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Nutritional Benefits of Feeding a Pelleted Supplement Manufactured from North Atlantic Seaweed to Transit-Stressed Feedlot Cattle: Animal Performance And Medical Costs

J.N. Carter, T.C. Stovall, D.R. Gill, A.W. Confer, R.A. Smith and R.L. Ball

Story in Brief

Two experiments were conducted using mixed breed heifers (mostly British crosses) from southern Oklahoma and northern Texas auction barns to examine the effects of feeding a novel supplement, Tasco™, on animal performance and medical costs associated with anti-microbial drug therapy. Initial experiments at other research institutions indicate that Tasco™ improves not only daily gains, feed efficiency and total rumen function, but also immune system function and overall health, as well as carcass marbling scores, quality grade and retail shelf-life when fed for the first 14 d of the initial receiving period. Feed was delivered once daily to each pen; cattle were fed ad libitum. Tasco™ was included in the diet at the rate of 0.6 lb/hd for the first 14 d only. Experienced veterinary personnel evaluated all cattle each day for signs of respiratory and other diseases; all incidences of disease and anti-microbial treatments were closely monitored and recorded. Daily gains were not improved; however, feed intakes trended lower in Experiment 1 for cattle fed Tasco™, and thus, feed conversion was improved. In both experiments, Tasco™ fed cattle required more treatments with anti-microbial drugs, and medical costs overall were greater in these cattle compared to controls. Tasco™ clearly did not improve the immune function and overall health response of the cattle in this study and provided only isolated benefits to animal performance.

Key Words: Tasco™, Seaweed, Stress, Shipping Fever, Feedlot

Introduction

The bovine respiratory disease (BRD) complex has long been recognized as a serious and important factor in the stocker and feedlot industry (Duff et al., 1999) and can have a great impact on producer profitability (Gill and Smith, 1992). The complex includes viral pathogens, as well as bacterial, and efficacy of therapeutic treatment with anti-microbial drugs can range from complete success to absolute failure, and is always costly. Further, animal agriculture has been criticized recently of contributing to the development of resistant strains of bacteria, by either over-use or inappropriate use of anti-microbial drugs, that ultimately could effect human populations (Angulo et al., 1999). Although it is unlikely that anti-microbial drug use in agriculture will ever be completely prohibited, developing other means of controlling or minimizing the effects of BRD may be prudent. Mediation of the immune response through nutrition could prove to be beneficial to animal performance, animal immune response, and the producer via reduced labor and medical costs, and improved profitability.

The objective of this research was to determine the effects that a novel supplement manufactured from North Atlantic seaweed might have on animal performance and response to the normal challenge of BRD induced by co-mingling and transit. Limited data exist with respect to cattle feeding trials using this product; however, it is commercially available in Oklahoma, as well as other states.

Materials and Methods

Experiment 1. Ninety mixed breed beef heifers (458 lb initially) were purchased by order

buyers in several southern Oklahoma and northern Texas auction barns in late October, 1999. They were trucked to a facility near Purcell, OK, held overnight and subsequently organized into load lots the next morning. The cattle were then delivered by truck to the Willard Sparks Beef Research Center (WSBRC) in Stillwater, OK. On arrival, cattle were held in a return alley for approximately 1 h to rest and acclimate to their new surroundings. The cattle were then pre-processed—individual weights were obtained and individually numbered ear tags were applied. The cattle were allowed to rest overnight before initiation of the study the next day. Feed and water was provided (2 lb/hd of prairie hay and 3 lb/hd of the control diet described in Table 1). Tasco™ pellets consisted of 50% seaweed meal and 50% wheat middlings. Tasco™ was added in the diet of Treatments 5 through 8 for the first 14 d only at the rate of 0.6 lb/hd (6% of total diet if intake was 10 lb/d). The amount of wheat middlings in the diet was decreased and Tasco™ was substituted, accordingly by percentage. Feed was delivered once daily to each pen; eight pens were used with 11 to 12 hd/pen. Cattle were started on feed at 5 lb/hd on d 0 and were fed ad libitum, but were required to have a slick bunk at 6:00 a.m. each day to merit an increase in feed for that day. Hay was fed at 2 lb/hd for the first 5 d, then reduced by half on each d 6 and d 7; no hay was fed after d 7.At 6:00 a.m. the day after arrival, cattle were processed and allocated to their treatment pens. Processing included vaccination for viral respiratory (BRSV-Vac 4™, 2 ml IM) and clostridial (Vision-7™, 2 ml SubQ) diseases, as well as a treatment for internal and external parasites (Ivomec-Plus™, 1.0 ml/110 lb SubQ). Viral respiratory vaccines were boostered on d 14. Cattle were weighed on d 0, 14, 28, and 42. Day-0 weights were averaged with off-truck weights and d-42 weights were obtained after an overnight shrink with no access to feed or water. Eight dietary treatments were included in this study: 1=Control; 2=vitamin E for 7 d; 3=vitamin E for 14 d; 4=itamin E for 28 d; 5=Control+Tasco™; 6=vitamin E for 7 d+Tasco™; 7=vitamin E for 14 d+ Tasco™; 8=vitamin E for 28 d+Tasco™. Supplemental vitamin E (in treatments 2, 3, 4, 6, 7, and 8) was added at the rate of 2000 I.U./hd/d. A hospital card was initiated for each animal that was either suspect or confirmed as morbid. Information recorded included identification, date, weight, rectal temperature, severity score, and treatment regimen engaged. This information was not made available to veterinary personnel making each day's evaluation of cattle for morbidity. Health records were monitored WSBRC personnel to determine if an animal had been previously treated. If so, eligibility for re-treatment was determined based on the label instructions of the relevant antibiotic and the veterinary prescribed treatment regimen.

