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## Energy Levels for Growing and Finishing Steers<sup>1</sup>

Mike Dikeman, Keith Bolsen, and Jack Riley

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### Summary

Four combinations of low (LE), moderate (ME) and high (HE) energy rations were fed to growing and finishing steers. The four treatments were: LE-ME; LE-HE; ME-ME and ME-HE. All steers were more efficient during the growing phase (473 to 750 lbs.) than the finishing phase (750 to 1050 lbs.). During the growing phase, performance of steers fed the ME ration exceeded that of steers fed the LE ration. During the finishing phase, performance of steers fed the HE ration exceeded that of steers fed the ME ration. Steers on the LE-HE treatment required more energy per lb. of gain than steers on any of the other three treatments. Carcass merit was similar for carcasses from the different treatments. The fact that these cattle were slaughtered at similar weights, and that steers on lower energy rations were fed longer, affected carcass traits more than ration energy did.

### Introduction

Recent fluctuations in grain prices have renewed interest in feeding more roughage and less grain to feedlot cattle. Our objectives in this study were to measure feedlot performance and carcass merit of steers fed different energy combinations during the growing and finishing phases.

### Experiment Procedures

One hundred ninety-two Angus x Limousin crossbred steers averaging 473 lbs. were allotted to eight pens of 24 steers each. Two pens were assigned to each of the four experimental treatments (table 25.1). Each pen was changed from growing phase to finishing phase when steers averaged about 750 lbs.; all steers were slaughtered at about the same average weight (1050 lbs.).

Individual weights were taken at the beginning and end of the growing phase and end of the finishing phase after steers were without feed or water 15 hrs. Final live weights at the end of the finishing phase were adjusted to a constant dressing percentage.

Steers were transported to Wilson and Company approximately 18 hrs. before slaughter. After carcasses chilled a minimum of 24 hrs., U.S.D.A.

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yield grade and quality grade data were obtained. Additionally, the left wholesale rib from 20 carcasses in each treatment was transported to KSU for further carcass composition (protein, fat, and water) evaluations.

### Results

Feedlot performances of the steers during the growing and finishing phases are shown separately in table 25.2. During the growing phase, steers fed the ME ration gained 23% faster and 6% more efficiently than steers fed the LE ration. In the finishing phase, the HE ration supported 14% faster and 9% more efficient gains than the ME ration. All steers made their most efficient gains during the growing phase. One ton of dry matter from the ME ration produced 246 lbs. of gain in the growing phase; 193 lbs. in the finishing phase.

Feedlot performances for the four treatments are shown in table 25.3; total feed requirements per steer, in table 25.4. Steers on the LE-HE treatment required more energy per lb. of gain than steers on any of the other three treatments. The price of feeds will not be the same for all cattle feeders at any one time. However, using current feed prices in Manhattan (early January, 1976), the ME-ME treatment gave the lowest feed cost per lb. of gain; the LE-HE treatment, the highest.

Carcass data in table 25.5 suggest that the steers on each treatment were similar in carcass composition traits. Fat thickness only ranged from .49 inch to .56 inch, and yield grades only ranged from 2.6 to 3.2. Marbling scores and quality grades were also similar for carcasses on the different treatments. Because time on feed influences marbling, and because cattle were slaughtered at similar weights, steers on the lower energy rations graded as well as those on the higher energy rations.

Table 25.1 Experimental Treatments Tested with Growing and Finishing Steers

| Treatment designation | Energy level of the ration <sup>1</sup> |                 |
|-----------------------|---|-----------------|
|                       | Growing phase                           | Finishing phase |
| 1. LE-ME              | low                                     | moderate        |
| 2. LE-HE              | low                                     | high            |
| 3. ME-ME              | moderate                                | moderate        |
| 4. ME-HE              | moderate                                | high            |

<sup>1</sup>All rations contained rolled milo, forage sorghum silage, soybean meal and supplement.

