

# THE EFFECT OF VITAMIN E SUPPLEMENTATION ON HEALTH AND PERFORMANCE OF NEWLY ARRIVED STOCKER CATTLE

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## Story in Brief

Five hundred two newly received steer and bull calves and yearlings averaging 532 pounds were used in a study to determine the effect of vitamin E supplementation on health and performance over a 28 day receiving period. All cattle had ad libitum access to prairie hay and were fed 2 lb/day of a soybean meal-based pellet for the first 21 days and 1 lb/day during days 22-28 with 252 of the cattle receiving vitamin E in their supplement (800 IU/lb supplement). Cattle fed vitamin E gained 1.17 lb/day compared to .95 lb/day for control cattle. Feed intake was not affected by vitamin E supplementation but cattle fed vitamin E had 28.6% higher gain to feed ratios than control cattle (.063 vs .049 lb gain/lb feed). The number of sick pen days per head was reduced by 15.6% (2.7 vs 3.2 days/head) and morbidity was reduced by 13.4% (37.5 vs 43.3%) with vitamin E supplementation. These data suggest that vitamin E supplementation improved the performance of newly received, stressed cattle.

(Key Words: Vitamin E, Newly Received Cattle, Stressed Cattle)

## Introduction

Supplementing vitamin E in pharmacological doses in well balanced diets has been shown to increase humoral antibody production against a variety of particulate and soluble antigens in chickens, mice, turkeys, guinea pigs, and rabbits (Tengerdy, 1980). Studies also have shown that high levels of vitamin E may enhance the immune system of swine, sheep, and horses.

Little research has been conducted on the effects of vitamin E on the health, immune response or performance of beef cattle. Early research showed vitamin E supplementation or injection had no effect on weight gains of feedlot calves (Perry et al., 1968; Totusek et al., 1968). In contrast to these studies Lee et al. (1985) reported that vitamin E supplementation (400 IU/head/day) of the receiving diet of stressed calves improved daily gains ( $P < .08$ ) and feed efficiency ( $P < .02$ ) by 5% and reduced morbidity and mortality by 8% and 50%, respectively.

The vitamin E requirement of young calves is thought to be between 15 and 60 IU/kg of dry diet (NRC, 1984). Normal diets are thought to supply adequate amounts of vitamin E for adult cattle. However, the nutrient needs of stressed cattle may be greater due to reduced feed and water intake and health problems. Therefore, the objective of this research was to study the effect of dietary vitamin E supplementation (800 IU/lb feed) on the health and performance of newly arrived stocker cattle.

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## Materials and Methods

Six truck loads (trials) of cattle were purchased by order buyers from auction markets in Georgia, Kansas, Mississippi, Oklahoma, and Texas and shipped to Pawhuska, Oklahoma. The arrival date and weight, origin, number of head, and in-transit shrink for each load is summarized in Table 1. The procedures followed for this experiment are described elsewhere in this publication (Hicks et al., 1986).

Table 1. Origin, arrival date, number of head, arrival weight and in-transit shrink for each load of cattle.

Trial	Origin	Arrival Date	Number of Head	Arrival Wt., lb	% Shrink
1	GA	11-12-84	79	548	7.6
2	GA	11-18-84	77	539	9.0
3	MS	2-06-85	91	491	9.7
4	TX & OK	2-12-85	92	519	3.4
5	KS	3-10-85	88	550	4.8
6	KS	3-18-85	76	552	5.1

## Results and Discussion

Effects of vitamin E supplementation on weight gains, sick days, morbidity, and mortality are presented in Table 2. Gains in the 28 day receiving period were significantly increased ( $P < .01$ ) by vitamin E supplementation (1.17 vs .95 lb/head/day). Daily gains of those cattle that were never sick were 1.34 and 1.47 lb/head/day for control cattle and cattle fed vitamin E, respectively. The number of sick pen days per head tended to be lower for the cattle fed supplemental vitamin E than for the control cattle (2.7 vs 3.2 days). Morbidity was also lower in these cattle (37.5 vs 43.3%). Death loss was 1.6% in the control cattle and 1.2% in the vitamin E cattle.

