UTILIZATION OF STEAM-FLAKED MILO OR CORN AND SUPPLEMENTAL FAT BY FINISHING STEERS[1]

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Summary

One hundred forty crossbred yearling steers (815 lb) were utilized to evaluate grain type (steam flaked corn vs steam flaked milo) and supplemental fat (0 or 4% yellow grease) on finishing performance. There were no differences in carcass-adjusted average daily gain, feed intake, or feed conversion between steers fed milo vs corn. Calculated NEm and NEg contents of flaked milo were approximately 99% those of flaked corn and 15 to 20% greater than those of dry rolled milo (NRC, 1984). Supplemental yellow grease increased (P=.12) average daily gain 4.4% and improved (P<.05) feed efficiency 6%. There were no grain type x fat interactions for any performance parameter measured. Steers fed milo had smaller (P<.05) ribeye areas and tended to have more backfat and internal (KPH) fat than corn-fed steers. As a result, milo-fed steers had a higher (P<.001) yield grade. Steers fed corn had a higher (P<.001) degree of yellow pigmentation in external fat than those fed milo. Supplemental yellow grease resulted in an additive increase (P<.025) in yellow pigmentation. There were no differences in peak shear force or sensory traits of beef longissimus muscle as a result of either grain type or fat level. Our data indicate that steam flaking can increase the net energy value of milo to nearly that of flaked corn, with no detrimental effects on the quality of beef produced.

(Key words: Steam-flaking, Milo, Corn, Fat, Finishing, Carcass Traits.)

Experimental Procedures

One hundred forty yearling crossbred steers (815 lb) were utilized in a 2×2 factorial experiment to evaluate the effects of grain type (steam flaked milo vs steam flaked corn) and level of supplemental fat (0 or 4% yellow grease) on finishing performance, carcass characteristics, chemical composition, and organoleptic properties of beef. Steers were allotted to five weight replicates (seven head per pen), and treatments were assigned to pens at random.

Diets were formulated to contain 13% crude protein and 10% alfalfa hay. Yellow grease, when used, replaced 4% of molasses. Milo and corn were flaked to densities of 26 and 20 lb/bu, respectively, measured directly off the rolls (20% moisture). Steers were weighed on trial immediately before being placed on the final diet. Initial weights were the average of two consecutive weights obtained on October 3 and 4, 1988. Final weights were based on hot carcass weights adjusted to a 63% dressing percent. Carcass data were obtained following a 24-

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hr chill. Rib sections were obtained from half the carcasses from each treatment for subsequent determination of chemical composition, shear force, and sensory analysis by a trained taste panel. The trial was conducted for 100 d.

Results and Discussion

There were no differences in dry matter intake, average daily gain, or feed conversion between steers fed steam-flaked milo (SFM) or steam flaked corn (SFC, Table 3.1). Main effect means for daily gain (lb/d), dry matter intake (lb/d), and efficiency of feed conversion (feed/gain) were 4.03 vs 4.03, 21.3 vs 21.2, and 5.32 vs 5.28 for SFM vs SFC, respectively. Prices are shown in footnote, Table 3.1. Addition of 4% yellow grease improved daily gain 4.4% (P=.12) and feed efficiency 6% (P<.05) compared to non-supplemental diets. Costs of gain for SFM (−fat), SFM (+fat), SFC (−fat), and SFC (+fat) were 44, 43, 49, and 48¢/lb, respectively. Thus, with the current price structure, milo is much more economical than corn for feedlots equipped with steam flakers. Although supplemental fat increased ration costs, costs of gain were reduced by 1¢/lb. In this study, cattle were all slaughtered at the same time. Because fat produced faster gain, cattle fed fat could have been killed sooner, reducing interest and yardage and increasing their cost of gain advantage. Ration net energy concentrations were calculated from animal performance. Flaked milo and corn were 107.9, 75.9 and 108.8, 76.7 Mcal/cwt NEm and NEg, respectively. Thus, flaked milo contained about 99% the NEm and NEg of flaked corn. Further, flaking increased the NEm and NEg of milo 15 and 19%, respectively, compared to NRC (1984) values for dry rolled milo.

