

NRV Research: All Milk vs Deluxe Protein Blend

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Trial DB01-MIA-20

Abstract

Holstein bull calves fed an all-milk milk replacer or milk replacer with NRV's Deluxe Protein Blend had equal rate of gain: 1.40 and 1.40 lb/d, respectively, through 56 days of age. Cost of milk replacer per head was lower with Deluxe Protein Blend (\$47.19) compared with All-Milk (\$50.53) which represented a savings of \$3.34 per calf. Total feed cost per head was lower in calves fed Deluxe Protein Blend (\$51.19) compared with All-Milk (\$54.18) which resulted in lower cost cost-of-gain for calves fed Deluxe Protein Blend (\$0.65/lb) compared with All-Milk (\$0.70/lb). Through 56 days of age, calf performance was equal. Calves fed Deluxe Protein Blend had \$2.99 lower total feed cost than all-milk.

Introduction

Protein is the most expensive component of milk replacer which has traditionally been supplied from milk sources such as non-fat dry milk (skim milk) and/or whey proteins. Since early development of milk replacers in the 1950's and 1960's, research has been conducted to find alternatives to milk proteins to lower cost of milk replacer and to improve calf performance. In the United States, various soy and corn protein ingredients have been developed and, more recently, blood plasma protein has been developed. In Europe, hydrolyzed wheat protein and soy protein concentrate have been successfully used since the 1990's.

Several research studies have shown similar performance of calves when milk proteins have been replaced with hydrolyzed wheat gluten and/or blood plasma. The purpose of this trial was to compare performance of Holstein bull calves raised for dairy beef when fed an all-milk milk replacer or milk replacer comprised of NRV's proprietary blend of milk proteins, hydrolyzed wheat gluten, blood plasma, soy protein concentrate and synthetic amino acids.

Materials and Methods

One hundred Holstein bull calves were raised in a naturally-ventilated calf barn for milk beef. Test milk replacers were fed with the producer blind to two treatments. Even-numbered calves were fed an all-milk control milk replacer containing 22% protein and 20% fat. Odd-numbered calves were fed NRV's Deluxe Protein Blend (milk proteins, hydrolyzed wheat gluten, blood plasma, and soy protein concentrate plus synthetic amino acids) in milk replacer also containing 22% protein and 20% fat. Calves on the two treatments were distributed equally throughout the barn. Calves were weighed on days 1, 28, and 56 after arrival using a digital electronic scale.

Milk replacers were fed according to the following feed plan:

Table 1. Milk replacer feed plan for calves

<u>Days</u>	<u>Oz/feeding</u>	<u>Feedings/day</u>	<u>Days</u>	<u>Oz/feeding</u>	<u>Feedings/day</u>
1	8.0	2	10-31	10.5	2
2	8.5	2	32-37	8.0	2
3-4	9.0	2	38-47	8.0	1
5-6	9.5	2	48	0.0	0
7-9	10.0	2			

Textured calf starter feed (18% protein) was provided free-choice through week 5 and then a textured calf grower feed (16% protein) was provided free choice. Water was provided daily to all calves.

Data were analyzed using Statistix 10 for Windows using analysis of variance for completely randomized experiment with differences declared with $P < 0.05$.



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Table 2. Performance of Calves	Number of Calves	Deluxe Protein Blend 22/20	Number of Calves	All-Milk 22/20	P-value	
Live Weight, lb	Day 1	50	88.5 ± 1.33	50	86.3 ± 1.24	0.23
	Day 28	49	118.2 ± 1.90	45	116.0 ± 1.98	0.42
	Day 56	49	167.1 ± 2.95	45	164.8 ± 3.16	0.60
Gain per Head, lb	Days 1 to 28	49	29.6 ± 1.28	45	28.9 ± 1.42	0.70
	Days 28 to 56	49	48.9 ± 1.66	45	48.8 ± 1.74	0.99
	Days 1 to 56	49	78.5 ± 2.41	45	77.8 ± 2.61	0.83
Average Daily Gain, lb/day	Days 1 to 28	49	1.06 ± 0.05	45	1.03 ± 0.05	0.70
	Days 28 to 56	49	1.75 ± 0.06	45	1.74 ± 0.06	0.99
	Days 1 to 56	49	1.40 ± 0.04	45	1.40 ± 0.05	0.83
Milk Replacer Intake and Economics						
Milk Replacer, lb/head		50.9		50.9		
Price per bag Milk Replacer, \$		\$46.36		\$49.64		
Milk Replacer, \$/head		\$47.19		\$50.53		
Grain Intake and Economics						
Week 1, lb/head	49	0.19	49	0.19		
Week 2, lb/head	49	0.19	45	0.10		
Week 3, lb/head	49	0.65	45	0.71		
Week 4, lb/head	49	1.40	45	1.22		
Week 5, lb/head	49	2.24	45	1.93		
Week 6, lb/head	49	2.71	45	2.64		
Week 7, lb/head	49	4.88	45	4.06		
Week 8, lb/head	49	5.78	45	5.99		
Total Grain Intake, lb/head		17.63		16.85		
Grain Cost - Starter, \$/ton		\$365		\$365		
Grain Cost - Grower, \$/ton		\$328		\$328		
Total Grain Cost, \$/head		\$4.00		\$3.65		
Total Feed Cost per Head					<u>Difference</u>	
Milk Replacer, \$/head		\$47.19		\$50.53	-\$3.34/hd	
Starter and Grower Feed Cost, \$/head		\$4.00		\$3.65	+0.35/hd	
Total Feed Cost, \$/head		\$51.19		\$54.18	-\$2.99/hd	
Total Feed Cost-of-Gain, \$/lb		\$0.65		\$0.70	-\$0.05/lb gain	

Results and Discussion

Performance was not different for calves fed either milk replacer and shown in Table 2. Live weight on day 1 (P=0.23), day 28 (P=0.41) and day 56 (P=0.60) were equal for calves fed the two treatment milk replacers. Live weight gain and average daily gain were not different (P>0.69). Mortality was 10% in calves fed the all-milk milk replacer (5/50) and 2% in calves fed Deluxe Protein Blend milk replacer (1/50). Overall mortality was 6%.

Economically, the all-milk milk replacer cost \$49.64/bag while the Deluxe Protein Blend milk replacer cost \$46.36/bag. Calves fed the all-milk milk replacer consumed 0.78 lb less calf starter and grower feed than calves fed the Deluxe Protein Blend milk replacer (16.85 vs 17.63 lb, respectively).

Overall calf performance was equal in this trial for calves fed 22% protein/20% fat milk replacers made either with all-milk ingredients or Deluxe Protein Blend. Total feed cost per calf was higher in calves fed the all-milk milk replacer (\$51.19/head) than in calves fed the Deluxe Protein Blend milk replacer (\$54.18). Calves fed the Deluxe Protein Blend milk replacer had lower cost-of-gain (\$0.65/lb) than calves fed the all-milk milk replacer (\$0.70/lb).



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