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The Effect on Meat Quality of Integrating Pasturing Systems into Cattle Finishing Programs

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Abstract
Forage source and quality in finishing cattle programs continue to be a source of concern because of economics and also because of their impact on beef eating qualities. The integration of pasturing systems for cattle finishing programs should allow the producer to produce a leaner and possibly more economical beef supply thus benefiting the consumer and the producer. This experiment was designed to investigate alternative pasture management systems for finishing cattle and to study the impact on meat quality.

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Introduction

Forage source and quality in finishing cattle programs continue to be a source of concern because of economics and also because of their impact on beef eating qualities. The integration of pasturing systems for cattle finishing programs should allow the producer to produce a leaner and possibly more economical beef supply thus benefiting the consumer and the producer. This experiment was designed to investigate alternative pasture management systems for finishing cattle and to study the impact on meat quality.

Materials and Methods

A two-year study was conducted involving 84 fall-born and 28 spring-born calves in year one and 116 fall-born calves in year two. Fall-born calves were started on test in May and spring-born calves in October. Seven treatments were imposed in year 1: 1) fall-born calves direct to feedlot; 2 and 3) fall-born calves provided cool season pasture with or without Rumensin® and then to the feedlot at the end of July; 4 and 5) fall-born calves provided cool season pasture with or without Rumensin® and then to the feedlot at the end of October; and 6 and 7) spring-born calves provided cool season pasture with or without Rumensin® and then to the feedlot at the end of October. Four treatments with all cattle receiving Rumensin® were imposed for year 2: 1) calves direct to feedlot; 2) calves provided cool season pasture and then to the feedlot at the end of July; 3) calves provided cool season pasture and then to the feedlot at the end of October; and 4) calves provided cool season pasture until July, followed by warm season grass until the middle of August, cool season pasture until the end of October, and then to the feedlot. Rotationally grazed cool season grass consisted of smooth bromegrass, and warm season grass consisted of switchgrass. The feedlot diet consisted of an 82% concentrate diet containing corn, alfalfa hay, and a protein, vitamin and mineral supplement containing Rumensin® and molasses. When steers averaged 1,150 lb (year 1) and 1,200 lb (year 2) they were processed. Following processing, one 12th rib ribeye steak was removed from each carcass, aged postmortem for 15 days and later used for meat quality determination by sensory panel evaluation and Warner Bratzler shear force values.

Results and Discussion

In Table 1, fall-born cattle on pasture until October had less (P<.05) backfat (BF) than steers that went directly to the feedlot. Quality grades (QG) for all fall-born cattle on pasture until October were poorer (P<.05) than the other treatments. Table 2 reveals that the backfat for cattle on bromegrass pasture until October, and for cattle that were on warm season and cool season grass was less (P<.05) than for cattle that went directly to the feedlot or were on bromegrass pasture until July. The yield grade (YG) for cattle on bromegrass pasture until October was higher (P<.05) than the YG for cattle on bromegrass and switchgrass pastures. The QG for the steers that went directly to the feedlot was lower (P<0.05) than for the other three treatments. This may have been due to slightly lower HCW. In both trials there were differences (P<0.05) among treatments for QG, and in year 2 differences (P<0.05) existed for YG. However, all YG were within the YG 2 category, and nearly all QG averaged low Choice or higher. The Warner Bratzler shear force values and sensory tenderness evaluations showed there were no differences among treatments for tenderness. Thus time on pasture did not affect tenderness. Although differences (P<.05) were observed among treatments for juiciness, flavor intensity and flavor (Table 1), and juiciness (Table 2), no consistent patterns were observed, and because all sensory scores averaged five or higher, they were considered to be acceptable eating attributes.

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Table 1. Least square means and SEM of carcass composition and meat eating qualities of steers in year one.

