PAYOUT CHARACTERISTICS OF ANABOLIC AGENTS FROM SYNOVEX®, FINAPLIX®, AND REVALOR® IMPLANTS IN FINISHING YEARLING STEERS

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Summary

Forty, individually fed, yearling steers (750 lbs) were used to measure payout characteristics of different tre n bolone acetate-containing implants and to correlate those characteristics to growth response. Treatments were 1) control, 2) Synovex-S®, 3) Finaplix-S®, 4) Synovex® plus Finaplix, and 5) Revalor®. Steers were fed a 12% crude protein, corn-based, finishing diet for 112 days. Compared to Revalor, which had a fairly constant payout over time, the combination of Synovex plus Finaplix resulted in higher blood levels of estradiol and trenbolone acetate (TBA) up to 56 days, followed by a relatively rapid declin e to 112 days. Despite elevated levels of TBA at 112 days for all TBA-containing implants and elevated estradiol at 112 days from Revalor steers, implants d id not improve performance in the final 28 days before slaughter. Short (less than 120 days) feeding periods may favor implants that increase blood levels of anabolics for shorter (56-84 day) periods. Data for plasma urea nitrogen were interpreted to indicate that 12% cr u de protein was adequate for yearling steers gaining approximately 3.5 lbs per day.

(Key Words: Tre n bolone Acetate, Estradiol, Serum Hormones, Feedlot.)

Introduction

Anabolic implants are proven, safe, and effective management tools to enhance profitability for cattle feeders. In order to optimize performance and maximize return, implant program s should be custom designed for each pen of cattle, based on cattle type, projected days on feed, and market or contract specifications for finished cattle.

Research has shown that, in beef cattle, maximal response to trenbolone acetate (TBA) has generally been achieved when it was administered in combination with an estrogenic implant used once and administered as the terminal implant in the schedule. Recent K-State research indicated that calf-fed Holstein steer performance is enhanced with multiple TBA implants, although carcass quality grade may be reduced. This places added importance on knowing release rates from TBA-containing implants, in order to maximize performance and minimize negative effects on carcass quality. Estrogenic implants also may reduce carcass quality if administered too close to slaughter (less than 60-65 days remaining on feed). Two TBA-containing implants are commercially available. Finaplix-S contains 140 mg TBA in a lactose-carrie r, and Revalor S contains 120 mg TBA plus 24 mg estradiol in a cholesterol-based implant. Synovex-S contains 20 mg estradiol benzoate and 200 mg progesterone. We measured payout characteristics of these implants and corresponding performance of finishing yearling steers.

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Experimental Procedures

Forty, crossbred, yearling, beef steers (750 lbs) were penned individually and fed a rolled corn finishing diet (10% roughage, dry basis) that contained 12% crude protein. Steers had been previously implanted with Synovex-S and backgrounded on corn silage for 90 days. Previous implants were removed 14 days before this study began.

Eight steers were assigned to each of five implant treatments: 1) Control (no implant), 2) Synovex-S only (SYN), 3) Finaplix-S only (FIN), 4) Synovex plus Finaplix used together (SYN + FIN), and 5) Revalor (REV). Blood samples were obtained twice daily (30 minutes apart, before the morning feeding) on days 0, 14, 28, 42, 56, 84, and 112. Serum was analyzed for estradiol, trenbolone acetate, and growth hormone. Plasma was analyzed for urea nitrogen. The trial was conducted for 112 days (May 1 to August 21, 1992). Steers then were slaughtered, and carcass characteristics were measured.

Results and Discussion

As expected, serum trenbolone acetate (TBA) concentrations were essentially zero for control and SYN steers and lower ($P<.05$) than those for the other treatments at all sampling times (Figure 1). Serum concentrations of TBA were higher ($P<.10$) in steers implanted with Finaplix vs Revalor for the first 42-56 days of the study, then declined. At 84 days, TBA levels were similar for steers implanted with Finaplix or Revalor, but were higher ($P<.10$) at 112 days for Revalor steers. Thus, TBA in Revalor apparently pays out at a fairly constant rate (at least to 112 days), whereas payout from Finaplix is characterized by a more rapid release for the first 42-56 days, followed by a decline.

