Using DDGS in Mixed Lamb Diets

Jeff Held
South Dakota State University

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Dried Distiller Grain with Solubles (DDGS) is a palatable feed ingredient for growing/finishing lamb diets, serving as the supplemental protein source. This co-product from the ethanol production industry has a crude protein content of approximately 30% and its physical form is a meal.

With the growth of the ethanol industry in the Midwest there is greater local access to DDGS. This has prompted more sheep producers to explore the use of this feed ingredient to lower production costs in lamb finishing enterprises. Sheep research feeding trials have been conducted at SDSU to provide information requested by producers.

SDSU lamb finishing trial with DDGS

Research at the SDSU Sheep Unit demonstrated that DDGS mixed with cracked corn or pelleted soyhulls provide palatable lamb finishing diets when offered in self-feeders. Lamb finishing phase average daily gain was 0.75 lb per day and dry matter intake approximately 4% of animal body weight.

The residual feed remaining in the feeder trough was removed on a weekly basis. Fewer pounds of residual feed were removed for the lambs offered the pelleted soyahull/DDGS diet compared to the cracked corn/DDGS diet, averaging 0.25 lb and 0.42 lb per lamb per day, respectively.

Dry matter intake was 3.8 vs. 4.5% of lamb body weight for the cracked corn/DDGS compared to the soyahull/DDGS diet. Lamb diet consumption was similar to expectations for a standard industry formulation of grain plus commercial pelleted protein supplement. Previous research has also demonstrated higher levels of intake with pelleted soyhulls based diets.

Lamb growth performance was not different by diet type and fit industry expectations for the genotype used in this finishing trial.

Mixed vs. industry standard diet formulation considerations

Compared to the standard industry lamb diet formulation of grain plus commercial pelleted protein supplement, expect greater residual feed with mixed diets when offered in self-feeders. Residual feed is mostly small particle-sized diet components contributed from all ingredients in the formulation.

Lamb feed consumption preference increasingly shifts from smaller to larger particle size with age; by 8 weeks of age small particles have the lowest preference. Sheep select feed with their cleft lips; thus, they possess an ability to sort diets by preference with great skill!

Lamb diets are formulated with an assumption that an animal will uniformly consume the ingredients offered to provide a balanced diet of energy, protein, minerals, and vitamins plus ingredients to promote growth or maintain health status. Yet with any diet offered to lambs in a self-feeder a small residual feed component will result. With a grain plus commercial pelleted protein supplement we would expect the residual to be mostly smaller particles from grain sources. However, with mixed diets the residual feed will contain other small particle-sized ingredients contributed from the protein source, minerals, vitamins, and coccidiostat. Therefore, with mixed diets the composition of the residual feed is less certain, meaning you are also less sure about the nutrient balance in the consumed feed.

Urinary calculi and coccidiosis prevention are high priority concerns when formulating lamb diets. The risk
for these lamb diseases and other nutritional disorders increases in mixed diets due to less predictable consumption patterns and ingredient sorting. Given these circumstances, using mixed diets incorporating DDGS requires a higher level of management.

**Lamb finishing mixed diets using DDGS**

In Table 1 are two simple choices for a mixed finishing lamb diet using DDGS. These diets contain grain (corn or pelleted soyhulls) as the energy feed, DDGS for the protein source, white salt and ammonium chloride to aid in the prevention of urinary calculi, and limestone for added calcium to maintain the calcium to phosphorus ratio of 2:1 or greater. Liquid molasses is added to help keep ingredients mixed uniformly. Decoquinate (Deccox) serves as the coccidiostat.

The crude protein level for these diets is formulated at 13.5% as-fed basis (15.1% dry matter basis). The diets are formulated for lambs from 80 lb to finish. Lambs are self-fed and have limited access to good quality forage.

Also it is assumed that lambs have been accustomed to a high grain self-fed feeding system. Grass-reared lambs entering a finishing phase diet must be started on low grain-based diets and gradually moved to higher grain-based diets over 3 to 5 weeks. The pelleted soyhull based diet in Table 1 requires less transition from grass to feedlot.

If on-farm equipment is used to mix these diet ingredients it is recommended to first incorporate the low quantity ingredients (white salt, limestone, and ammonium chloride) into a small quantity of DDGS (50 lb) before adding to the mixer to aid proper ingredient distribution in the diet. A sheep trace mineral salt mixture can be offered free-choice or added directly to the diet formulation (see notes in table 1) to provide essential trace minerals and vitamins. Commercial trace mineral and vitamin premixes are also available for direct incorporation into the diet.

To maintain the proper calcium to phosphorus ratio of 2:1 or greater, the limestone inclusion is 2%, twice the level of limestone traditionally added to mixed diets for supplemental calcium.

**Table 1. Simple lamb growing/finishing mixed diet**

Assume an 80 lb lamb is consuming 4.5% of its body weight (as-fed basis). Lambs are self-fed the diet and have limited access to high-quality alfalfa hay. Also assume lambs have been accustomed to a high grain ad lib feeding system. (Lambs off grass must be started on low grain-based diets and gradually moved to high grain diets over 2-4 weeks.)

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Diet 1 (pounds)</th>
<th>Diet 2 (pounds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Whole shelled corn**</td>
<td>1478</td>
<td></td>
</tr>
<tr>
<td>2. Pelleted soyhulls</td>
<td></td>
<td>1528</td>
</tr>
<tr>
<td>3. DDGS***</td>
<td>400</td>
<td>350</td>
</tr>
<tr>
<td>4. White Salt</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>5. Limestone</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>6. Liquid Molasses</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>7. Decoquinate (6.6%)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>8. Ammonium Chloride</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

2000  2000

* Must offer a *sheep trace mineral salt* free-choice to provide essential minerals and vitamins. An option is to add into mixed diet at 0.5% or 10 lb per ton.

** Substitute with pelleted soyhulls or ground alfalfa if desired up to 25%! Improves the Ca to P ratio to 2.2:1 or higher. Soyhulls and alfalfa are excellent sources of calcium. Soyhulls and alfalfa add fiber to the diet, which helps protect against acidosis. Depending on the CP level of the alfalfa the protein source, DDGS, could be decreased.

*** Substitute SBM (48%) for DDGS at 60% of the DDGS level. Add back the pounds as grain (corn, soyhulls).

**Implications**

DDGS can be an economical and palatable protein source ingredient for finishing lamb diets. Using DDGS in lamb finishing diets will require a higher level of management skills and more labor, especially when mixing diets on-farm. There are also inherent risks associated with mixed diets offered in self-feeders due to diet sorting and animal consumption patterns. Residual feed wastage is a cost that must be included in the analysis of cost of gain in the lamb feeding enterprise.