2011

Feeding Strategies of Optaflexx on Growth Performance and Carcass Characteristics of Feedlot Steers

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Dib, Marco G.; Griffin, William A.; Benton, Joshua R. Benton; Erickson, Galen; Klopfenstein, Terry; Sindt, Justin J.; and Choat, W. Travis, "Feeding Strategies of Optaflexx on Growth Performance and Carcass Characteristics of Feedlot Steers" (2011). Nebraska Beef Cattle Reports. 606.  
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Summary
Live BW and carcass traits of steer calves were evaluated after feeding Optaflexx (200mg/day) for 35 days on an intermittent basis or continuously. The negative control consisted of 63 days on the same diet without Optaflexx, whereas the positive control consisted of Optaflexx supplemented daily during the last 35 days prior to harvest. The four-day intermittent treatment consisted of feeding Optaflexx for seven days, followed by four days of no Optaflexx, while the seven-day intermittent treatment consisted of seven days on Optaflexx, followed by seven days off. In both the four-day and seven-day intermittent treatments, cattle received Optaflexx for a total of 35 days. Regardless of the delivery pattern, feeding Optaflexx increased ADG, DMI, and live BW. Feeding 200 mg per steer daily of Optaflexx for a total of 35 days in either four-day or seven-day intermittent patterns was as effective but no more so as continuous feeding for a 35-day period.

Introduction
Ractopamine hydrochloride (Optaflexx; Elanco Animal Health, Indianapolis, Ind.) increases live weight gain and gain efficiency. Optaflexx is approved for continuous feeding to feedlot cattle during the last 28 to 42 days prior to harvest at a dose ranging from 70 to 430 mg per steer daily or 9.1 to 27.3 g/ton of DM. Continuous feeding of Optaflexx for 42, 35, and 28 days prior to harvest at doses up to 200 mg per steer increased live BW by 16.4, 18.1, and 18.8 lb, respectively, compared with a control diet, and improved ADG by 0.53 lb/day in feedlot steers. In addition, LM area also was larger for treated animals, with no effect on fat depth. Additionally, about 87% of the live weight response has been observed in the first 28 days compared to 42 days when Optaflexx was fed at 200 mg/steer daily (2006 Nebraska Beef Cattle Report, pp. 72-74, 2007 Nebraska Beef Cattle Report, pp. 65 - 67). Studies in pigs indicate that intermittent use of Optaflexx increases ADG, F:G, and BW. Our objective was to evaluate the effects of intermittent use of Optaflexx on growth and carcass characteristics of feedlot steers.

Procedure
Crossbred steer calves (BW = 1057 ± 26 lb) were assigned to two blocks based on reimplant BW. The heavy block consisted of 1 replication of 40 steers, and the light block consisted of 7 replications of 280 steers. Steers were assigned randomly to a pen within block and pens assigned randomly to 1 of the 4 treatments (8 pens/treatment; 10 steers/pen). The treatments consisted of no delivery of Optaflexx (NONE), continuously feeding of Optaflexx throughout the last 35 days prior to harvest (CONTIN), intermittent seven day feeding Optaflexx followed by four days of withdrawal (4-dINT) and intermittent seven days feeding Optaflexx followed by seven days of withdrawal (7-dINT). The three treatments with Optaflexx resulted in a total of 35 days of feeding Optaflexx but on different days. Steers were managed during the pre-trial phase (102 days) in the actual experiment pens after being assigned within a block (4 pens for the heavy block and 28 pens for the light block). Three animals were removed from three different pens prior to Optaflexx feeding due to death or health reasons. Before the start of the trial, each steer was weighed on two consecutive days after feed restriction (decrease of 2 lb/day of DM during three days). Pens of animals were weighed weekly, with a 4% shrink factor applied to the BW, throughout the 63 days of the Optaflexx treatment period and prior to harvest.

