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## An Enzyme-Microbial Feed Product for Finishing Steers

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## Results

Supplemental treatments did not significantly effect daily gain, feed efficiency or carcass characteristics (Table 3). There was a trend for cattle supplemented with Synergy to consume slightly more feed and gain slightly more. Feed efficiency did not appear to be different among the treatments. Ration quality (absence of dust or fines) appeared to be higher for the rations containing Synergy and lowest for the control ration. When lecithin was added at 1.12% of the ration DM along with 1.12% pork fat, dry matter intake and steer performance were similar to those observed in the control steers.

Carcass dressing percent, fat cover, marbling, quality grade and yield grade were not affected by treatments. Percentage of condemned livers was not increased by lipid treatments over the control.

Four steers were removed from the overall analysis. One steer died unrelated to the treatment. Two other steers were more than two standard deviations below the average for daily gain and another steer experienced health

**Table 4. Pooled results for two finishing trials with Synergy and pork fat supplements.**

	Control	Synergy 1.12% lipid	Pork fat 1.12% lipid	Pork fat 2.24% lipid	P Value
No. of pens	6	6	6	6	
No. of steers	71	71	71	71	
Initial wt, lb	822	823	821	825	
Final wt, lb <sup>a</sup>	1240	1264	1255	1255	.35
Daily gain, lb <sup>a</sup>	3.33	3.52	3.46	3.42	.35
Feed DM intake, lb	23.6	24.6	24.1	23.8	.47
Feed/gain ratio	6.30	6.32	6.24	6.28	.63

<sup>a</sup>Final live weight and daily gain calculated by dividing hot carcass weight by a common dressing percentage (62.5).

problems and had sub-standard gains. As a consequence, one steer was removed from the control treatment, one from Synergy plus 1.12% pork fat treatment, one from control plus 2.24% pork fat treatment and one from the 1.12% pork fat plus 1.12% lecithin treatment.

Pooled results for the four treatments common between this trial and the similar 1995 trial are presented in Table 4. Non-significant increases in daily gain and feed dry matter intake are shown for Synergy over the control values. The 1.12% lipid addition to the diet from Synergy may not affect performance as much as it affects dry matter intake. The easy-flowing Synergy liquid

supplement appeared to improve ration quality by reducing fines or dust, which could be the reason for any increased feed intake. These results suggest lipid from soybean oil refining byproduct is as effective as pork fat (white grease) for supporting performance of finishing steers.

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<sup>2</sup>Synergy 19/14 supplement is a patented product of Cargill Molasses Liquid Products Division, Elk River, MN, and supplies 19% crude protein and 14% lipid from processed soybean oil refining byproduct.

# An Enzyme-Microbial Feed Product for Finishing Steers

**Burt Weichenthal**  
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The MSE feed additive containing multiple enzymes, microbes and yeast appears to be competitive with Rumensin/Tylan for supporting an economical finishing performance in yearling steers.

## Summary

*Feeding MSE (multiple stabilized enzymes in an enzyme-microbial feed product) at the rate of 2 lb of product per ton of diet dry matter in two trials*

*with finishing yearling steers, increased daily gain by an average of 6.9% over feeding Rumensin-Tylan at 29 g and 10 g per ton, respectively. Feed-to-gain ratio was improved by an average of 5.6% with MSE in the same comparison. Carcass measurements were similar, except for slight increases in hot carcass weight and dressing percent for cattle fed MSE. Percentages of liver abscesses were low and similar for both treatments.*

## Introduction

The 1996 Nebraska Beef Report (pp. 68-69) included results from a finishing trial using British crossbred yearling steers in which Rumensin-Tylan was

compared to MSE, a feed product containing multiple stabilized enzymes plus four strains of bacteria (three *Lactobacillus* cultures and one of *Bacillus subtilis*), three strains of yeast (*Saccharomyces cerevisiae*) and three strains of fungi (two of *Aspergillus oryzae* and one of *Aspergillus niger*). Steers fed MSE gained about 10% faster and 7.5% more efficiently than those fed Rumensin-Tylan. Liver abscesses were similar for both treatments. These results suggested Rumensin-Tylan could be replaced by MSE, especially in situations such as organic beef production, without the use of antibiotics. A second trial was initiated to test the same comparison with large-framed yearling steers and a similar diet differing only

in the replacement of 35% of the corn dry matter with ground, ensiled high-moisture corn.

