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Effects of Optaflexx Fed in Combination with MGA on Feedlot Heifer Performance

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William A. Griffin, Galen E. Erickson, Bill D. Dicke, Terry J. Klopfenstein, Robert J. Cooper, D.J. Jordon, Jim S. Drouillard, William M. Moseley, Gary E. Sides

Summary

A commercial feedlot experiment was conducted using 1,807 heifers to evaluate the effects of Optaflexx fed in combination with MGA on finishing heifer performance. In heifers receiving MGA throughout the entire 126-143 day feeding period, feeding Optaflexx for the last 31-38 days increased ADG and hot carcass weight compared to heifers fed MGA but not Optaflexx. Heifers fed MGA and Optaflexx had increased DMI, improved feed efficiency and increased final live weight. Carcass quality measurements were not influenced by treatment.

Introduction

Optaflexx, the trade name for rac-
topamine hydrochloride, is a beta-1
adrenergic agonist that increases
weight gain the last 28 to 42 days of
the finishing period. Melengestrol
acetate (MGA) is an orally active
progestogen that inhibits estrus and
ovulation and is a product commonly
fed to finishing heifers. MGA has
also been shown to increase weight
and improve feed efficiency
in heifers. Data on the response to
feeding Optaflexx to finishing heif-
ers are limited. Previous heifer trials
that were conducted did not include
heifers fed MGA in combination with
Optaflexx; therefore, the objective of
this study was to determine the effect of
feeding Optaflexx in combination with
MGA on finishing heifer performance.

Procedure

The experiment was conducted
between August 2004 and March 2005
using 1,807 heifers (714 lb ± 45.5) in
a randomized block design. Follow-
ing arrival, heifers were individually
weighed, processed, and blocked by
date received and site of procurement.
During initial processing, heifers
were vaccinated for viral diseases
(Bovishield Gold® 4, Pfizer, Animal
Health, New York City, N.Y.), treated
for internal and external parasites
(Dectomax Injectable® 4, Pfizer, New
York City, N.Y.), and implanted with
Ralgro® (Shering-Plough Animal
Health, Union, N.J.). Heifers were
determined to be bred, open, or
freemartins by rectal palpation. Free-
martins and heifers over 100 days
pregnant were removed from the trial.
Heifers less than 100 days pregnant
were given Lutalyse® (Pfizer, New
York City, NY). Open heifers were
not given Lutalyse, therefore, some
undiagnosed early pregnancies at
initial processing may have allowed
some pregnant heifers to complete the
trial. Heifers from the separate loca-
tions were assigned randomly to one
of two treatments, and then assigned
of 20 home pens (10 replica-
tions/treatment). Treatments were:
1) heifers fed MGA (Pfizer Animal
Health, New York City, N.Y.) for
the entire finishing period, and 2) heif-
ers fed MGA for the entire finishing
period and Optaflexx® (Elanco Ani-
mal Health, Greenfield, Ind.) the last
31 to 38 days. MGA was not included
in step up diets. The finishing diet
was formulated to provide 0.4 mg
of MGA/head, 330 mg of Rumensin®
(Elanco)/head, and 90 mg of Tylan®
(Elanco)/head/daily. During the last
31 to 38 days of finishing, Optaflexx
was included in the diet to target
200 mg/hd/daily for cattle receiving
Optaflexx treatment.

Heifers were reimplanted with
Synovex Plus® (Fort Dodge Animal
Health) an average of 80 day pre-
slaughter (range 73 to 87 days), with
animals implanted on the same day
within arrival block. The final diet
contained 38% dry-rolled corn, 29.5%
steam-flaked corn, 18% distillers
grains, 6% alfalfa hay, 2% sorghum
hay, 1.5% fat, and 5% supplement
in the control diet (DM basis). The
Optaflexx supplement was delivered
in a pelleted form, fed at 4% of the diet
DM and replaced dry-rolled corn.
Optaflexx supplement consisted of
fine ground corn and wheat midds.
The diet was formulated to contain
14.9% CP, 0.72% Ca, 0.37% P, and
6.9% fat (DM basis). Heifers were fed
an average of 133 days (range 126 to
143 days).

