



#24167 Evaluation of feeding BIG BEEF™ in a calf milk replacer on health and performance.



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Abstract:

The inflammatory response in the gut due to ingestion of feed can account for 10-20% of the energy consumed to mount the animal's immune responses. The objective of this study was to evaluate the efficacy of BIG BEEF™ (anti-phospholipase A2) to modulate this inflammatory response, promote growth and health in young dairy calves. Holstein bull calves (n=72, +/- 2 d of age) were stratified by weight and assigned to 1) Control, 2) 20/20 all milk replacer medicated with 400 g Neomycin and 200 g Oxytetracycline Per ton, 3) Control plus 0.7% BIG BEEF™, 4) Control plus 1.4% BIG BEEF™. For this 56-day study all calves were fed 454 grams of milk replacer per day and 18% protein texturized calf starter feed ad lib. After 42 days calves were weaned if they had consumed 454 grams of starter feed for 3 consecutive days; if calves were not weaned the calves were reduced to one feeding of milk daily to promote an increase in starter feed intake. Parameters measured in this study were: fecal scores, growth (calves were weighed weekly), daily starter intake and morbidity. During this study there was 0% death loss.

	Total Gain, kg	Starter Intake, kg	Calves Treated
Control	34.7	53.9	45
0.7% BIG BEEF™	33.8	52.6	57
1.4% BIG BEEF™	37.6	61.2	30

Although, no statistical differences were found in growth, starter intake, morbidity or fecal scores, the calves with 1.4% BIG BEEF™ added in the milk replacer did have the highest weight gain, the fewest calves treated and the highest starter feed intake for the study. At the end of the 8-week study, calves in the 1.4% BIG BEEF™ group were 2.9 kg heavier, had taken in 13.5% more feed and required 33% less treatment versus the control animals. Results provide evidence that the inclusion of BIG BEEF™ in a calf milk replacer may play a role in reduction of the inflammatory response due to ingestion of a calf milk replacer. The 1.4% inclusion rate may not be the optimal inclusion rate and additional levels may need to be tested.

Introduction:

In all vertebrates, ingestion of a meal stimulates an overwhelming inflammatory response in the gut as the first line of defense against food borne pathogens (Cook, et al., 1993). It is estimated that as much as 10-20% of the energy associated with a given meal can be used to mount this immune response. In swine and poultry, blocking the gut inflammatory response results in remarkable improvements in weight gains and feed conversion efficiencies as energy and nutrients are diverted to growth (Yang et al., 2003). Phospholipase A2 (PLA2) is an enzyme that hydrolyzes the sn-2 position ester bond of phospholipids and liberates arachidonic acid from cellular membranes. Arachidonic acid, in turn, is further metabolized to produce prostaglandins and leukotrienes, the key mediators of the gut inflammatory response (Kudo and Murakami, 2002; Cook, 2002). Blocking the PLA2 enzyme with an anti-PLA2 antibody (aPLA2) stops this cascade and inhibits gut inflammation (Cook et al., 1993, 2004). In the current study, we examined the effect of the anti-PLA2 antibody egg powder in the application as a calf milk replacer supplement. Growth performance and health status were closely monitored and the results presented here are very encouraging. The data showed that using Big Beef in calf milk replacer improved both growth performance and health status.

Objective:

The objective of this study was to evaluate the efficacy of BIG BEEF™ (anti-phospholipase A₂) in promoting growth and health in young dairy calves.

Material and Method:

Trial period: 8 weeks: from 3/19/07 to 5/14/07.

Treatments:

1. Gold Start (20/20) calf milk replacer medicated with 400 grams Neomycin and 200 grams Oxytetracycline per ton.
 2. As 1 and supplemented with 0.7% inclusion rate of BIG BEEF.
 3. As 1 and supplemented with 1.4% inclusion rate of BIG BEEF.
- Calves: 72 calves purchased from livestock market.