### Procedure

Charolais crossbred yearling steers were purchased in the spring for allotment to 12 pens of nine head each for six pens on each of two treatments: (1) Rumensin fed at 29 grams and Tylan at 10 grams per ton of diet dry matter, and (2) the enzyme-microbial feed product MSE fed at 2 lbs per ton of diet dry matter. Three step-up diets were used to reach the final diet, which on a dry matter basis included 53.6% dry rolled corn, 28.9% high-moisture corn, 10.0% corn silage and 7.5% protein-mineral-vitamin supplement including NPN and natural protein to provide 58% crude protein. Calculated nutrient contents of the diet dry matter were 12.5% crude protein, .65 Mcal NE<sub>g</sub> per lb, .77% calcium and .34% phosphorus.

The MSE was premixed at the rate of 2 lbs of MSE with 8 lbs of finely ground corn so that ten pounds of premix were added to the mixer truck after all other ingredients had been added. During the first 72 hours on feed, MSE was fed at 6 lbs of diet dry matter (three times higher than the long-term feeding rate). Rumensin was fed at 25 grams per ton of diet dry matter during the first three days, at 28 grams during the next step-up and at 29 grams thereafter. A pelleted protein supplement with and without Rumensin-Tylan was used in the study.

The large-framed, yearling Charolais crossbred steers, weighing about 812 pounds when started on trial on February 22, 1996, were purchased from two sources and were not implanted. The steers were fed once a day at levels allowing them to clean up most of the feed before the next feeding. The steers were slaughtered after 139 days on feed and carcasses were evaluated for dressing percentage, fat thickness, marbling, quality grade, rib eye area and yield grade.

One steer died during the test, apparently unrelated to treatment, and one bull was removed. Carcass measurements could not be taken on a few carcasses per treatment at the packing

**Table 1. Rumensin-Tylan vs MSE<sup>a</sup> for large-framed finishing steers, 1996 trial.**

	Rumensin-Tylan	MSE
No. of pens	6	6
No. of steers	51	51
Initial weight, lb	810	814
Daily gain, 84d, lb	4.04	4.19
Final weight, lb <sup>b</sup>	1284	1305
Daily gain, 139d, lb <sup>b</sup>	3.41	3.54
Feed DM intake, lb	21.82	21.91
Feed/gain	6.41	6.19
Hot carcass weight, lb	796	809
Dressing percent	63.6	64.0
Fat thickness, in	.31	.29
Rib eye area, sq in	14.3 <sup>c</sup>	14.6 <sup>d</sup>
Rib eye area, sq in per cwt of carcass	1.8	1.8
Marbling score <sup>e</sup>	5.1	5.0
Quality grade <sup>f</sup>	18.2	18.0
Percent Choice	51.0	45.3
Yield grade	2.1	1.9
Liver abscesses, %	13.2	11.3

<sup>a</sup>MSE = Multiple Stabilized Enzymes, an enzyme-microbial feed product of Natur's Way, Inc., Horton, KS.

<sup>b</sup>Final weight and daily gain were calculated by dividing hot carcass weight by a common dressing % (62).

<sup>c,d</sup>Means differ ( $P < .06$ ).

<sup>e</sup>Marbling scores: Small begins at 5.0, Modest at 6.0.

<sup>f</sup>Quality grade scores: Choice- begins at 18.0.

plant, but hot carcass weights were available on 51 carcasses per treatment and measurements for fat thickness and rib eye area were available for 48 carcasses per treatment. Final weights and daily gains were calculated for 51 steers per treatment by dividing hot carcass weights by a common dressing percent (62). Daily gains and carcass measurements for individual steers were analyzed by the general linear model in SAS. Feed intake and feed conversion means were analyzed by SAS with pen as the experimental unit.