	Treatments						
	Fall born calves					Spring born calves	
	Direct	Pasture to July 28		Pasture to Oct. 16		Pasture to Oct. 16	
	to drylot	No ionophore	Ionophore	No ionophore	Ionophore	No ionophore	Ionophore
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Hot carcass wt., lb	747.1^{a}±13.5	737.2^{a}±19.1	734.0^{a}±19.1	670.0^{b}±19.8	710.0^{ab}±19.1	721.9^{ab}±19.1	733.6^{a}±19.1
Backfat, in.	0.6^{a}±0.03	0.5^{abc}±0.1	0.6^{abc}±0.1	0.4^{bc}±0.1	0.4^{bc}±0.1	0.5^{abc}±0.1	0.5^{abc}±0.1
Ribeye area, in.^{2}	13.1±0.2	12.4±0.3	12.7±0.3	12.4±0.3	12.6±0.3	12.9±0.3	12.9±0.3
Kidney, pelvic, heart fat, %	2.4^{a}±0.1	2.7^{bc}±0.1	2.7^{bc}±0.1	2.2^{ad}±0.1	1.9^{d}±0.1	3.0^{bc}±0.1	2.9^{bc}±0.1
Yield grade[f]	2.7±0.1	2.6±0.2	2.6±0.2	2.4±0.2	2.4±0.2	2.5±0.2	2.6±0.2
Quality grade[g]	6.1^{ad}±0.2	6.1^{abde}±0.2	6.1^{abde}±0.2	6.7^{ac}±0.3	6.8^{bc}±0.2	5.8^{d}±0.2	5.5^{de}±0.2
Warner Braztler shear, kgf[h]	2.3±0.1	2.4±0.1	2.2±0.1	2.5±0.1	2.7±0.1	2.4±0.1	2.3±0.1
Tenderness[i]	5.7±0.1	5.4±0.2	5.9±0.2	5.8±0.2	5.4±0.2	5.7±0.2	5.6±0.2
Juiciness[i]	5.3^{bc}±0.1	5.1^{b} ±0.2	5.4^{bc}±0.2	5.3^{bc}±0.2	5.2^{bc}±0.2	5.7^{c}±0.2	5.6^{bc}±0.2
Flavor intensity[i]	5.2^{bd}±0.1	5.3^{bcd}±0.1	5.4^{bc}±0.1	5.3^{bc}±0.1	5.0^{d}±0.1	5.5^{bc}±0.1	5.5^{c}±0.1
Flavor[i]	5.4^{bc}±0.1	5.3^{bc}±0.1	5.5^{bc}±0.1	5.4^{bc}±0.1	5.2^{c}±0.1	5.6^{b}±0.1	5.6^{b}±0.1

[a,b,c,d,e] Means within the same row with different letters are different, P<0.05.
[f]Yield grades were called by the USDA Meat Grading Service.
[g]Quality grade was converted to a number system: Choice^{+}=4; Choice^{0}=5; Choice^{-}=6; Select^{+}=7; etc.
[h]Warner Bratzler shear measured by kilograms of force (kgf).
[i]Sensory panel scores based on eight point scale (8=excellent; 1=very poor).

Table 2. Least square means and SEM of carcass composition and meat eating quality of steers in year two.

	Treatments				
Variable	Direct to drylot (1)	Bromegrass pasture to July 13 (2)	Bromegrass pasture to Oct. 1 (3)	Bromegrass and switchgrass pasture to Oct 1 (4)	SEM
Hot carcass wt., lb	730.6	764.1	744.6	754.4	12.5
Backfat, in.	0.5^{a}	0.5^{a}	0.4^{b}	0.4^{b}	0.02
Ribeye area, in.^{2}	13.2	13.1	13.1	13.4	0.2
Kidney, pelvic, heart fat, %	2.3^{a}	2.7^{b}	2.3^{a}	2.4^{a}	0.1
Yield grade[d]	2.5^{ab}	2.6^{ab}	2.7^{b}	2.4^{a}	0.1
Quality grade[e]	6.4^{a}	5.8^{b}	5.8^{b}	5.8^{b}	0.2
Warner Bratzler shear, kgf[f]	2.5	2.5	2.4	2.4	0.1
Tenderness[g]	5.3	5.6	5.5	5.3	0.1
Juiciness[g]	5.0^{ac}	5.5^{b}	5.2^{c}	4.8^{a}	0.1
Flavor intensity[g]	5.2	5.7	5.4	5.2	0.3
Flavor[g]	5.4	5.4	5.5	5.3	0.1

[a,b,c]Means within the same row with different letters are different, P<0.05.
[d]Yield grades were called by the USDA Meat Grading Service.
[e]Quality grade was converted to a number system: Choice^{+}=4; Choice^{0}=5; Choice^{-}=6; Select^{+}=7; etc.
[f]Warner Bratzler shear measured by kilograms of force (kgf).
[g]Sensory panel scores based on eight point scale (8=excellent; 1=very poor).