Effects of Rumensin® and Tylan® in Finishing Diets with Wet Distillers Grains Plus Solubles

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Summary

A total of 3,632 crossbred steers at three different sites (Nebraska, Colorado, and Oklahoma) were utilized in a randomized complete block design (RCBD) study. Data were combined for the Colorado and Oklahoma trials. Steers were fed one of five treatments: 1) Traditional corn diet with Rumensin and Tylan (CORN+RT); 2) Wet distillers grains plus solubles (WDGS); 3) WDGS with Rumensin (WDGS+R); 4) WDGS with Rumensin and Tylan (WDGS+RT); and 5) WDGS with expanded dose range of Rumensin and Tylan (WDGS+HIRT) to evaluate the effects of Rumensin and Tylan in feedlot diets containing WDGS. In WDGS diets, feed-to-gain ratio (F:G) was improved when Rumensin and Tylan were included (P < 0.05). With the exception of dressing percentage, there were no differences in performance or carcass characteristics when Rumensin was fed at 33.3 g/ton compared to 44.4 g/ton. Treatments containing Tylan resulted in significantly fewer liver abscesses than other treatments. Cattle fed Rumensin and Tylan diets containing WDGS had improved F:G and decreased liver abscesses compared to those receiving diets with no additives, regardless of corn processing method.

Introduction

Replacing dry-rolled or high-moisture corn grain with wet corn distillers grains with solubles improves cattle F:G and average daily gain (ADG; 2008 Nebraska Beef Report, pp. 39-40). The effects of Rumensin and Tylan in corn by-product diets have not been studied, and it is possible that reduced starch and increased dietary fiber concentration may alter the effectiveness of Rumensin and/or Tylan in finishing cattle diets.

An interaction between grain processing method (i.e., steam-flaking vs. dry-rolled or high-moisture) and cattle response to wet distillers grains exists (2007 Nebraska Beef Report, pp. 33-35.). Regional differences affect preferences in grain processing, with steam flaking (SFC) being a predominant method in the Southern and High Plains, and high moisture ensiling (HMC) and dry rolling (DRC) prevalent in the Midwest. One objective of this study was to evaluate the effects of Rumensin and Tylan in diets containing WDGS on cattle performance, carcass characteristics and liver abscesses. The second objective was to compare the response on a regional basis where corn processing method is the major difference.

Procedure

Three separate trials were conducted at research facilities in Nebraska (University of Nebraska ARDC research feedlot), Colorado (Horton Research) and Oklahoma (Bos-Technica Research). A total of 3,632 steers were utilized in a randomized complete block design. Steers were purchased ranch direct or from regional auction markets and received from October 3, 2006, to March 27, 2007. Cattle were processed at each site according to the site’s standard procedures, with all cattle receiving anabolic and progestational vaccines and parasites. All steers were implanted with Revalor-S® (Intervet, Millsboro, Del.) or Synovex® Choice (Fort Dodge Animal Health) at study initiation. Trials were initiated from January 23, 2007, to April 3, 2007.

At the Nebraska site, five days prior to study initiation, steers were limited fed a diet that consisted of 50% alfalfa and 50% wet corn gluten feed (DM basis) at 2% of BW to minimize variation in gastrointestinal fill. On days 0 and 1, steers were individually weighed and the average weight was used to determine starting BW. Based on day 0 weight, steers were blocked by BW into one of four blocks, stratified by weight within block and assigned to pens, and pens were assigned randomly to treatments. A total of 800 British and British x Continental steers were utilized with 20 steers per pen and eight pens per treatment.

At the Oklahoma site, cattle were pen-weighed for initial and final weights. At the Colorado site, cattle were individually weighed for initial and final weights, following procedures similar to those used at the Nebraska site. At the Colorado and Oklahoma sites, a total of 1,432 Continental steers were utilized, respectively, with 70 to 72 steers per pen and four pens per treatment.