Table 2. Effect of vitamin E supplementation on daily gains, sick days, morbidity and mortality in stressed cattle.

	Controls	Vitamin E
Number of head	252	250
Number of head never sick	146	158
Arrival weight, lb	528	537
Average daily gain, lb*	.95 <sup>a</sup>	1.17 <sup>b</sup>
Daily gain of head never sick, lb*	1.34 <sup>a</sup>	1.47 <sup>b</sup>
Sick days	3.2	2.7
Morbidity, %*	43.3	37.5
Mortality, %	1.8	1.6

\* Expressed as LSMEANS.

<sup>a, b</sup> Means with different superscripts differ ( $P < .01$ ).

**Table 3. Effect of vitamin E supplementation on daily gains, sick days, repulls and response to first treatment in sick cattle.**

	Controls	Vitamin E
Number of head	106	92
Average daily gain, lb*	.57	.70
Sick days*	7.0	6.6
Repulls, %*	13.3	17.8
Response to first treatment, %	58.8	61.5

\*Expressed as least square means.

Effects of vitamin E supplementation on the health and performance of the sick cattle are reported in Table 3. Those sick cattle fed vitamin E gained .70 lb/day compared to .57 lb/day for sick control cattle. The number of treatment days per head tended to be lower in the vitamin E group (6.6 vs 7.0 days). However, the number of repulls was greater for the vitamin E cattle than for the control cattle (17.8 vs 13.3%). The response to first drug treatment was similar for both treatments (61.5% and 58.8% for vitamin E and controls, respectively).

Feed intakes and gain to feed ratios are reported in Table 4. Vitamin E supplementation did not affect feed intake (17.60 vs 17.58 lb/head/day for vitamin E and control, respectively). However, due to the 23.2% increase in daily gains, feed to gain ratio was increased from .049 to .063 lb gain/lb feed.

Effects of vitamin E supplementation on the health and the performance of cattle with those sick head pulled at time of processing excluded from the analysis are presented in Tables 5 and 6. Excluding these head from the analysis did not change the interpretation of results. With the data analyzed in this manner, cattle fed vitamin E gained 22.2% faster than control cattle ( $P < .05$ , 1.21 vs .99 kg/head/day). Vitamin E supplementation reduced morbidity by 11.7% (30.9 vs 35.0%) and sick days by 12.5% (2.1 vs 2.4 days/head). In the sick cattle, vitamin E supplementation tended to increase gains and reduce sick days.

Under the conditions of this study, vitamin E supplementation (800 IU/lb supplement or 1600 IU/head/day) significantly increased weight gains and tended to reduce sickness in newly received, stressed stocker cattle. These results are consistent with those reported by Lee et al. (1985). These studies suggest that the vitamin E requirement of stressed cattle is higher than the 33 to 132 IU/lb of dry diet that is suggested by NRC (1984) for young calves. More studies need to be conducted in stressed cattle with different levels of the vitamin to determine its requirement for such cattle.

**Table 4. Effect of vitamin E supplementation on feed intake and gain to feed ratio.**

	Controls	Vitamin E
Number of pens*	6	6
Feed intake, lb*	17.60	17.58
lb gain/lb feed*	.049	.063

\*Expressed as least square means.

Table 5. Effect of vitamin E supplementation on daily gains, sick days, morbidity and mortality in stressed cattle with sick head pulled at processing excluded.

	Controls	Vitamin E
Number of head	216	222
Arrival weight, lb	528	539
Average daily gain, lb*	.99 <sup>a</sup>	1.21 <sup>b</sup>
Sick days	2.4	2.1
Morbidity, %*	35.0	30.9
Mortality, %	.93	.45

\* Expressed as least square means.

<sup>a, b</sup> Means with different superscripts differ (P<.05).

Table 6. Effect of vitamin E supplementation on daily gains, sick days, repulls and response to first treatment in sick cattle with head pulled at processing excluded.

	Controls	Vitamin E
Number of head	68	63
Average daily gain, lb*	.44	.66
Sick days	6.6	6.2
Repulls, %	8.2	9.5
Response to first treatment, %*	62.9	64.1

\* Expressed as least square means.

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