Feeding:

- (a) Milk replacer: ½ lb (227 grams) milk replacer per calf per feeding, two feedings per day for first 42 days.
- (b) Starter feeding: 18% Protein texturized, free choice starting day 1.

Water: offered ad libitum throughout the trial.

Weaning: weaned on day 42 if consumed 454g of starter feed for 3 consecutive days.

Housing: housed in individual hutches

Weighing: Weekly

Evaluation: Calves were evaluated on a daily basis for the following characteristics:

- | | |
|-----------------------------|--------------------------------|
| I) Fecal score | VI) Legs, Coat hair |
| II) Eyes, Nose, Navel, Ears | VII) Feed refusal |
| III) Dehydration | VIII) Activity, Aggressiveness |
| IV) Depression/lethargy | IX) Appetite, Alertness |
| V) Lumps, Bloat | X) Breathing |

Recording Health and Treatment Information:

- I) On daily fecal scoring sheet circle calves that need 2nd day of electrolytes and continued antibiotic treatment.
- II) Record fecal score for all calves.
- III) While recording scores, note how each calf's eyes, nose, navel, dehydration and overall attitude are – note any calf that does not seem completely healthy.
- IV) Make a list of all calves that receive electrolytes.
- V) List all calves that need to have a temperature taken, this includes:
 - (i) All calves with a scour score of 3 or greater
 - (ii) All calves that are showing signs of illness
 - (iii) All calves that do not voluntarily consume milk replacer
 - (iv) All calves with decreased starter intake
- VI) If a calf was treated, a detailed description of the symptoms must be included on the daily sheet

Results & Discussions:

Mortality---We had 0% death loss during this study. One calf was removed from study due to a chronic middle ear infection.

Calf health---The overall average number for calves treated per week were the same for the Control and the 0.7% Trt at 2.75 and lower for the 1.4% Trt at 1.88 (about 32% lower) (Table 1). The treatments per calf were the highest for the 0.7% Trt (2.70) and were similar for the control and 1.4% Trt at 1.63 and 1.57 respectively. The overall total numbers of medication treatments of calves were as follows: Control 45: 0.7% Trt 57: 1.4% Trt 30. The 1.4% Trt group had the lowest total health treatments (Table 2).

Table 1. The total numbers of calves treated with medication showed 1.4% group has the least number of calves needed medication treatment.

Calves Trt	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Average
Gold Star	3	11	1	1	2	2	2	0	2.75
0.70%	4	6	4	2	2	2	1	1	2.75
1.40%	3	7	0	0	3	1	1	1	1.88

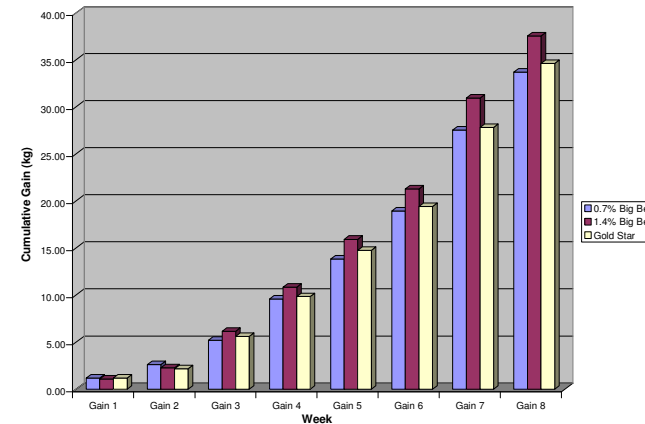
Table 2. The total numbers of medication treatments of calves showed 1.4% group has the least total number of medication treatments.

Total Trts	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Total
Gold Star	4	24	1	1	7	5	3	0	45
0.70%	4	11	13	11	10	6	1	1	57
1.40%	4	11	0	0	8	2	1	4	30

Fecal Scores---Very low scores for all treatments with values under 1.6 for the first 2 weeks and under 1.3 for the remaining 4 weeks with no differences among treatments.

