THE EFFECT OF VITAMIN E SUPPLEMENTATION ON PERFORMANCE OF NEWLY RECEIVED STOCKER CATTLE

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Story in Brief

Two loads of calves consisting of 131 newly received steer and bull calves and yearlings averaging 534 pounds were used in a study to compare the effects of supplemental vitamin E on health and performance during a 28 day receiving period. All cattle had ad libitum access to prairie hay and were fed a soybean meal-based pellet at the rate of 2 lb/day for the first 21 days and 1 lb/day during days 22-28. Upon arrival, half of the cattle received a vitamin E injection at a rate of 3,000 IU/head. Half of each group (injected and non-injected) also received vitamin E in the feed at a rate of 400 IU/lb of supplement. Daily gains were increased 38.4%, feed intake was increased 3.61%, feed:gain ratio was best, and sickdays and morbidity were reduced (23.5% and 21.4%) by adding vitamin E to the feed. Injecting vitamin E increased sickdays by 31.9%, and tended to increase morbidity. These data suggest that vitamin E supplementation of the diet can improve the performance of newly received, stressed cattle.

(Key Words: Vitamin E, Performance, Stressed Stocker Cattle.)

Introduction

Pharmacological doses of vitamin E can increase humoral antibody production in monogastric animals (Tengerdy, 1980). Although the role of vitamin E on the immune system of ruminants has yet to be fully established, recent studies have shown that vitamin E supplementation in diets of newly received cattle may improve daily gains, feed efficiency and reduce morbidity during a 28 day receiving period (Lee et al., 1985; Gill et al., 1986). These results contrast with results of earlier research in which vitamin E supplementation or injection had no effect on performance of feedlot calves (Perry et al., 1968; Totusek et al., 1968). The objective of this research was to examine the health and performance response of newly arrived stocker cattle to dietary supplementation of vitamin E (400 IU/lb supplement) or injection of vitamin E (3,000 IU/head).

Materials and Methods

Two truck loads of cattle (designated as trials), were assembled by order buyers and shipped to Pawhuska, Oklahoma in September, 1985. The origin, arrival date and weight, number of head, and transit shrink for each load is summarized in Table 1. Upon arrival, cattle were weighed individually, ear tagged and randomly placed in one of four pens

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Table 1. Origin, arrival date, number of head, arrival weight, and transit shrink for experimental cattle.

	Origin	Arrival Date	Number of Head	Arrival Wt lb	% Shrink
Trial 4	KY	9-09-1985	55	611	5.8
Trial 5	KY	9-11-1985	76	485	NA[a]

[a]NA = not available.

holding 24 to 39 animals each. Pens were randomly assigned to vitamin E supplement and control supplement groups. On the morning following arrival, each pen was processed as follows:

1. Body temperature and time were recorded.
2. Cattle were vaccinated with IBR-PI3 (MLV) IM, Leptospira pomona bacterin, and Clostridia chavoei, septicum, novyi and sordellii bacterin and dewormed with Ivermectin.
3. Cattle with odd numbered ear tags received an injection of Vitamin E (3,000 IU DL-alpha tocopherol/animal).
4. Cattle with clinical signs of illness or a body temperature of 104F or greater received antibiotic treatment and sick animals were placed in the hospital pen and healthy animals were returned to their home pen.

Cattle had free access to prairie hay and were fed 2 lb/head/day a pelleted feed supplement (Table 2) for the first 21 days. Supplement was decreased to 1 lb/head/day during days 22-28. The supplement contained no supplemental vitamin E, or 400 IU Dl-alpha tocopherol acetate/lb of supplement. Two hospital pens were maintained so that sick animals received their assigned feed while out of their home pen.

Cattle were checked twice daily for signs of illness. If the body temperature exceeded 104F the animal was considered sick. The animal could also be classified as sick based on clinical signs. If an animal was sick, it was taken to the processing area where its body temperature was measured and severity of illness (slight, moderate, or severe) was appraised.

Sick animals received a medical treatment based on a specified sequence of antimicrobial drugs (Table 3.). Sick animals were initially

Table 2. Composition of supplement.