Changes in serum estradiol concentrations (Figure 2), although somewhat more variable, show similar trends. Estradiol in Revalor-implanted steers remained relatively constant throughout the 112 days. Conversely, estradiol was elevated for SYN+FIN steers for approximately 84 days, then dropped rapidly. Serum estradiol levels were higher for SYN+FIN vs SYN steers throughout the first 84 days of the study. Although the reason for this synergistic effect is not entirely clear, we know that significant amounts of TBA can be converted to estradiol in the body. Alternatively, TBA can displace estradiol from receptor sites, thus increasing circulating estradiol concentration.

In our study, implant type did not affect serum growth hormone or plasma urea concentrations. Generally, implantation with estradiol has been associated with increased blood concentrations of growth hormone, although most of that work has been done with younger animals. These data indicate that some factor other than increased growth hormone is responsible for growth promotion by anabolic implants. Time on feed had significant effects on growth hormone and plasma urea nitrogen (Figure 3). Growth hormone concentration decreased linearly ($P<.01$) with time on feed, as animals approached physiological maturity. Plasma urea nitrogen increased ($P<.01$) with time on feed. This might be interpreted to indicate that 12% crude protein progressively exceeded the protein requirement of the steers during the finishing period, because elevated plasma urea is associated with protein wastage. Further, the lack of an implant effect or implant × time interaction suggests that 12% crude protein (50% soybean meal N:50% urea N) met or exceeded the protein requirements for implanted steers in this study. Compared to nonimplanted control steers, feed efficiency was improved 16.8, 8.1, 28.7 and 16.8% for steers implanted with Synovex, Finaplix, Synovex plus Finaplix, and Revalor, respectively. No deleterious carcass traits were seen for any implant treatment.

Ears were collected at slaughter and evaluated for abscesses. Large implant-site abscesses were noted for 2 of 16 steers implanted with Synovex, 2 of 16 steers implanted with Finaplix, and 1 of 8 steers implanted with Revalor. Blood levels of estradiol and TBA for steers with abscessed

implant sites did not deviate significantly from treatment averages.

Regardless of mechanisms involved, elevated serum concentrations of hormones generally correlated well with period daily gains by the steers (Figure 4), particularly for SYN+FIN steers. No gain response from any implant was seen in the last 28 days, despite elevated serum levels of TBA (REV, SYN+FIN, FIN) and estradiol (REV). Lack of an implant response as cattle approach slaughter has been observed in other Kansas State research. This suggests that finishing weight is nearing mature weight, and little response should be expected from anabolic agents. The implication is that, for yearlings fed for 120 days, the time frame for an implant response may be only about 90-100 days. A more rapid, shorter-lived payout of anabolic agents may promote faster, more efficient growth in this instance.