Pen weights were taken for each
pen at initial processing, reimplant,
start of Optaflexx feeding, and prior
to shipment on the day of slaughter.
Pen weights, excluding initial weight,
were shrunk 4%. Initial weights were
not shrunk because animals were
processed immediately upon arrival
or following an overnight receiving
period. Pen weights were used for per-
formance calculations on a live-basis.
Additionally carcass weights were
used and adjusted to a common dress-
ing percentage of 63.5% to calculate a
carcass adjusted live weight. Carcass
adjusted live weight was used to deter-
mine daily gain and feed conversion
on a carcass adjusted basis.

Both pens within a block (replica-
tion) were harvested under similar
conditions on the same day, at the
same plant. Hot carcass weights and
liver abscesses were recorded on the
day of harvest. Carcass fat thickness,
marbling score, kidney, pelvic and
heart fat (KPH), longissimus muscle
area and USDA yield grade were
recorded following a 24- to 36-hour
chill.

(Continued on next page)
An economic analysis was conducted to determine the return for using Optaflexx with heifers fed MGA using two scenarios for cattle prices, 2-year and 10-year cattle prices. Finishing diet cost of $120.16/ton was calculated using 10-year average prices for ingredients (agecon.unl.edu/mark/agprices/index.htm). Intake and days on feed along with diet costs were used to determine total feed costs. In diets containing Optaflexx, a cost of $0.26/day was added to ration cost to account for the cost of Optaflexx delivered in the bunk. Other costs included $0.35/head/day yardage, $30.00 processing, health, shipping, etc., and 7% interest on animal and feed. Initial animal cost was determined using a 10-year average feeder heifer price of $77.65/cwt and two-year average price of $95.32/cwt (www.feuzmarketanalysis.com). Live sale price was calculated using a 10-year average fed heifer price of $70.24/cwt, and a two-year average of $84.65/cwt (www.feuzmarketanalysis.9com). Along with selling cattle on a live basis, a marketing grid profitability analysis was performed. Based on three different carcass grid-pricing scenarios, profit or loss for each treatment on each grid was calculated. The analysis used three different grids consisting of a quality-rewarding grid, yield-rewarding grid, and a commodity grid, as proposed by Feuz (2002 Nebraska Beef Report, pp.39-41). The dressed price used for the 10-year average was $111.91/cwt and $134.03/cwt (www.feuzmarketanalysis.com) for the two-year average. Premiums and discounts for each grid used are from Feuz (2002 Nebraska Beef Report, pp.39-41). Profitability was calculated from a 10-year and a two-year average dress base price with individual grid premiums and discounts applied. Grid profit or loss was calculated from a carcass break-even calculated as with live break-even, with hot carcass weight instead of final BW as a multiplier.

Animal performance, carcass data and economics were analyzed using the Mixed procedure of SAS, with treatment as a fixed effect, and block as a random effect. Data are presented with deads and railers removed from the analysis. Fifteen animals (eight Optaflexx and MGA and seven MGA alone) were removed from the study at the feedlot. Four and three heifers were removed from the Optaflexx and MGA and MGA alone treatment, respectively, after inclusion of Optaflexx. Data were not collected from 72 rail-outs in the plant, 46 MGA only and 26 Optaflexx and MGA treated-heifers. Of the 1,720 heifers harvested, 852 were on the MGA alone and 868 were on the Optaflexx and MGA treatment, respectively. At slaughter, fetuses were observed in 82 heifers, 39 in the MGA alone group and 43 in the Optaflexx and MGA group. The pregnant heifers are included in the analysis. Feed intake was figured according to feedyard close-out information on each individual pen of cattle.

