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U.S. Department of Transportation

SunGrant INITIATIVE South Central Region

Project Title: ***Evaluation of the Nutritional and Feeding Value of Ethanol By-Products for Animal Production***

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Project Outcomes:

Substituting distillers dried grains for cottonseed meal in small ruminant finishing diets:

- As distiller's dried grains (DDG) increased in the diet, average daily gain (ADG) and gain to feed efficiency (G:F) decreased quadratically, but no difference in daily dry matter intake (DMI) was observed.
- Serum urea nitrogen (SUN) increased as DDG increasingly replaced cottonseed meal (CSM), which was attributed to an increase in degradable protein intake.
- Serum non-esterified fatty acids (NEFA) decreased linearly and serum IGF-1 decreased quadratically as DDG increasingly replaced CSM in the diets.
- Ruminal disappearance of fiber in the diet was not affected.
- Wool characteristics were not affected.
- DDG can replace all the CSM in small ruminant finishing diets without negatively affecting growth, efficiency of gain, or wool characteristics, and can potentially reduce cost of feed·kg^{-1} gain. As DDG increased in the diet, extracted fat from the longissimus muscle linearly increased.
- Meat from lambs fed diets with all CSM replaced by DDG, had less cook-loss and greater initial and sustained juiciness than meat from lambs fed 0DDG diet. Results indicated that partially or totally substituting DDG for CSM in lamb-finishing diets is acceptable and may enhance sensory traits.

Substituting distillers dried grains for cottonseed meal and milo in lamb finishing diets:

- As DDG increased in the diet (replaced 0% (0DDG), 25% (25DDG), 50% (50DDG), or 75% (75 DDG) of the milo and cottonseed meal (CSM), average daily gain quadratically increased and at times, DMI linear increased.
- Feed efficiency (gain:feed) linearly decreased as DDG increased in the diet, which may have been attributed to greater occurrence of urinary calculi in lambs fed diets containing DDG.
- Serum urea nitrogen and phosphorus linearly increased but IGF-1 was similar among lambs as DDG increased in the diet.
- Fecal P and N linearly increased but IGF-1 was similar among lambs as DDG increased in the diet.
- Increasing DDG in the diet quadratically increased average fiber diameter and average fiber curvature, but all other wool characteristics were similar among lambs.

Sun Grant funding on this project has led to additional feeding trials (funded by other sources) that used DDGS as the concentrate/protein source, and led to collaborations with industry such as POET nutrition.

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Funded: $116,103
Start Date: 07/01/2007
End Date: 06/30/2010