High protein sorghum grain with no added protein in all concentrate cattle finishing rations; Urea and soybean oil meal in all concentrate rations

E.F. Smith
D. Richardson
C.L. Drake

See next page for additional authors

Follow this and additional works at: https://newprairiepress.org/kaesrr

Part of the Other Animal Sciences Commons

Recommended Citation
Smith, E.F.; Richardson, D.; Drake, C.L.; and Brent, B.E. (1968) "High protein sorghum grain with no added protein in all concentrate cattle finishing rations; Urea and soybean oil meal in all concentrate rations," Kansas Agricultural Experiment Station Research Reports: Vol. 0: Iss. 1. https://doi.org/10.4148/2378-5977.2868

This report is brought to you for free and open access by New Prairie Press. It has been accepted for inclusion in Kansas Agricultural Experiment Station Research Reports by an authorized administrator of New Prairie Press. Copyright 1968 Kansas State University Agricultural Experiment Station and Cooperative Extension Service. Contents of this publication may be freely reproduced for educational purposes. All other rights reserved. Brand names appearing in this publication are for product identification purposes only. No endorsement is intended, nor is criticism implied of similar products not mentioned. K-State Research and Extension is an equal opportunity provider and employer.
High protein sorghum grain with no added protein in all concentrate cattle finishing rations; Urea and soybean oil meal in all concentrate rations

Abstract
Trials at several research centers as well as in Kansas (Bulletin 483, page 32) have shown roughage may be satisfactorily omitted from finishing rations for cattle and doing so, often reduces feed required per pound of gain. That has made it feasible to try to finish cattle on all grain diet, when the grain has sufficient protein, and to omit other protein sources as well as roughage. Other research on this subject is reported in Kansas Bulletins 493 and 507 and on page in this bulletin.

Keywords
Cattlemen's Day, 1968; Report of progress (Kansas State University. Agricultural Experiment Station); 518; Beef; Protein; Sorghum grain; Finishing rations; Urea; Soybean oil

Creative Commons License
This work is licensed under a Creative Commons Attribution 4.0 License.

Authors
E.F. Smith, D. Richardson, C.L. Drake, and B.E. Brent
High Protein Sorghum Grain With No Added Protein in all Concentrate Cattle Finishing Rations; Urea and Soybean Oil Meal in all Concentrate Rations, (Project 253-6), 1967.

E. F. Smith, D. Richardson, C. L. Drake and B. E. Brent

Trials at several research centers as well as in Kansas (Bulletin 483, page 32) have shown roughage may be satisfactorily omitted from finishing rations for cattle and doing so, often reduces feed required per pound of gain. That has made it feasible to try to finish cattle on all grain diets, when the grain has sufficient protein, and to omit other protein sources as well as roughage. Other research on this subject is reported in Kansas Bulletins 493 and 507 and on page in this bulletin.

To further evaluate sorghum grain as the only source these rations were compared: sorghum grain with no added protein, sorghum grain and 1 percent urea; and sorghum grain and soybean oil meal. Sufficient soybean oil meal was added to equal the protein equivalent supplied by 1 percent urea.

The rations were made as nutritionally adequate as possible by using calcium, trace minerals, stilbestrol, antibiotic and vitamin A in a 50 lb. premix which was added to all rations, as shown in table 8. The premix was added at the mixer as were urea or soybean oil meal. Feed was delivered from the mixer to a self-feeder about once weekly.
Hereford steer calves in this study weighed about 400 lbs. each when received from New Mexico in November, 1966. They were fed alfalfa hay and sorghum silage from November until December 16. On December 16 the alfalfa hay was discontinued (silage continued to be fed in a separate bunk) and the steers were started on a self-feeder containing 40% dehydrated alfalfa crumbles and 60% ground sorghum grain. The proportion of grain in the mixture was gradually increased until by Jan. 3 the steers were receiving only ground sorghum grain in the self-feeder with sorghum silage which was fed in a separate bunk. The silage was gradually reduced until January 9 when the steers were on an all grain diet and this test began.

The sorghum grain came from several fields and varied from 10.4 to 11.2% protein on an air dry basis. Only that from higher protein fields was used.