Table 25.2 Feedlot Performances of Steers During The Growing and Finishing Phases.

| Item                                     | Rations       |       |                 |       |
|--|---------------|-------|-----------------|-------|
|  | Growing phase |       | Finishing phase |       |
|  | LE            | ME    | ME              | HE    |
| No. of days                              | 153           | 125   | 148             | 133   |
| No. of steers                            | 94            | 95    | 95              | 94    |
| Initial wt., lbs.                        | 473           | 473   | 747             | 756   |
| Final wt., lbs.                          | 750           | 753   | 1045            | 1062  |
| Avg. total gain, lbs.                    | 277           | 280   | 298             | 306   |
| Avg. daily gain, lbs.                    | 1.81          | 2.24  | 2.01            | 2.30  |
| <u>Avg. daily feed, lbs.<sup>1</sup></u> |               |       |                 |       |
| Silage                                   | 10.18         | 6.29  | 8.88            | 2.99  |
| Milo                                     | 2.23          | 8.94  | 10.00           | 16.86 |
| Soybean meal                             | 2.19          | 1.95  | .87             | .86   |
| Supplement                               | .93           | 1.00  | 1.08            | 1.06  |
| Total                                    | 15.53         | 18.18 | 20.83           | 21.77 |
| Feed/lb. of gain, lb.                    | 8.58          | 8.12  | 10.36           | 9.46  |

<sup>1</sup>100% dry matter basis.

Table 25.3 Feedlot Performances of Steers for Each Experimental Treatment

| Item                                     | Experimental treatment |       |       |       |
|--|------------------------|-------|-------|-------|
|  | LE-ME                  | LE-HE | ME-ME | ME-HE |
| No. of days                              | 306                    | 288   | 269   | 255   |
| No. of steers                            | 47                     | 47    | 48    | 47    |
| Initial wt., lbs.                        | 471                    | 474   | 471   | 475   |
| Final wt., lbs.                          | 1060                   | 1061  | 1031  | 1057  |
| Avg. total gain, lbs.                    | 589                    | 587   | 560   | 582   |
| Avg. daily gain, lbs.                    | 1.92                   | 2.05  | 2.08  | 2.28  |
| <u>Avg. daily feed, lbs.<sup>1</sup></u> |                        |       |       |       |
| Silage                                   | 10.16                  | 6.85  | 8.15  | 4.53  |
| Milo                                     | 5.47                   | 9.86  | 8.12  | 12.28 |
| Soybean meal                             | 1.58                   | 1.52  | 1.44  | 1.42  |
| Supplement                               | 1.00                   | 1.03  | 1.00  | 1.00  |
| Total                                    | 18.21                  | 19.26 | 18.72 | 19.23 |
| Feed/lb. of gain, lbs. <sup>1</sup>      | 9.48                   | 9.40  | 9.00  | 8.43  |

<sup>1</sup>100% dry matter basis.

Table 25.4 Total Feed Required for each Experimental Treatment.

| Item   | Experimental treatment |       |       |       |
|--|------------------------|-------|-------|-------|
|  | LE-ME                  | LE-HE | ME-ME | ME-HE |
| Total gain/steer, lbs.                         | 589                    | 587   | 560   | 582   |
| Total feed/steer, lbs. (as fed moisture basis) |                        |       |       |       |
| Silage <sup>1</sup>                            | 7772                   | 4932  | 5480  | 2888  |
| Milo <sup>2</sup>                              | 1969                   | 3340  | 2570  | 3684  |
| Soybean meal <sup>3</sup>                      | 537                    | 486   | 349   | 402   |
| Supplement <sup>3</sup>                        | 340                    | 330   | 299   | 283   |

<sup>1</sup>40% dry matter  
<sup>2</sup>85% dry matter  
<sup>3</sup>90% dry matter

Table 25.5 Carcass Yield Grade and Quality Grade Data for Each Experimental Treatment

| Item                        | Experimental treatment |       |       |       |
|-----------------------------|------------------------|-------|-------|-------|
|                             | LE-ME                  | LE-HE | ME-ME | ME-HE |
| Hot carcass wt., lb.        | 662                    | 667   | 644   | 658   |
| 12th rib fat th., in.       | .53                    | .50   | .49   | .56   |
| Kidney knob, %              | 3.7                    | 3.1   | 3.3   | 3.7   |
| Rib eye area, sq. in.       | 12.45                  | 12.84 | 13.17 | 12.23 |
| Yield grade                 | 3.1                    | 2.8   | 2.6   | 3.2   |
| Marbling score <sup>a</sup> | 12.8                   | 11.2  | 12.0  | 12.4  |
| Quality grade <sup>b</sup>  | 7.3                    | 6.7   | 6.9   | 7.2   |

<sup>a</sup>11=small<sup>0</sup>, 12= small+, 13 = modest-, etc.  
<sup>b</sup>6 = Good+, 7 = Choice-, 8 = Choice<sup>0</sup>, etc.