



# VITAL E<sup>®</sup>-500 and EMCELLE<sup>®</sup> TOCOPHEROL For Neonatal Dairy Calves

Injecting calves upon arrival with 1500 I.U. vitamin E (VITAL E-500) and supplementing milk replacer daily with 200 I.U. vitamin E (EMCELLE TOCOPHEROL) resulted in enhanced performance and reduced mortality.

## Introduction

Calves are born with very low vitamin E status and depend upon colostrum and milk to supply adequate vitamin E. It is not uncommon to see very low serum vitamin E in newborn calves. This study was conducted to determine if dairy calves would respond to either an injection of vitamin E at arrival, oral vitamin E supplementation in milk replacer for 28 days, or a combination of injection and oral supplementation. The treatments were: (1) Milk replacer containing 50 I.U. per lb; (2) Initial injection 1500 I.U. vitamin E (VITAL E-500); (3) 200 I.U. vitamin E per day oral (EMCELLE

TOCOPHEROL); and (4) Initial injection plus daily oral supplementation.

**Table 1. Response of Milk-fed Calves to Initial Vitamin E Injection and/or Daily Vitamin E Supplementation**

Dr. Jim Morrill, Manhattan, Kansas

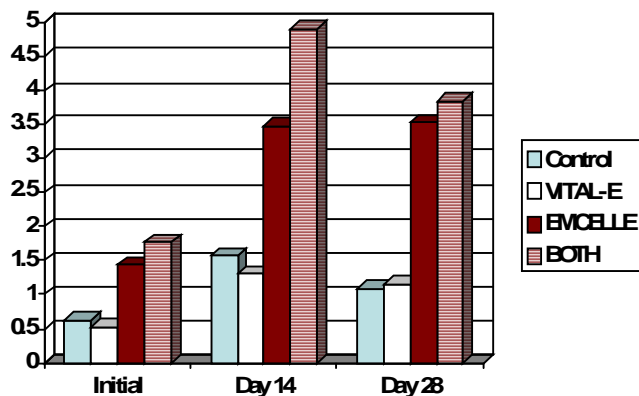
Parameter	Control	VITAL E-500 (1500 I.U.)	EMCELLE TOCOPHEROL (200 I.U. Daily)	VITAL E-500+ EMCELLE	Difference From Control
28-day gain (lbs)	4.71 <sup>a</sup>	5.94 <sup>a</sup>	5.72 <sup>a</sup>	11.70 <sup>b</sup>	+7 lbs
Avg. daily feed (lbs)	1.65	1.52	1.50	1.74	+0.1 lbs
Feed Conversion	9.74 <sup>a</sup>	7.18 <sup>b</sup>	7.39 <sup>b</sup>	4.17 <sup>c</sup>	+57.2%
Mortality %	16.67 <sup>d</sup>	0 <sup>e</sup>	0 <sup>e</sup>	0 <sup>e</sup>	2 vs 0
Medicine Cost (\$)	1.82	1.96	1.29	1.18	-\$0.64

Each treatment represents the mean of twelve Holstein calves  
<sup>a,b,c</sup>Values with different superscripts are significantly different (P<0.10)  
<sup>d,e</sup>Values with different superscripts are significantly different (P<0.05)

## Results

Table 1 shows the main treatment effects. Calves receiving both injection and daily supplementation had higher total gain (P<0.10), better feed conversion (P<0.10) than the other three treatments. Mortality was dramatically reduced in calves receiving vitamin E supplementation. Two of twelve calves in the control group died during the first week of the study, while no calves receiving vitamin E died. Medication cost tended to be

**Figure 1. Effects of Vitamin E injection and/or Supplementation on Calf Serum alpha-Tocopherol (µg/ml)**



Each value represents the mean of 3 calves. On days 14 and 28, EMCELLE and Combination are significantly different from control and injection only (P<0.05).

lower in those calves receiving injection and daily supplementation compared to control and injection alone.

Figure 1 shows the average serum alpha-tocopherol levels initially and days 14 and 28. On days 14 and 28, calves receiving the daily supplementation had higher vitamin E status than either control or injected calves (P<0.05). Continual supplementation maintained serum tocopherol level above 3 µg/mL which was the objective. The reason injected calves did not show higher serum levels was because serum alpha-tocopherol levels show maximum levels 18-24 hours post-injection and return to pre-injection levels within 72 hours.

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## Procedures

Male Holstein calves were purchased and transported to a Kansas calf growing facility. Upon arrival, calves were housed in individual hutches and fed electrolyte solution. On the second day and fourteenth day after arrival, all calves were vaccinated with intranasal IBR and PI-3. The day after arrival, 12 calves were randomly assigned to one of four treatments. Three calves per treatment group were bled initially and on days 14 and 28 of the 28-day study. The parameters measured were total gain, total dry matter intake, feed conversion, percent mortality, and average drug cost per calf within treatments. The study was conducted by Dr. Jim Morrill, Manhattan, Kansas.

## Discussion

Vitamin E (alpha-tocopherol) is a critically important and essential nutrient for growth and maintaining health status of calves. Vitamin E helps maintain cell membrane integrity, and has been shown to enhance immunity. Vitamin E requirements are separate from selenium and can not be replaced by selenium supplementation.

These results show the benefits of adequate vitamin E status in calves when supplemented with a biologically available source of vitamin E (*d-alpha*-tocopherol). Newborn calves are born deficient in vitamin E due to poor placental transfer and depend totally upon colostrum for their initial vitamin E needs. Serum alpha-tocopherol levels at birth are typically 1.0 µg/mL or less. Adequate serum tocopherol levels should be above 3.0 µg/mL. In this study, the milk replacer did not provide adequate amounts or proper form of vitamin E to raise serum tocopherol levels above 1.0 µg/mL. In a survey of dairy calves less than one month of age, a range of 0.11 µg/mL to 5.37 µg/mL was reported.

Calves with low serum vitamin E (less than 1.0 µg/mL) are prone to diarrhea and weakness due to muscle destruction.

## Conclusion

**Vitamin E injection and oral supplementation enhanced calf performance and reduced mortality during the initial 28 days at a calf growing facility. This research has shown the importance of adequate vitamin E during this critical time of a calf's life.**

## Recommendation

**Inject 3 mL VITAL E-500 or 5 mL VITAL E-A+D at birth and supplement milk/milk replacer daily with 0.2-0.4 mL EMCELLE TOCOPHEROL (100-200 I.U. daily) during the first 28 days on milk/milk replacer. This will cost less than \$1.95 per calf for a 28-day program.**

## **VITAL E-500 and VITAL E-A+D (injectables) and EMCELLE TOCOPHEROL (oral)**

### **Features and Benefits**

- All three products have the most biological available sources of vitamin E that is in the same form of vitamin E found in colostrum and milk (*alpha*-tocopherol).
- **VITAL E-500 and Vital E-A+D** are immediately absorbed from the injection site, unlike other vitamin E injectables.
- **EMCELLE TOCOPHEROL** (*d-alpha*-tocopherol) is the only product that is micellized (made into small water-dispersible droplets) to enhance absorption by the young calf. Other vitamin E supplements have the same synthetic vitamin E form that is in milk replacer which needs to be further metabolized before the calf can utilize it (*dl-alpha*-tocopheryl acetate).
- Over 21-year use record.
- University and field tested.