Steers fed SFM had a smaller (P<.05) ribeye area and numerically higher dressing percentage, backfat thickness, and percentage of KPH fat than steers fed SFC (Table 3.2). As a result, SFM steers had a higher (P<.001) yield grade than SFC steers. The fact that SFM steers had smaller ribeye areas and higher numerical yield grades is puzzling, and no

Table 3.1. Effect of Grain Type and Supplemental Fat on Steer Finishing Performance

Item	Flaked milo		Flaked corn		SE
	0% fat	4% fat	0% fat	4% fat	
No. pens	5	5	5	5	
No. steers	35	35	35	35	
Initial wt, lb	815	815	815	816	.5
Daily gain, lb[a]	3.94	4.12	3.94	4.11	.104
Daily feed, lb DM	21.3	21.3	21.5	20.9	.32
Feed/gain[bc]	5.46	5.19	5.46	5.10	.160
Cost of gain, $/lb[d]	.44	.43	.49	.48	
Ration net energy, Mcal/cwt					
NEm	99.5	102.7	98.6	104.1	
NEg	68.7	71.5	67.9	72.7	

[a]Final weights were warm carcass weights adjusted to a 63% dress.
[b]Analyzed statistically as gain/feed.
[c]Fat effect (P<.05).
[d]Based on $2.85/bu corn, $4.30/cwt milo, 11% interest, $.06 daily yardage.

Table 3.2. Effect of Grain Type and Supplemental Fat on Carcass Traits

Item	Flaked milo		Flaked corn		SE
	0% fat	4% fat	0% fat	4% fat	
Warm wt, lb	762	772	762	773	9.2
Dressing percent	63.8	63.6	62.7	63.2	.61
Ribeye area, in.^{2} [ab]	12.4	12.8	13.0	13.3	.22
Backfat, in.[a]	.46	.53	.46	.47	.023
Kidney, pelvic, and heart fat, %	2.40	2.61	2.33	2.41	.112
Yield grade[d]	3.07	3.21	2.87	2.84	.103
Marbling	Sm^{40}	Sm^{40}	Sm^{30}	Sm^{30}	.130
Percent Choice	83	74	83	80	
Fat color[1] [cd]	1.8	2.0	2.5	2.8	.10
Lean color[2] [a]	4.9	4.4	4.7	4.4	.20

[1]Scale of 1-5; 1=bleached white, 5=yellow.
[2]Scale 1-10; 1=light cherry red, 10=dark red.
[ac]Fat effect ([a]P<.08;[c]P<.025).
[bd]Grain effect ([b]P<.05; [d]P<.001).

reasonable explanation for this difference is available. SFC steers had a higher (P<.001) degree of yellow color in their subcutaneous fat than SFM steers. Steers fed yellow grease also had a higher (P<.025) fat color score, but lighter (P<.05) lean color than non-supplemented steers. Whether these findings have any potential effect on consumer acceptability is unclear at this point.

Neither grain type nor supplemental fat had an effect on tenderness (shear force) or sensory traits of beef (Table 3.3). These data discount the misconception that beef from milo-fed cattle is inferior to that from corn-fed cattle.

Table 3.3. Effect of Grain Type and Supplemental Fat on Consumer Attributes of Beef

Item	Flaked milo		Flaked corn	
	0% fat	4% fat	0% fat	4% fat
Flavor intensity[1]	6.2	6.1	6.1	6.2
Off flavor[1]	7.8	7.8	7.7	7.8
Juiciness[1]	5.9	5.9	6.0	6.0
Myofibrillar tenderness[1]	6.2	6.1	6.2	6.2
Connective tissue[1]	7.4	7.3	7.3	7.3
Overall tenderness[1]	6.5	6.3	6.4	6.4
Warner-Bratzler peak shear force, kg	4.0	4.0	3.9	4.0

[1]Trained taste panel evaluation of rib steaks on a scale of 1 to 8, with 8 most desirable.