### Results

Average daily gains for Rumensin-Tylan and MSE treatments were 4.04 and 4.19 lb at 84 days, and 3.41 and 3.54 lb ( $P = .42$ ) at 139 days on feed, respectively (Table 1). Means for dry matter intake were similar for both treatments. At 84 days, a power outage during hot weather caused the cattle to be without water, which reduced feed intake. However, both treatment groups came back on full feed in a few days. Final feed to gain ratios were 6.41 and 6.19 for Rumensin-Tylan and MSE, respectively, a difference not statistically significant ( $P = .24$ ).

Means for carcass measurements were similar between treatments. Numerical differences in hot carcass weight, dressing percent, marbling score and yield grade, were not statistically significant. Rib eye area was larger ( $P < .06$ ) with MSE, but rib eye area per cwt of carcass was the same. Percentages of liver abscesses were 13.2 and 11.3% for Rumensin-Tylan and MSE, respectively, which were neither excessive nor unusual for a high-grain diet in which the only roughage component was in the corn silage fed at 10% of diet dry matter.

Since the 1995 and 1996 trials were similar in design, and there were no interactions between years, results were pooled (Table 2) for statistical analysis. Pooled means for 12 pens on each treatment resulted in improvements for MSE ( $P \leq .1$ ) in final weight (adjusted to a common 62% carcass dress), hot carcass weight, daily gain and feed conversion. Dressing percent was higher for MSE ( $P < .05$ ). Feeding MSE at the rate of 2 lb of product per ton of diet dry matter increased daily gain by an average of 6.9% over the feeding of Rumensin-Tylan at 29 g and 10 g per ton, respectively. Feed-to-gain ratio was

(Continued on next page)

**Table 2. Rumensin-Tylan vs MSE<sup>a</sup> for finishing yearling steers, 1995 and 1996 trials pooled.**

	Rumensin-Tylan	MSE
No. of pens	12	12
No. of steers	96	94
Initial weight, lb	835	838
Final weight, lb <sup>b</sup>	1267	1298
Daily gain, 130 d, lb <sup>b</sup>	3.32 <sup>c</sup>	3.55 <sup>d</sup>
Feed DM intake, lb	22.36	22.62
Feed/gain ratio	6.77 <sup>c</sup>	6.39 <sup>d</sup>
Hot carcass weight, lb	785 <sup>c</sup>	805 <sup>d</sup>
Dressing percent	63.1 <sup>e</sup>	63.7 <sup>f</sup>
Fat thickness, in	.42	.41
Rib eye area, sq in	13.6 <sup>e</sup>	13.9 <sup>f</sup>
Rib eye area, sq in per cwt of carcass	1.7	1.7
Marbling score <sup>g</sup>	5.3	5.2
Quality grade <sup>h</sup>	18.5	18.3
Percent Choice	63.6	58.3
Yield grade	2.5	2.4

<sup>a</sup>MSE = Multiple Stabilized Enzymes, an enzyme-microbial feed product of Natur's Way, Inc., Horton, KS.

<sup>b</sup>Final weight and daily gain were calculated by dividing hot carcass weight by a common dressing % (62).

<sup>cd</sup>Means differ ( $P \leq .1$ ).

<sup>ef</sup>Means differ ( $P < .05$ ).

<sup>g</sup>Marbling scores: Small begins at 5.0, Modest at 6.0.

<sup>h</sup>Quality grade scores: Choice- begins at 18.0.

improved by an average of 5.6% when MSE was fed. Carcass measurements were similar except for increases in hot carcass weight ( $P < .1$ ) and dressing percent ( $P < .05$ ) with MSE. Although the mechanism for any response to MSE remains to be defined, improved feed utilization is suggested during ruminal digestion. The costs of the two feed additive treatments were similar, so the feeding of MSE appears to be competitive with the feeding of Rumensin-Tylan to finishing yearling steers. These results may also be useful for producers of organic beef where the routine feeding of antibiotics is avoided.

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