EFFECT OF β-HYDROXY-β-METHYL BUTYRATE ON THE HEALTH AND PERFORMANCE OF SHIPPING-STRESSED CALVES

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Story in Brief

Three truck loads (n = 158) of cattle weighing an average of 407 lb were used to evaluate the effects of dietary β-hydroxy-β-Methyl Butyrate (HMB) on the health and performance of newly received shipping-stressed calves. Treatments consisted of a control (basal protein supplement) and this control plus 4 g of (HMB)/head/day. Overall daily gains tended to be greater for calves fed HMB (1.31 vs 1.11 lb). Daily gains for calves never treated for illness were greater for calves fed HMB (1.45 vs 1.11 lb), but there were no differences in daily gains among calves treated for illness. Daily feed intake was similar for both treatments. Morbidity, repulls and number of treatment days were directionally decreased with HMB feeding (73.0 vs 63.4%; 32.0 vs 23.6%; 2.12 vs 1.79 day, respectively). Average treatment costs ($/head) were less for calves receiving HMB. Both initial treatment ($6.31 vs $5.43) and repull ($4.62 vs $2.23) costs were lower due to fewer calves becoming ill initially and fewer repulls with HMB feeding. This resulted in an overall savings of $3.27/head for calves fed HMB. Lower drug and labor costs, combined with increased weight gain, resulted in more profit for calves fed HMB.

(Key Words: Calves, Stress, Health, Performance.)

Introduction

Transportation over long distances and mixing of cattle at sale barns are the principal stress factors that increase susceptibility of calves to illness. This stress often causes abnormally low feed intakes which restricts the amount of nutrients available for growth and recovery from illness. Thus, any compound

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that stimulates immune function and enhances animal performance would be of value to cattlemen.

β-hydroxy-β-Methyl Butyrate (HMB) is produced by the body during the breakdown of the amino acid leucine. HMB may enhance immune function and animal performance. Thus, we designed a study to evaluate the effects of HMB on the health and performance of newly received shipping-stressed stocker calves.

Materials and Methods

Three truck loads (Table 1) of cattle weighing an average of 407 lb and originating from 2 different locations were received at the Pawhuska Research Station between September and November 1992. Upon arrival, each calf was weighed, identified and allowed free access to long stem prairie hay and water overnight. The following day, each animal was processed as follows: vaccinated with IBR-PI3-BRSV (modified live virus; i.m.) and 4-way clostridial bacterin and dewormed with ivermectin. At 14 day, an IBR-PI3-BRSV vaccine booster shot was given. Amprolium (16 oz. of 9.6% solution/100 gal water) was added to the drinking water for 5 days to treat symptoms of coccidiosis in loads 1 and 2. Following processing, calves were assigned randomly to dietary treatments (either 0 or 4 g of HMB/hd/day incorporated into the protein supplement) and allotted to pens. During the 28-day receiving period, calves were limit fed a ration (Table 2) at 3% of body weight to attain daily gains of 1.0 lb. This ration consisted of 2 lb/hd/day of protein supplement and free choice access to prairie hay.

During the 28-d trial, calves were monitored twice daily for sickness; cattle displaying visual signs of sickness, depressed activity and feed intake were taken to the processing area. There, rectal temperatures were taken and severity of illness was appraised clinically. Animals with rectal temperatures > 104°F were considered sick and treated with antimicrobial drugs until rectal

Table 1. Origin, date, arrival weight, sex and number calves from individual loads.

Load	Origin	Date	Arrival Weight, lb	Gender	Number of Head
1	AL	9/92	367	M	52
2	AL	10/92	383	M	43
3	KS	11/92	471	M	63

Table 2. Composition of diets (DM basis).

Ingredients	Control	HMB
Prairie Hay, lb	10	10
Supplement, lb	2	2
	(%)	
Supplement		
Soybean meal	55.33	54.89
Cottonseed meal	40.00	40.00
Salt	3.00	3.00
Dicalcium phosphate	1.38	1.38
HMB	0	.44
Vitamin A, 30,000 IU/g	.11	.11
Vitamin E, 103 IU/g	.09	.09
Selenium, 600 ppm	.10	.10

Nutrients	
NEm, Mcal/cwt	51.98
NEg, Mcal/cwt	25.78
Crude protein, %	12.24
K, %	1.25
Ca, %	0.44
P, %	0.32

temperatures remained < 104°F. At the end of 28 days, feed and water were withheld overnight and calves weighed off treatment. Data were analyzed using a linear model that included the main effects of HMB, load, sickness and appropriate interactions. Least squares means are reported.

Results and Discussion

Daily gains (Table 3) averaged for all cattle were 18% ($P<.11$) higher for calves fed HMB. When daily gains were separated based upon illness of each calf, calves never treated for illness had greater daily gains (1.11 vs 1.45 lb; $P<.06$) when fed HMB. Calves that were treated for illness did not differ in daily gains. Daily feed intake was similar for both treatments. Feed efficiency was numerically improved when calves were fed HMB.

Table 3. Effect of β-Hydroxy-β-Methyl Butyrate (HMB) on performance.[a]

	Control	HMB	SEM	Observ. Sig. Level (P<)
Animals, number	80	78		
Pens, number	3	3		
Weight, lb				
Day 0	405	410	4.98	.45
Day 28	438	448	5.81	.22
Average Daily Gain, lb				
Overall	1.11	1.31	.09	.11
Healthy calves	1.05	1.45	.15	.06
Calves sick at least once	1.17	1.17	.10	.98
Number of calves sick	60	50		
Daily feed intake, lb	10.88	10.86	.15	.92
Feed/gain	11.08	10.39	.37	.31

[a]Least squares means.

Table 4. Effect of β-Hydroxy-β-Methyl Butyrate (HMB) on health.[a]

	Control	HMB	SEM	Observ. Sig. Level (P<)
Animals, number	80	78		
Pen, number	3	3		
Morbidity, %	73.0	63.4	5.03	.18
Mortality, %	4.17	2.15	2.15	.51
Initial Temp., °F	105.5	105.7	.04	.45
Treatment days	2.12	1.79	.22	.28
Repulls	32.0	23.6	6.08	.33
Treatment Cost, $/hd				
Initial Treatment	6.31	5.43		
Repull	4.62	2.23		
Total Treatment	10.93	7.66		

[a]Least squares means.

Morbidity, repulls and number of treatment days were directionally decreased with calves fed HMB (Table 4). Average treatment cost ($/hd) was less for calves receiving HMB. Both initial treatment and repull costs were lower due to fewer calves becoming ill initially and fewer repulls. This resulted in an overall savings of $3.27/hd for calves fed HMB. Lower drug and labor costs, combined with an increase in weight gain resulted in more profit for calves fed HMB.