Results

Differences among the treatments (table 9) were small. Steers receiving urea required least feed per lb. of gain (5.9 to 1); those receiving soybean oil meal required slightly above 6 lbs. and the two lots getting no added protein averaged 6.5 to 1. Feed cost per 100 lbs. of gain was also lowest for steers receiving urea.

Two steers, one with urinary calculi and one that foundered, were removed from the test. No other health problems were observed.
The carcasses graded high good and low choice, however, 16 of the 58 were shipped by the packer before complete carcass data were obtained.

This test indicates that sorghum grain as the only protein source does as surprisingly good job in an all concentrate ration. The addition of urea or soybean oil meal improved feed efficiency slightly. If analysis indicates or if there is any reason to believe grain may be borderline in protein value urea makes a low cost addition for insurance.
### Table 8
Composition of Rations¹, 1967

<table>
<thead>
<tr>
<th>Ingredients per ton</th>
<th>Sorghum grain</th>
<th>Sorghum grain and 1% urea</th>
<th>Sorghum grain and soybean oil meal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground sorghum grain</td>
<td>1950</td>
<td>1930</td>
<td>1815</td>
</tr>
<tr>
<td>Premix</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Urea</td>
<td>0</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>Soybean oil meal</td>
<td>0</td>
<td>0</td>
<td>135</td>
</tr>
<tr>
<td><strong>Total, lb.</strong></td>
<td><strong>2000</strong></td>
<td><strong>2000</strong></td>
<td><strong>2000</strong></td>
</tr>
</tbody>
</table>

**Ingredients in 50 lbs. of premix**

- Ground limestone: 20.0
- Trace mineral premix: 1.0
- Stilbestrol premix (1 gram stilbestrol per lb.): 1.0
- Vitamin A premix (10,000 IU per gram): 0.3 (140 grams)
- Chlortetracycline premix (10 grams per lb.): 0.8 (380 grams)
- Fine ground sorghum grain (enough to make the premix up to 50 lbs.): 26.9
- **Total, lbs.**: 50.0

¹ Salt, free choice

² Percentages of indicated elements in trace mineral premix: manganese, 4.4; iron, 6.6; copper, 1.32; cobalt, 0.23; iodine, 0.30; zinc, 5; magnesium, 20; sulfur, 2.70.
Table 9

<table>
<thead>
<tr>
<th></th>
<th>Sorghum grain, ground</th>
<th>Sorghum grain, ground and 1% urea</th>
<th>Sorghum grain, ground, and soybean oil meal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lot number</td>
<td>18</td>
<td>20</td>
<td>22</td>
</tr>
<tr>
<td>Number of steers per lot</td>
<td>10</td>
<td>10</td>
<td>9*</td>
</tr>
<tr>
<td>Av. initial wt. lbs.</td>
<td>494</td>
<td>498</td>
<td>500</td>
</tr>
<tr>
<td>Av. final wt. lbs.</td>
<td>939</td>
<td>960</td>
<td>991</td>
</tr>
<tr>
<td>Av. daily gain lbs.</td>
<td>2.59</td>
<td>2.69</td>
<td>2.87</td>
</tr>
<tr>
<td>Av. daily feed intake, lbs.</td>
<td>16.7</td>
<td>17.6</td>
<td>17.0</td>
</tr>
<tr>
<td>Feed required per lb. of gain, lbs.</td>
<td>6.5</td>
<td>6.5</td>
<td>5.9</td>
</tr>
<tr>
<td>Feed cost per cwt. of gain, $</td>
<td>11.96</td>
<td>12.11</td>
<td>11.20</td>
</tr>
<tr>
<td>Percent protein in concentrate mixture (88% dry matter basis)</td>
<td>10.06</td>
<td>10.07</td>
<td>12.11</td>
</tr>
<tr>
<td>Cost of concentrate mixture per ton $</td>
<td>37.09</td>
<td>37.09</td>
<td>37.83</td>
</tr>
</tbody>
</table>

* Foundered steer removed April 20.

** Steer with urinary calculi removed April 28.

1 Feed costs used are on inside back cover.