Five dietary treatments at three different sites (Table 1) were utilized in the study. All sites received common Rumensin and Tylan treatments. Diets at Nebraska used a 50:50 combination of high-moisture (HMC) and dry-rolled corn (DRC); at the Colorado and Oklahoma sites, steam-flaked corn (SFC) was utilized as a common grain source. Treatment 1 (CORN+RT) contained corn grain and Rumensin (Elanco Animal Health, Greenfield, Ind.), formulated at 33.3 g monensin/ton DM basis, and Tylan (Elanco Animal Health, Greenfield, Ind.) formulated to provide 90 mg tylosin/steer daily. Treatments 2, 3, 4 and 5 contained 25% WDGS, replacing corn. Treatment 2 (WDGS) contained no active dietary additives; treatment 3 (WDGS+R) contained Rumensin formulated at 33.3 g monensin/ton DM basis; treatment 4 (WDGS+RT) contained Rumensin formulated at 33.3 g monensin/ton DM basis and Tylan formulated to provide 90 mg tylosin/steer daily; and
Within a row means without a common superscript letter differ (P < 0.05).

Table 1. Composition of dietary treatments and analyzed nutrient composition (DM basis).  

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>0%</th>
<th>25%</th>
<th>0%1</th>
<th>25%2</th>
<th>0%1</th>
<th>25%2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>WDGS (Neb.)</td>
<td>WDGS (Neb.)</td>
<td>WDGS (Col.)</td>
<td>WDGS (Col.)</td>
<td>WDGS (Okla.)</td>
<td>WDGS (Okla.)</td>
</tr>
<tr>
<td>Steam-flaked corn</td>
<td>—</td>
<td>—</td>
<td>73.8</td>
<td>56.0</td>
<td>85.0</td>
<td>62.6</td>
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<tr>
<td>High-moisture corn</td>
<td>39.75</td>
<td>29.75</td>
<td>—</td>
<td>—</td>
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<td>—</td>
</tr>
<tr>
<td>Dry-rolled corn</td>
<td>39.75</td>
<td>29.75</td>
<td>—</td>
<td>—</td>
<td>—</td>
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<tr>
<td>WDGS3</td>
<td>—</td>
<td>25.0</td>
<td>—</td>
<td>25.0</td>
<td>—</td>
<td>25.0</td>
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<tr>
<td>Corn silage</td>
<td>7.0</td>
<td>7.0</td>
<td>8.0</td>
<td>8.0</td>
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<tr>
<td>Soybean meal, 47.5%</td>
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<td>—</td>
<td>5.0</td>
<td>5.0</td>
<td>—</td>
<td>—</td>
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<tr>
<td>Alfalfa hay</td>
<td>3.5</td>
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<td>4.0</td>
<td>4.0</td>
<td>5.0</td>
<td>5.0</td>
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<td>Molasses</td>
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</tr>
<tr>
<td>Choice white grease</td>
<td>—</td>
<td>—</td>
<td>4.0</td>
<td>1.8</td>
<td>—</td>
<td>—</td>
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<tr>
<td>Tallow</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
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</tr>
<tr>
<td>Supplement, meal4</td>
<td>5.0</td>
<td>5.0</td>
<td>—</td>
<td>—</td>
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<td>—</td>
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<tr>
<td>Supplement, pellet</td>
<td>—</td>
<td>—</td>
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</tr>
<tr>
<td>Supplement, liquid</td>
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<td>—</td>
<td>5.2</td>
<td>5.2</td>
<td>—</td>
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</tr>
</tbody>
</table>

Analyzed Nutrient Composition

- Crude protein, %
- Fat, %
- Calcium, %
- Phosphorus, %
- Sulfur, %

1Monensin was included at 33.3 g/ton and 90 mg of tylosin phosphate per animal via a flush system with water as a carrier.
2Monensin was included at 0, 33.3 or 44.4 g/ton and 0 or 90 mg of tylosin phosphate per animal via a flush system with water as a carrier.
3Procured from commercial ethanol plants (Neb. = Abegona Bioenergy, York, Neb; Col. = Pacific Ag Products LLC, Windsor, Col.; Okla. = East Kansas Agri Energy, Garnett, Kan.).
4Supplement formulated to provide 0, 33.3 or 44.4 g/ton monensin and 0 or 90 mg of tylosin phosphate per animal. Ground corn was the carrier for the supplement.

