Distiller’s grains in cow/calf and stocker programs

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Introduction
The expansion of the national ethanol industry has increased the availability of feed byproducts in our region. Wet distiller’s grains and condensed distiller’s solubles (or “syrup”) are available from new production facilities in southwest Kansas and the panhandle of Texas. Although dried distiller’s grains have been imported into the region for several years, growth of the ethanol industry in the midwest and our region has increased the supply. The primary use of the distiller’s byproducts has been in confined feeding operations; however opportunities may arise for cow/calf and stocker producers to utilize these byproducts in their production systems.

Supplemental nutrients
Compared to the range of protein and energy concentrations in other commodities and manufactured feeds used to supplement cattle, distiller’s grains are upper end of the ranges (Table 1). The combination of protein, energy, and also phosphorus, make distiller’s grains an attractive consideration as a supplement for grazing cattle. Sulfur content may present a challenge in some environments.

Supplemental protein is often a primary concern for cattle grazing dormant perennial forages and crop residues. Distiller’s grains typically contain 29-32% crude protein (CP) on a dry matter basis (Table 1). Only the oilseed meals and manufactured range supplements composed primarily of oilseed meals have higher CP concentrations. The protein in distiller’s grains contains a smaller proportion of ruminally degradable protein than conventional oilseed meals. Some have questioned whether this might limit the value of distiller’s grains as supplements to low protein forages. However, directly replacing conventional protein sources with distiller’s grains has not proven detrimental to performance and adding ruminally degradable protein to distiller’s grains supplements has not necessarily proven beneficial (Doering-Resch, 2005; Harborth et al., 2006; Smith et al., 2001; Stalker et al., 2004).

Supplemental energy may be an additional concern when forage is limiting or performance objectives are higher than what can be achieved from forage alone. The energy value of distiller’s grains is similar to or greater than the grain from which the distiller’s grains were derived. The fermentation process removes the starch from the grain and concentrates the bran (a readily digestible fiber source) and oil (fat) in the by-product. The NEm values in table 1 were calculated by Dairy One and are based on the constituents of the distiller’s grains and the estimated digestibility of the constituents. Based on growth performance studies, Erickson et al. (2005) concluded that the energy value of dried distiller’s grains in high forage diets is 120-127% that of dry rolled corn.

Cow/calf and heifer programs
Distiller’s grains can replace conventional protein and energy supplements in cow/calf and heifer development programs based rangeland, crop residues, silages and hays (Smith et al., 2001; Doering-Resch et al., 2005; Engel et al., 2005; Stalker et al., 2006; Martin et al., 2007).
these studies, distiller’s grains were compared with other supplemental nutrient sources such as alfalfa hay, corn gluten feed, soybean hulls, and oilseed meals.

**Stocker programs**

Distiller’s grains supplementation has improved weight gain by growing cattle grazing forages of varied nutritional value or consuming high roughage diets (Loy et al., 2003; Morris et al., 2005; Gustad et al., 2006; Morris et al., 2006; Epp et al., 2007; MacDonald et al., 2007; Buttrey et al., 2008; Corrigan et al., 2007; Greenquist et al., 2008; Jenkins et al., 2008; Klopfenstein et al., 2007; Nuttelman et al., 2008). Forages grazed or fed in these studies ranged in quality from wheat pasture to cornstalks. Supplementation rates varied from around 0.25% body weight/day to over 1.0% body weight/day. Efficiencies of supplementation (lbs gain added/lb supplement) ranged around 2.3 to nearly 10.0 depending on forage nutritional value and daily supplementation rate. Efficiencies were better on lower quality forages and at lower rates of supplementation.

At higher levels of supplementation, distiller’s grains will substitute for forage intake (Morris et al., 2005; Corrigan et al., 2008). In these studies, substitution rates were between -0.35 and -0.60 lb forage DM/lb distiller’s grains. This effect can be used to an advantage if forage availability is limited or will become limited during the grazing period.

**Conclusion**

Distiller’s grains can be used in supplementation programs for cows, heifers, and stockers. It would appear that the distiller’s grains can replace conventional supplemental feeds based on relative nutritional values. Two challenges for producers will be handling the commodity that is a loose meal or a small soft pellet, and, in some instances, accounting for total sulfur intake to insure that performance and health are not compromised.

**Table 1.** Concentrations of nutrients and energy in distiller’s products reported by Dairy One Laboratory, Ithaca, NY.

<table>
<thead>
<tr>
<th>Feed</th>
<th>CP(^{a})</th>
<th>NDF(^{a})</th>
<th>Starch</th>
<th>Fat(^{a})</th>
<th>NE(_{m})^{a}</th>
<th>P(^{a})</th>
<th>S(^{a})</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dry Matter basis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dried distiller’s grains</td>
<td>Mean</td>
<td>30.7</td>
<td>33.5</td>
<td>5.6</td>
<td>13.1</td>
<td>99.2</td>
<td>0.90</td>
</tr>
<tr>
<td></td>
<td>sd(^{b})</td>
<td>4.0</td>
<td>4.5</td>
<td>4.8</td>
<td>3.0</td>
<td>7.8</td>
<td>0.15</td>
</tr>
<tr>
<td>Wet distiller’s grains</td>
<td>Mean</td>
<td>29.8</td>
<td>29.9</td>
<td>5.9</td>
<td>12.6</td>
<td>101.3</td>
<td>0.85</td>
</tr>
<tr>
<td></td>
<td>sd(^{b})</td>
<td>10.8</td>
<td>9.6</td>
<td>10.4</td>
<td>4.4</td>
<td>9.1</td>
<td>0.17</td>
</tr>
<tr>
<td>Condensed distiller’s solubles</td>
<td>Mean</td>
<td>20.3</td>
<td>4.0</td>
<td>5.8</td>
<td>18.4</td>
<td>129.9</td>
<td>1.6</td>
</tr>
<tr>
<td></td>
<td>sd(^{b})</td>
<td>5.6</td>
<td>3.9</td>
<td>4.9</td>
<td>3.9</td>
<td>11.4</td>
<td>0.47</td>
</tr>
<tr>
<td>Corn</td>
<td>Mean</td>
<td>9.4</td>
<td>9.9</td>
<td>70.3</td>
<td>4.3</td>
<td>100.4</td>
<td>0.32</td>
</tr>
<tr>
<td></td>
<td>sd(^{b})</td>
<td>1.6</td>
<td>3.1</td>
<td>5.2</td>
<td>1.2</td>
<td>3.2</td>
<td>0.09</td>
</tr>
</tbody>
</table>


\(^{a}\)CP=Crude protein %, NDF=Neutral detergent fiber %, Fat=Crude fat %, Net Energy maintenance mcal/cwt, P=Phosphorus %, S=Sulfur %

\(^{b}\)sd=standard deviation
Literature Sources


Smith, C. D., J. C. Whittier, D. N. Schutz, and D. Couch. 2001. Comparison of alfalfa hay and distillers dried grains with solubles, alone or in combination with cull beans, as protein sources for beef cows grazing native winter range. Professional Animal Scientist 17:139-144.