Experiment 2. Eighty-five mixed breed beef heifers (512 lb initially) similar in origin to those in Exp. 1 were received at the WSBRC in Stillwater one week later and started on a similar experiment. Cattle were handled identically on arrival and at processing. All conditions and procedures were the same as Exp. 1, except for dietary treatments. No supplemental vitamin E was fed in Exp. 2 and thus, only two treatments existed—control and Tasco™. Cattle were randomly and evenly distributed to eight pens; four pens received only a control diet and four pens received Tasco™ at the above stated rate for 14 d. On d 15, all cattle received control diet only for the remainder of the 42-d receiving period.

Statistical Analysis. All data from both Exp. 1 and 2 were analyzed by ANOVA for daily gain and feed conversion (pen=experimental unit) using GLM and MIXED procedures of SAS® in a randomized block design. Variables related to medical treatment costs were analyzed by ANOVA using animal as experimental unit.

Results and Discussion

Experiment 1. Animal performance results by dietary treatment are displayed in Table 2. Tasco™, when combined with a high supplemental level of vitamin E, did not significantly improve daily gain (1.9 lb/d), nor total gain (81.2 lb/d) during the 42-d receiving period. Cattle fed Tasco™ consumed less feed overall, and thus, feed conversion was improved

(P>.05) in those treatments. The incidence of BRD was greater in cattle fed Tasco™ + vitamin E (63.6%) than those cattle fed only supplemental vitamin E (50.0%); altogether, these differences were significant (P=.0023). Likewise, medical costs were also significantly greater (P=.006) for cattle receiving the Tasco™ supplement. The number of anti-microbial treatments (AMT) required per sick animal was also greater (P=.0066) for the Tasco™ fed cattle.

Experiment 2. Table 3 contains all relevant data for this experiment. Daily gains were reduced (P=.13) by 0.33 lb/hd on average in cattle supplemented with Tasco™; performance measured by total gain was similarly improved (P=.13) and favored controls. Unlike the response observed in Exp. 1, feed conversion was better in cattle fed the control diet only, compared to the experimental diet (5.78 vs 7.52; P=.17). Medical costs were different (P=.0001), which coincided with the increased incidence of BRD in Tasco™ fed cattle compared to controls (34.9% vs 69.0%).

In summary, negative results were observed regarding feedlot performance as measured by daily gain, total gain, and feed conversion. The data clearly show that the incidence of BRD, and thus, medical costs were higher in cattle supplemented with Tasco™. Immune function is complex and can be affected by many determinants acting alone or in combination with dietary, environmental, and managerial factors.

Literature Cited

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Table 1. Composition of control diet on a dry matter basis[a]

Ingredient	%DM
Soybean hulls	33.0
Corn, whole shelled	26.5
Wheat middlings	16.9
Supplement[b]	13.6
Cottonseed hulls	10.0

[a]Crude Protein = 14.8%.

[b]Supplement composition: Cottonseed meal 55.5%, soybean meal (47.5%) 31.5%, limestone 8.75%, pellet partner 5.0, salt 1.75%, vitamin A (30,000 IU/gm) .14%, vitamin E-50 Adsorbate

.02%, Bovatec 68™ .17%, selenium (0.02) .08%.

Table 2. Experiment 1: Results of animal performance and health response.

Response variable	Control + vitamin E	S.E.	Tasco™ + vitamin E	S.E.
Average daily gain, lb/d	1.9	.22	1.9	.22
Total gain, lb	80.1	9.2	82.3	9.2
Feed conversion, F/G	5.71	.5	5.52	.5
AMT per sick animal	1.0	.6	1.2	.5
Medical costs, $/hd	5.64	3.6	7.15	3.6
Morbidity, %	50.4	.3	63.7	.3

Table 3. Experiment 2: Results of animal performance and health response.

Response variable	Control	S.E.	Tasco™	S.E.
Average daily gain, lb/d	1.9	.2	1.6	.2
Total gain, lb	80.5	9.6	66.8	9.8
Feed conversion, F/G	5.78	1.7	7.52	1.7
AMT per sick animal	1.1	.4	1.7	.3
Medical costs, $/hd	3.09	4.49	9.47	4.54
Morbidity, %	34.9	.2	69.0	.2

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