Table 2. Site 1 (Nebraska) performance, carcass and liver characteristics of steers fed different diets and amounts of Rumensin and Tylan.

<table>
<thead>
<tr>
<th>Treatments1</th>
<th>CORN +RT</th>
<th>WDGS</th>
<th>WDGS +R</th>
<th>WDGS +RT</th>
<th>WDGS +HIRT</th>
<th>SEM</th>
<th>P-value</th>
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</thead>
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<tr>
<td>Pens, n</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>0.72</td>
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<tr>
<td>Steers, n2</td>
<td>160</td>
<td>160</td>
<td>160</td>
<td>160</td>
<td>160</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average DOF</td>
<td>153</td>
<td>153</td>
<td>153</td>
<td>153</td>
<td>153</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Performance

- Initial BW, lb
- Final BW, lb3
-DMI, lb 3
-ADG, lb 3
-F:G4

Carcass Characteristics

- HCW, lb
- 12th rib FT, in
-KPH fat, %
-Marbling score5
-Calculated YG6

Liver Abscesses

- Total, %
- A+, %

1CORN = corn control; WDGS = wet distillers grains plus solubles; R = monensin at 33.3 g/ton; HIRT = monensin at 44.4 g/ton, T = tylosin phosphate formulated for 90 mg/d.
2Number of steers at trial initiation.
3Calculated from carcass weight adjusted to a 63% common dressing percentage.
4Calculated as total gain divided by total DMI and analyzed as G:F. The reciprocal is presented (F:G).
5Where 400 = Slight 0, 500 = Small 0.
6Calculated as YG = 2.50 + (2.5*FT, in) – (0.32*LM, in2) + (0.2*KPH, %) + (0.0038*HCW, lb).
7Within a row means without a common superscript letter differ (P < 0.05).

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increased G:F by 3.1% and feeding of DRC and HMC. Feeding Rumensin feeding value of a 50:50 combination fed at 25% (DM basis) had 128% the 2). Wet distillers grains plus solubles similar dry matter intake (DMI; Table Page 88 — containing Tylan, CORN+RT (17.0%),pared to steers receiving treatments (42.4%) and WDGS+R (40.8%), compared to steers receiving treatments containing Tylan, CORN+RT (17.0%), WDGS+RT (8.3%), and WDGS+HIRT (8.9%). Fewer severe liver abscesses also were seen in steers whose diets contained Tylan (P < 0.05).

Results for Combined Colorado and Oklahoma Trials

Compared to steers fed CORN+RT, steers fed WDGS+RT were less efficient and had increased DMI (Table 3). Wet distillers grains plus solubles fed at 25% (DM basis) had 87% the feeding value of SFC. Feed efficiency was measured as G:F, which is more statistically valid than F:G. Feeding Rumensin increased G:F numerically by 1.7%, and feeding Rumensin plus Tylan increased G:F by 4.1% compared to WDGS without feed additives (P < 0.05). Carcass characteristics, with the exception of HCW, were unaffected by treatment. Hot carcass weight was greatest in steers fed CORN+RT, WDGS+RT and WDGS+HIRT, compared to WDGS and WDGS+R (P < 0.05). Total liver abscesses were significantly greater in steers fed WDGS (45.9%) and WDGS+R (44.3%), compared to treatments containing Tylan, CORN+RT (15.7%), WDGS+R (17.9%) and WDGS+HIRT (20.3%). Additionally, cattle fed Tylan had fewer severe liver abscesses in both the Colorado and Oklahoma studies (P < 0.01).

In summary, this study indicates that cattle fed Rumensin and Tylan in diets containing 25% WDGS show improved feed efficiency and decreased liver abscesses compared to those whose diets contain no additives, regardless of corn processing method.

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