Ingredient	IFN[a]	% As Fed
Soybean meal	5-20-637	88.9
Cottonseed meal	5-01-621	5.0
Salt	6-04-152	3.0
Vitamin A-30,000 IU/g		.11
Premix[b]		.18
Dicalcium phosphate	6-01-080	2.75
Bovatec 68		.15

[a]International feed number.
[b]To provide: 0 for control, or 400 IU vitamin E/lb.

Table 3. Sequence of drugs used for treatment of BRD.

Treatment No.1:	Oxytetracycline (Biomycin-C) subcutaneously-5mg/lb. Plus Sulfamethazine Boluses (Sulmet -15gm) 1 bolus/150 lb on day 1. 1 bolus/300 lb on subsequent days.
Treatment No.2:	Erythromycin (Gallamycin) deep in the muscle-10 mg/lb.
Treatment No.3:	Spectinomycin (Spectam)-5mg/lb.
Treatment No.4:	Procain Penicillin G subcutaneously-30,000 IU/lb.
Treatment No.5:	Tylan 200-10mg/lb.
Treatment No.6:	Amoxicillan (Amoxi-ject) subcutaneously-5mg/lb.

[a]Certain antimicrobial drugs used in this study were used for extra-label purposes or at extra-label dosages and require a veterinarian-client-patient relationship before use.

treated with the first drug in the sequence. If body temperatures dropped 2F or to less than 104F within 24 hours, or if clinical signs were improved within 24 hours, the first drug was continued for two more days. If no improvement was apparent within 24 hours, the next drug in the sequence was administered. The process was repeated until a health improvement was detected.

At the end of the 28 day receiving period, cattle were weighed in the morning following an overnight shrink.

Results and Discussion

The effects of vitamin E supplementation and injection on weight gains, sickdays, and morbidity are shown in Table 4.

Gains during the 28 day receiving period were increased (P<.001) by feeding vitamin E (2.27 vs 1.64 lb/head/day) while gains of those cattle injected with vitamin E tended to be depressed (1.91 vs 2.00 lb/head/day). Number of sickdays were reduced (P<.07) by feeding vitamin E and increased (P<.06) by injection with vitamin E. Morbidity was reduced (P<.05) by feeding vitamin E and tended to be increased by injection with vitamin E (73.9 vs 65.6%). An interaction between injection and feed occurred for sickdays (P<.005) and morbidity (P<.04).

Table 4. Effect of vitamin E supplementation and injection on weight gains, sickdays, morbidity and mortality in stressed cattle.

Treatment	Feed		Injection	
	No E	E	No E	E
Number of head	67	61	65	63
Daily gain, lb*	1.64[a]	2.27[b]	2.00[a]	1.91[b]
Sickdays*	4.73[a]	3.62[b]	3.60[a]	4.75[b]
Morbidity, %	78.1[a]	61.4[b]	65.6	73.9
Mortality, %	2.3	0	0	0

*Expressed as least square means.
[ab]Means with different superscripts differ (P<.07).

Table 5. Effect of vitamin E supplementation in the ration on feed intake, gain to feed ratio and average daily gain.

	Control	Vitamin E
Number of pens	2	2
Feed intake, lb*	15.25[a]	15.81[b]
Lb gain/lb feed*	.11	.15

*Expressed as least square means.
[ab]Means with different superscripts differ (P<.01).

Effects of feeding vitamin E on feed intake and gain to feed ratio are reported in Table 5. Feeding vitamin E increased (P<.01) feed intake (15.8 vs 15.3 lb/head/day) and daily gains (2.31 vs 1.69 lb/head/day), but did not improve the gain to feed ratios. Feed intake and gain to feed ratio were influenced by truck load.

Under the conditions of this study, vitamin E supplemented in the diet (400 IU/lb supplement) significantly increased weight gains and reduced sickness in stressed stocker cattle. These results are consistent with results reported by Lee et al. (1985) and Gill et al. (1986). Injection of vitamin E (3,000 IU/head), however, did not improve stressed stocker cattle performance. Some swelling at the injection site was observed and may have caused the altered performance. Injections appear to reduce animal performance, compared to less stressful means of administration.

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