**Results**

**Performance**

Heifer live and carcass adjusted performance results are presented in Table 1. Final BW ($P = 0.53$) was not different, but final BW was increased by 15.5 lb or 1.2% in Optaflexx fed heifers. However, at the start of Optaflexx feeding, heifers receiving Optaflexx and MGA were numerically heavier (1158 vs. 1153 lb). Given this 5-lb advantage in initial weight, the gain increase was reduced to 11 lb (0.8%) for heifers fed Optaflexx and MGA compared to heifers fed MGA alone. DMI was increased by 0.38 lb/day ($P < 0.01$) for heifers fed Optaflexx and MGA compared to heifers fed MGA alone over the entire feeding period. Feed conversion was improved by 1.8% ($P = 0.03$) for heifers fed MGA and Optaflexx compared with MGA alone, even though ADG was not impacted ($P = 0.41$) when comparing treatments over the entire 133 day finishing period.

The diet containing Optaflexx was formulated to provide 200 mg/head/day. However, based on DMI (range 22.3 to 25.9 lb) changes across block, actual Optaflexx intake averaged 205.0 mg/head/day (range 185.1 to 222.4 mg/hd/d). Animals consumed an average of .169 mg/lb Optaflexx (range .157 to .174 mg/lb) when calculated on a per BW basis.

When comparing treatments during the last 35 days (time heifers

<table>
<thead>
<tr>
<th>Item</th>
<th>MGA Only</th>
<th>Optaflexx + MGA</th>
<th>Difference</th>
<th>SEM</th>
<th>$P$-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial BW, lb</td>
<td>743.2</td>
<td>741.1</td>
<td>-2.1</td>
<td>13.86</td>
<td>0.52</td>
</tr>
<tr>
<td>Reimplant BW, lb</td>
<td>989.1</td>
<td>986.0</td>
<td>-3.1</td>
<td>18.90</td>
<td>0.70</td>
</tr>
<tr>
<td>Start of Optaflexx BW, lb</td>
<td>1153.4</td>
<td>1158.4</td>
<td>5.0</td>
<td>16.48</td>
<td>0.73</td>
</tr>
<tr>
<td>Final BW, lb</td>
<td>1257.4</td>
<td>1273.9</td>
<td>15.5</td>
<td>17.14</td>
<td>0.53</td>
</tr>
<tr>
<td>Overall$^a$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DMI, lb</td>
<td>23.39</td>
<td>23.77</td>
<td>0.38</td>
<td>0.46</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>ADG, lb</td>
<td>3.87</td>
<td>4.00</td>
<td>0.13</td>
<td>0.16</td>
<td>0.41</td>
</tr>
<tr>
<td>F:G</td>
<td>6.07</td>
<td>5.96</td>
<td>-0.11</td>
<td>0.10</td>
<td>0.03</td>
</tr>
<tr>
<td>Last 35 days $^b$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DMI, lb</td>
<td>22.86</td>
<td>23.53</td>
<td>0.67</td>
<td>0.28</td>
<td>0.01</td>
</tr>
<tr>
<td>ADG, lb</td>
<td>2.97</td>
<td>3.27</td>
<td>0.30</td>
<td>0.17</td>
<td>0.09</td>
</tr>
<tr>
<td>F:G</td>
<td>7.88</td>
<td>7.35</td>
<td>-0.53</td>
<td>0.26</td>
<td>0.07</td>
</tr>
<tr>
<td>Carcass Adjusted Performance $^c$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final BW, lb</td>
<td>1263.1</td>
<td>1280.5</td>
<td>17.4</td>
<td>16.7</td>
<td>0.01</td>
</tr>
<tr>
<td>Overall$^a$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADG, lb</td>
<td>4.14</td>
<td>4.28</td>
<td>0.14</td>
<td>0.11</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>F:G</td>
<td>5.66</td>
<td>5.57</td>
<td>-0.09</td>
<td>0.08</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Last 35 days $^b$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADG, lb</td>
<td>3.11</td>
<td>3.43</td>
<td>0.32</td>
<td>0.15</td>
<td>0.01</td>
</tr>
<tr>
<td>F:G</td>
<td>7.57</td>
<td>6.97</td>
<td>-0.60</td>
<td>0.52</td>
<td>&lt; 0.01</td>
</tr>
</tbody>
</table>

$^a$Heifer performance over the entire feeding period.

$^b$Heifer performance during inclusion of Optaflexx in diet the last 35 days prior to slaughter.