Steers were implanted with Component TE-IS initially and re-implanted with Component TE-S 98 days prior to harvest. Steers were fed once per day at approximately 0830 hour, and the Optaflexx supplement was top dressed in a supplement at a rate of 0.5 lb per steer to ensure that steers received the amount of 200 mg of Optaflexx per day. The carrier used was fine ground corn. Steers received 0.5 lb of fine ground corn when not on Optaflexx or for the negative control treatment. Diets were formulated to meet or exceed NRC (1996) requirements for metabolizable protein, Ca, P, and K. High-moisture corn was fed at 50% of diet DM, wet corn gluten feed (Sweet Bran®, Cargill, Blair, Neb.) at 40% of DM and ground wheat straw at 5% of DM (Table 1). Diets were prepared by loading the HMC, WCGF, ground wheat straw, and then by adding dry supplement in the mixer/delivery box (Roto-Mix® model 420, Roto-Mix, Dodge City, Kan.). Rumensin and Tylos were fed to all steers, with consumptions of 348 and 90 mg/head/daily, respectively. Feeds and feeding procedures remained the same throughout

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>% of DM</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-moisture Corn</td>
<td>50.0</td>
</tr>
<tr>
<td>Wet Corn Gluten Feed</td>
<td>40.0</td>
</tr>
<tr>
<td>Ground Wheat Straw</td>
<td>5.0</td>
</tr>
<tr>
<td>Dry Supplement</td>
<td>5.0</td>
</tr>
</tbody>
</table>

Table 1. Diet composition and analyzed nutrient analysis for diets fed.

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and KPH were subjectively assigned measured. Bone score, lean score, chill, LM area and fat thickness were period. At harvest, HCW were collected, the same day after 165 days on feed, and content, CP, Ca, P, K, and ether extract. were processed and analyzed for DM 63 days of Optaflexx treatment pe-

were not different when compared to the others. Efficiency analyses show that steers on Optaflexx treatments had numerically lower F:G than the NONE, and approximately 19 lb heavier than the CONTIN and 4-dINT treatments. Live ADG was also affected positively by the Optaflexx treatments compared to NONE, providing an increase of approximately 0.29 lb/day.

On a carcass basis, treatments were not different when compared to NONE, except for the calculated yield grade trait that decreased for the 4-dINT treatment when compared to all other treatments due to differences in KPH scores. Positive trends for carcass adjusted final BW, HCW, and LM area were observed mainly for the 7-dINT treatment compared to the others. Efficiency analyses present that steers on Optaflexx treatments had numerically lower F:G than NONE (values numerically lower and P values less than 0.20).

Results from this experiment indicate that 200 mg/steer daily of Optaflexx fed intermittently increases DMI, ADG, and Live BW. Tendencies for a larger LM area on the positive control and better F:G on all Optaflexx treatments were also observed.

In conclusion, withdrawing Optaflexx for seven or four days then re-feeding, when compared to continuous, had no effect on live ADG or F:G.

Table 2. Growth performance of steers fed Optaflexx in continuous vs. intermittent patterns.

<table>
<thead>
<tr>
<th>Treatments</th>
<th>NONE1</th>
<th>CONTIN2</th>
<th>4-dINT3</th>
<th>7-dINT4</th>
<th>SEM</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Live Performance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial BW, lb</td>
<td>1077</td>
<td>1076</td>
<td>1074</td>
<td>1090</td>
<td>8.7</td>
<td>0.28</td>
</tr>
<tr>
<td>Live Final BW, lb</td>
<td>1352a</td>
<td>1366b</td>
<td>1365b</td>
<td>1385c</td>
<td>10.7</td>
<td>0.04</td>
</tr>
<tr>
<td>DMI, lb/day</td>
<td>22.3a</td>
<td>22.0a</td>
<td>22.3a</td>
<td>22.9b</td>
<td>0.31</td>
<td>0.05</td>
</tr>
<tr>
<td>ADG, lb</td>
<td>4.36a</td>
<td>4.61b</td>
<td>4.61b</td>
<td>4.68b</td>
<td>0.09 &lt;0.01</td>
<td></td>
</tr>
<tr>
<td>F:G</td>
<td>5.33</td>
<td>5.14</td>
<td>5.21</td>
<td>5.22</td>
<td>0.09</td>
<td></td>
</tr>
</tbody>
</table>