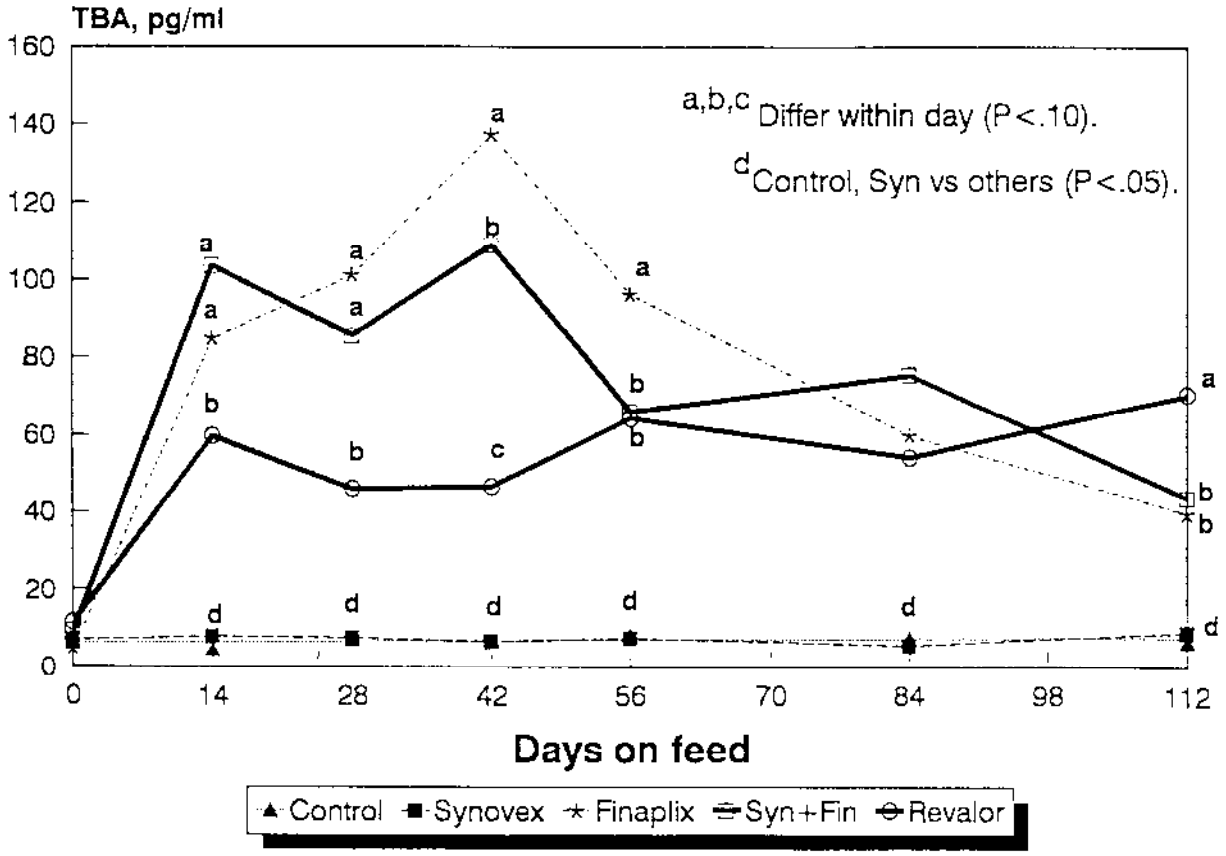

Figure 1. Serum Concentrations of Trenbolone Acetate

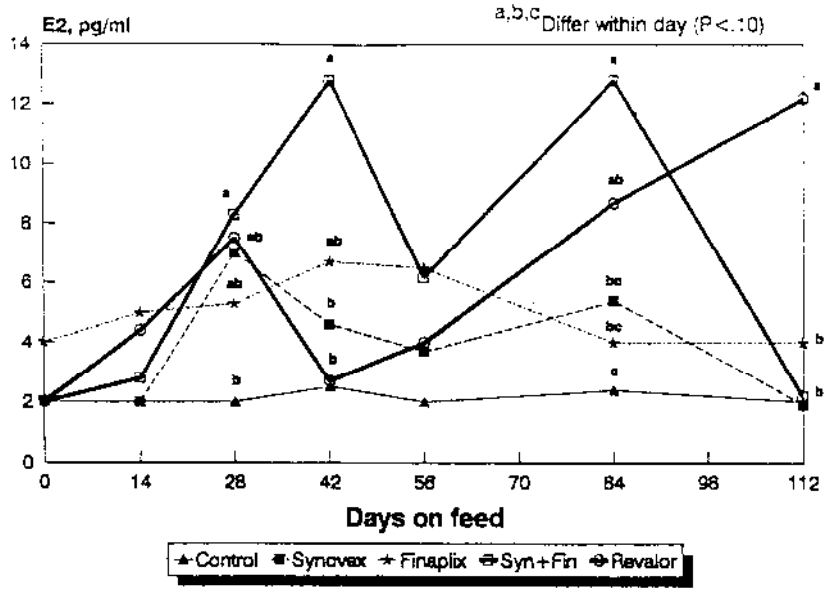

Figure 2. Serum Concentrations of Estradiol (E_2)