$^c$Carcass adjusted performance is hot carcass weight / 0.635.
Table 2. Carcass characteristics.

<table>
<thead>
<tr>
<th>Item</th>
<th>MGA Only</th>
<th>Optaflexx + MGA</th>
<th>Difference</th>
<th>SEM</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hot carcass weight, lb</td>
<td>802</td>
<td>813</td>
<td>11.0</td>
<td>10.62</td>
<td>0.01</td>
</tr>
<tr>
<td>12th rib fat thickness, in</td>
<td>0.56</td>
<td>0.56</td>
<td>0.00</td>
<td>0.02</td>
<td>0.92</td>
</tr>
<tr>
<td>Yield Grade</td>
<td>2.73</td>
<td>2.77</td>
<td>0.04</td>
<td>0.11</td>
<td>0.47</td>
</tr>
<tr>
<td>Yield Grade 1, %</td>
<td>19.1</td>
<td>17.1</td>
<td>-2.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yield Grade 2, %</td>
<td>44.7</td>
<td>45.7</td>
<td>1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yield Grade 3, %</td>
<td>29.9</td>
<td>31.1</td>
<td>1.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yield Grade 4, %</td>
<td>5.5</td>
<td>5.5</td>
<td>0.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yield Grade 5, %</td>
<td>0.7</td>
<td>0.6</td>
<td>-0.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marbling a</td>
<td>552.9</td>
<td>552.2</td>
<td>0.70</td>
<td>8.57</td>
<td>0.89</td>
</tr>
<tr>
<td>Prime, %</td>
<td>1.2</td>
<td>1.2</td>
<td>0.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Choice a, %</td>
<td>4.9</td>
<td>6.5</td>
<td>1.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Choice b, %</td>
<td>20.0</td>
<td>17.4</td>
<td>-2.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Choice c, %</td>
<td>45.8</td>
<td>46.4</td>
<td>0.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select, %</td>
<td>27.1</td>
<td>27.5</td>
<td>0.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard, %</td>
<td>0.9</td>
<td>1.0</td>
<td>0.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Longissimus area, in²</td>
<td>14.41</td>
<td>14.39</td>
<td>-0.02</td>
<td>0.21</td>
<td>0.91</td>
</tr>
<tr>
<td>KPH, %</td>
<td>1.96</td>
<td>1.95</td>
<td>-0.01</td>
<td>0.13</td>
<td>0.29</td>
</tr>
<tr>
<td>Dressing percentage, %</td>
<td>63.82</td>
<td>63.85</td>
<td>0.03</td>
<td>0.22</td>
<td>0.87</td>
</tr>
<tr>
<td>Empty body fat, %b</td>
<td>29.68</td>
<td>29.81</td>
<td>0.13</td>
<td>0.39</td>
<td>0.53</td>
</tr>
</tbody>
</table>

aMarbling score = 400 = Slight, 500 = Small etc.
bEmpty body fat = 17.76207 + (4.68142*12th rib fat thickness in cm) + (0.01945*carcass weight in kg) + (0.81854*marbling/100) - (0.06754*Longissimus in sq. cm.).

Table 3. Heifer economics.

<table>
<thead>
<tr>
<th>Item</th>
<th>MGA Only</th>
<th>Optaflexx + MGA</th>
<th>Difference</th>
<th>SEM</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-year average pricing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total animal cost, $</td>
<td>898.69</td>
<td>909.13</td>
<td>10.44</td>
<td>8.78</td>
<td>0.01</td>
</tr>
<tr>
<td>Live heifer value, $</td>
<td>883.27</td>
<td>893.99</td>
<td>10.72</td>
<td>11.10</td>
<td>0.02</td>
</tr>
<tr>
<td>Commodity heifer value, $</td>
<td>875.80</td>
<td>885.03</td>
<td>9.23</td>
<td>11.55</td>
<td>0.04</td>
</tr>
<tr>
<td>Commodity profit or loss, $</td>
<td>-22.90</td>
<td>-24.10</td>
<td>-1.20</td>
<td>9.15</td>
<td>0.75</td>
</tr>
<tr>
<td>2-year average pricing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total animal cost, $</td>
<td>1038.61</td>
<td>1048.53</td>
<td>9.92</td>
<td>9.85</td>
<td>0.04</td>
</tr>
<tr>
<td>Live heifer value, $</td>
<td>1064.48</td>
<td>1077.40</td>
<td>12.92</td>
<td>13.38</td>
<td>0.02</td>
</tr>
<tr>
<td>Commodity heifer value, $</td>
<td>1053.34</td>
<td>1064.81</td>
<td>11.47</td>
<td>13.73</td>
<td>0.02</td>
</tr>
<tr>
<td>Commodity profit or loss, $</td>
<td>25.87</td>
<td>28.87</td>
<td>3.00</td>
<td>7.99</td>
<td>0.49</td>
</tr>
<tr>
<td>Commodity profit or loss, $</td>
<td>14.73</td>
<td>16.28</td>
<td>1.55</td>
<td>9.73</td>
<td>0.71</td>
</tr>
</tbody>
</table>