Carcass Adjusted Performance

<table>
<thead>
<tr>
<th>Treatments</th>
<th>NONE1</th>
<th>CONTIN2</th>
<th>4-dINT3</th>
<th>7-dINT4</th>
<th>SEM</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>FBW, lb</td>
<td>1347</td>
<td>1356</td>
<td>1351</td>
<td>1371</td>
<td>11.5</td>
<td>0.19</td>
</tr>
<tr>
<td>ADG, lb</td>
<td>4.36</td>
<td>4.45</td>
<td>4.40</td>
<td>4.47</td>
<td>0.12</td>
<td>0.40</td>
</tr>
<tr>
<td>F:G</td>
<td>5.32</td>
<td>5.12</td>
<td>5.24</td>
<td>5.23</td>
<td>0.52</td>
<td></td>
</tr>
</tbody>
</table>

1NONE: treatment did not receive Optaflexx.
2CONTIN: treatment received Optaflexx for 35 days continuously.
34-dINT: treatment received intermittent seven day feeding Optaflexx followed by four days of withdrawal.
47-dINT: treatment received intermittent seven day feeding Optaflexx followed by seven days of withdrawal.
5Analyzed as G:F, reported as F:G.

Table 3. Carcass characteristics of steers fed Optaflexx in continuous vs. intermittent patterns.

<table>
<thead>
<tr>
<th>Treatments</th>
<th>NONE</th>
<th>CONTIN2</th>
<th>4-dINT3</th>
<th>7-dINT4</th>
<th>SEM</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCW, lb</td>
<td>848</td>
<td>854</td>
<td>851</td>
<td>864</td>
<td>7.3</td>
<td>0.18</td>
</tr>
<tr>
<td>Dressing, %a</td>
<td>62.8</td>
<td>62.5</td>
<td>62.4</td>
<td>62.4</td>
<td>0.02</td>
<td>0.25</td>
</tr>
<tr>
<td>12th rib fat, in</td>
<td>0.5</td>
<td>0.48</td>
<td>0.49</td>
<td>0.52</td>
<td>0.03</td>
<td>0.51</td>
</tr>
<tr>
<td>Marbling scoreb</td>
<td>507</td>
<td>485</td>
<td>506</td>
<td>505</td>
<td>14</td>
<td>0.37</td>
</tr>
<tr>
<td>LM area, in²</td>
<td>14.6</td>
<td>15.1</td>
<td>14.5</td>
<td>14.6</td>
<td>0.2</td>
<td>0.09</td>
</tr>
<tr>
<td>USDA yield gradec</td>
<td>2.76a</td>
<td>2.76a</td>
<td>2.45b</td>
<td>2.78a</td>
<td>0.1 &lt;0.01</td>
<td></td>
</tr>
</tbody>
</table>

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47-dINT: treatment received intermittent seven day feeding Optaflexx followed by seven days of withdrawal.
5Dressing percentage = carcass weight / average live weight (4% shrink).
6USDA marbling score where 450 = slight50, 500 = small0, and 550 = small50
7USDA calculated yield grade = 2.50 + (2.5*FT, in) – (0.32*LM area, in²) + (0.2*KPH, %) + (0.0038*HCW, lb).

By a University of Nebraska–Lincoln research technician, and marbling score was assigned by a USDA grader. Yield grade was calculated using the equation (YG= 2.50 + (2.5*FT, in) – (0.32*LM area, in²) + (0.2*KPH, %) + (0.0038*HCW, lb)).

Yield grade was calculated using the equation (YG= 2.50 + (2.5*FT, in) – (0.32*LM area, in²) + (0.2*KPH, %) + (0.0038*HCW, lb)).

Growth performance was evaluated on a 4% shrunken weight basis, across and within the Optaflexx treatment period. Data from the randomized complete block design were analyzed using a mixed model analysis (Proc Mixed, SAS), with treatment and block included in the model as fixed variables. Pen was the experimental unit. Data were analyzed using a protected F-test and means separated using a bonfereon t-test when variables that decreased for the 4-dINT treatment when compared to all other treatments due to differences in KPH scores. Positive trends for carcass adjusted final BW, HCW, and LM area were observed mainly for the 7-dINT treatment when compared to the others. Efficiency analyses present that steers on Optaflexx treatments had numerically lower F:G than NONE (values numerically lower and P values less than 0.20).

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