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IMPROVING THE VALUE OF CULL BEEF COWS WITH SOMATOTROPIN TREATMENT[1]

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BACKGROUND

In the United States, approximately 50% of the beef consumed is in the ground form (Johnson and Rodgers, 1992). A significant source of this beef is the lean tissue of cull or spent cows. Cows also are used to produce processed beef products, specialty steaks and other inexpensive retail cuts. In some situations the removal of the muscles of the middle cuts may result in a higher percentage of the boneless trim being derived from other parts of the carcass and possessing undesirably high chemical fat. Consequently, the value of a cull beef cow should be based on the yield of boneless meat and percentage of fat in this raw material. Despite the significance of cull cows, most producers do not consider enhancing the value of this cow-calf production byproduct. Beef cows are often culled after weaning a calf and possess a low body condition score. Many cows have experienced undernutrition such that they lose 15% - 20% of their optimal weight (Swingle et al., 1979). A recent National Non-Fed Beef Quality Audit (NNFBQA) identified per head costs for non-fed in 1994 of $14.43 for inadequate muscling and $17.74 for excess external fat (Smith et al., 1993). Furthermore, this audit indicated no recommendation for feeding cows to add value. Based on our research involving feeding spent cows, the value of cows can be improved through short-term feeding and metabolic modifiers (Mulvaney, 1994; Mulvaney, Mikel and Jones, 1995a,b). We also have shown that the composition and processing characteristics of raw material from the chuck from cull cows can be improved (Smith et al., 1993). Previous studies show that thin cows gain weight rapidly during the early period of refeeding, therefore, demonstrating compensatory gains. Research has shown that fed cows have significantly heavier carcasses, greater dressing percent, higher lipid content, and larger rib-eye areas (Price and Berg, 1981). Improvements of marbling and meat color have been shown in cull cows after feeding (Price and Berg, 1981). While there are many considerations in the decision to feed cull cows, improvements in lean yield without excess fat deposition in short-fed, cull beef cows should translate directly into increased economic value of the cow, benefiting both producer and packer/processors. Unlike the beef market focussing on quality grade of young cattle, strategies for improving lean yield of the cow and reducing fat of this raw material should be of value to consumers desiring lower fat beef products. Our hypothesis was that the metabolic modifier somatotropin could serve as a technological tool to add value of cull cows and the lean meat derived from them.

OBJECTIVE: Determine the effects of short term feeding and recombinant bovine somatotropin on performance, muscle replenishment, carcass characteristics and lean yields of cull beef cows.

EXPERIMENTAL DESIGN AND METHODS

This research was approved by the Auburn University Animal Care and Use Committee and the Food and Drug Administration. Sixty crossbred beef cows were blocked by breed composition and weight and then randomly assigned to receive daily injections of sterile solution containing 0, 25 and 50 mg of recombinant bovine somatotropin (rbST). Cows within treatments were randomized into pens containing individual Calan^{R} gates to enable accurate feed consumption, and slaughtered after 21 or 42 d of feeding. The Auburn University Bull Test diet was utilized to minimize nutritional limitations to performance. Additional representative cows were slaughtered at the initiation of the treatments. Ultrasound imaging (Aloka 500) was performed at the beginning, middle and end of the trial to obtain backfat and longissimus muscle areas. After slaughter at the Auburn University Meat Abbatoir, cows were dissected into boneless retail products and muscle weights recorded. Data were subjected to least squares analysis of variance using GLM procedures (SAS, 1985).

RESULTS AND DISCUSSION

The main effects of daily injections of rbST to cull beef cows on gain, feed conversion, carcass backfat, longissimus area, and carcass yield of boneless lean are presented in Table 1. These data counter the comments in the 1994 NNFBQA that cull cows cannot be fed to add value plus these data support the notion that inadequate muscle mass and excess adipose could be manipulated in a desirable direction.

A recent limited review of feeding of cull cows (McKeith, 1994) summarized results of studies of feeding cows. Most cases were effective in increasing LMA and dressing percentage but the problem was with excess fat in the gain, especially in the longer term trials.

CONCLUSIONS

Although rbST is not approved as a metabolic modifier for feedlot cattle, our study demonstrates the significant impact it has in addressing directly the problems of inadequate muscling, excess fat and poor feed efficiency of fed cows identified in the NNFBQA for feeding cows.

TABLE 1. Effects of Daily Somatotropin Injection on Selected Traits of Cull Beef Cows[a]

Parameter	Initial cows	Treatment 0 mg	25 mg	50 mg	% Change
Daily Gains (kg)	--	0.91	1.23	1.32	+45
Feed:Gain	--	17.9	11.5	10.5	-40
Backfat (cm)	0.06	0.22	0.16	0.12	-42
LMA (cm^2)	70.3	80.6	91.6	95.5	+18
Lean Yield (%)	52.0	64.7	68.6	69.9	+ 9
Semitendinosus (kg)	1.9	2.4	3.0	3.5	+41

[a]all data within rows differ significantly from 0 mg group ($p < .1$).

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