Carcasses of heifers in the Optaflexx and no Optaflexx treatments (Table 2) did not differ in USDA yield grade, marbling score, percentage of USDA choice and select based on Chi-Square analysis, 12th rib fat thickness, ribeye area, KPH, empty body fat, cutability, and dressing percentage. However Optaflexx-fed heifers had 11 lb heavier (1.4%) hot carcass weight ($P = 0.01$).

Optaflexx Economics

Total cost using a 10-year average (Table 3) was increased $10.44 for heifers fed Optaflexx and MGA ($P = 0.01$) due to cost of Optaflexx and increased DMI for heifers fed Optaflexx, although cost of gain was not different ($P = 0.19$). Only live and commodity grid pricing are shown in Table 3 due to similar price outputs between grids. Live pricing ($P = 0.02$) commodity ($P = 0.04$), yield rewarding ($P = 0.05$), and quality rewarding ($P = 0.03$) marketing grids showed an increase in total dollar value per animal based on the increased gain in the heifers fed Optaflexx in combination with MGA. There was no difference in profit, although when using a 10-year average price for live heifers, heifers receiving Optaflexx and MGA were numerically $0.28 (P = 0.93$) more profitable when compared to heifers receiving MGA alone.

Total cost ($P = 0.04$) using a two-year average price (Table 3) was $9.92 higher for heifers fed Optaflexx and MGA, when compared to heifers fed MGA alone. Live pricing ($P = 0.02$) commodity ($P = 0.02$), yield rewarding ($P = 0.03$), and quality rewarding ($P = 0.02$) marketing grids showed an increase in total dollar value per animal based on the increase gain response in the heifers fed Optaflexx. However due to the incurred cost from feeding Optaflexx heifers marketed on a live basis ($P = 0.49$) were not different, but profit was numerically increased by $3.00/head. When selling heifers on commodity ($P = 0.71$),

(Continued on next page)
yield ($P = 0.76$), or quality ($P = 0.71$) rewarding marketing grids, heifers fed Optaflexx and MGA were not statistically different despite numerically higher profit ($\$1.43 - $1.56$).

Regardless of average prices used for cattle, Optaflexx cost ($\$0.26/\text{head/day}$) remained the same when comparing 10- and two-year averages. However, the value per pound of beef increased when using the two-year averages, causing the cattle that received Optaflexx and MGA to be numerically more profitable than heifers fed MGA alone. In both scenarios (two-year and 10-year), no significant difference was observed in profitability between heifers fed Optaflexx and MGA, or MGA alone.

Results from this experiment indicate heifers fed Optaflexx (200 mg/\text{head/day}) during the last 35 days of the finishing period responded with 11 lb heavier carcass weights and 15.5 lb (live weight) to 17.5 lb (carcass adjusted) final weight. Optaflexx can be fed to heifers receiving MGA without compromising carcass quality and yield. Due to increased costs incurred by feeding Optaflexx and increased intake of heifers fed Optaflexx and MGA in this study, an economic advantage was not observed in this study. However, when using a two-year average price for cattle compared to 10-year, when weight was worth more, Optaflexx feeding in combination with MGA was numerically more profitable.

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