Growth---There was no statistically differences in weight gain between any of the three treatments. However from week 3 through week 7 the 1.4% Trt did have a numerical higher value. Total gain was 34.7 kg for the Control, 33.8 kg for 0.7% Trt and 37.6 kg for 1.4% Trt (8.4% increases over control) (Figure 1).

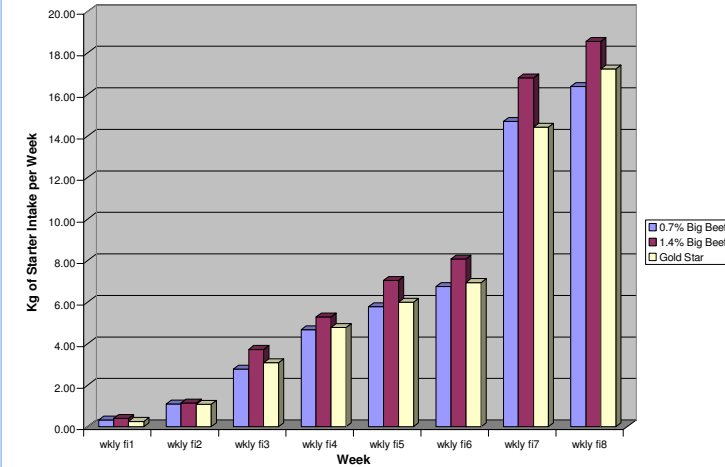
Figure 1. Cumulative weight gain showed a trend for 1.4% group gain more than the rest of groups and 2 years average.



Results & Discussions (cont):

Dry Starter Intake---There was no overall difference in DSI with the exception of week 6 when the 1.4% Trt was higher when compared to the control and the 0.7% Trt groups. The total DSI did have a trend P>0.13 for the 1.4% Trt group to be higher than the control and the 0.7% Trt groups. From week 3 through week 8 the 1.4% Trt group did have the numerically highest value. Total DSI were as follows: Control 53.9 kg: 0.7% Trt 52.6 kg (2.5% decreases): 1.4% 61.2 kg (13.5% increases). (Figure 2).

Figure 2. Weekly dry matter intake showed 1.4% group consumed more dry feed than the rest of groups.



Feed Efficiency---No differences were seen in F/G during the study (Table 3).

Table 3. Feed efficiency did not differ among treatment groups.

TRT	FE 0-3	FE 3-6	FE 6-8	FE 0-8
Gold Star	0.38	0.55	0.49	0.51
0.70%	0.37	0.53	0.48	0.50
1.40%	0.40	0.55	0.50	0.50

Percentage Weaned---There were a total of 7 calves (9.7%) that were not weaned on day 42 and received once a day milk feeding until adequate dry starter feed was consumed. Those 7 calves were as follows: 3 for control: 3 for 0.7% Trt and 1 for 1.4% Trt.

Summary of Conclusion

General health of this study was very good with 0% death loss, and should be taken into account when reviewing calf performance data when testing a product that might play a role in improved health and growth. No statistically differences were found in growth data. Total weight gain for the treatments are as follow: control 34.7 kg.: 0.7% Trt 33.8 kg.: 1.4% Trt 37.6 kg. No differences were found in DSI with the following results: control 53.9 kg.: 0.7% Trt 52.6 kg.: 1.4% Trt 61.2 kg. (11.8% higher than control). Total medication treatments per test group were as follows: control 45: 0.7% Trt 57: 1.4% Trt 30.

We were not able to see any linear effects with the two levels of aPLA2 added. However, although not statistically significant the highest level added aPLA2 did have the highest weight gain, the fewest medications treatments and the highest DSI for the study. The 1.4% inclusion rate may not be the optimal inclusion rate. Higher levels are currently being tested.

References:

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