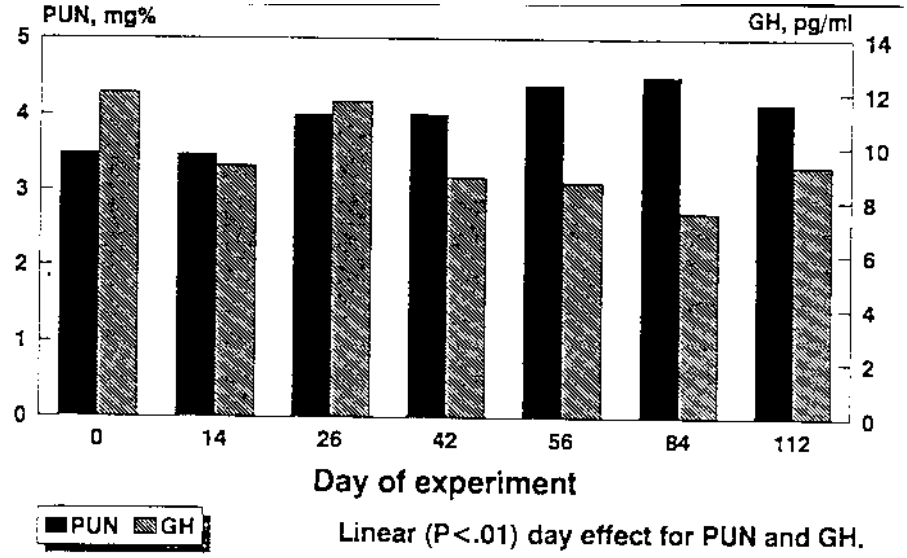

Figure 3. Plasma Urea Nitrogen (PUN) and Growth Hormone (GH) in Implanted Steers

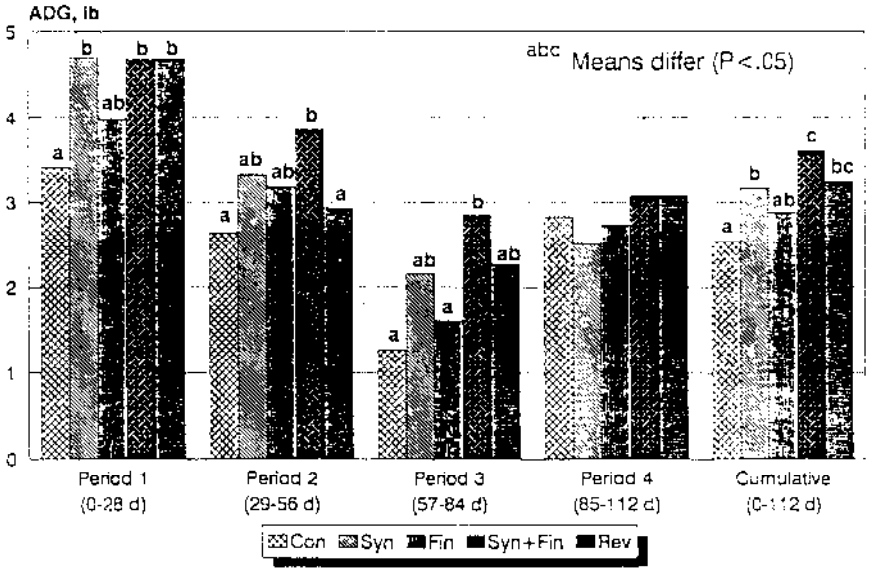

Figure 4. Average Daily Gain (ADG) by Implanted Steers