0.07)
- Fewer health problems such as abortions, leg, digestion, respiration, and udder problems



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