

Evaluation of Performance and Carcass Quality of Finishing Beef with Natural Feeding Practices in North Dakota

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Abstract

Based on consumer preferences and a growing concern over the use of antibiotics and other growth promoters in the animal feed industry, natural beef programs have shown exceptional growth in recent years. “Natural” is a widely used label that does not carry legal connotations but is often associated with no antibiotics, ionophores, or implants used. Several different additives have been developed that meet the “natural” criteria including yeasts, enzymes, probiotics and fermentation products. Some of the potential benefits associated with yeast include improved rumen fermentation and increased feed digestion. Bovi-Sacc (provided courtesy of Alltech, Nicholasville, KY) is a yeast product that also contains mannan oligosaccharides. North Dakota has abundant supplies of non-GMO grains including barley, field peas, and sunflower meal, as well as a number of non-GMO forages. The objective of this study was to compare performance, carcass quality, and economics of steers fed conventional vs. natural diet regimens with three different grain levels in the natural treatments.

One hundred twenty-eight mixed breed steers (initial wt 560.2 ± 40.9 lbs) were allotted by weight and source to one of four diets (Table 1): conventional (85% concentrate, rumensin in the diet), natural 85 (85% concentrate, Bovi-Sacc in the diet), natural 70 (70% concentrate, Bovi-Sacc in the diet), and natural 55 (55% concentrate, Bovi-Sacc in the diet). The concentrate portion of the diet consisted of barley and peas, the roughage portion of the diet consisted of oat hay and corn silage.

Table 1. Diets for calves fed conventional and natural diet regimes.				
	Conventional 85	Natural 85	Natural 70	Natural 55
Ingredients	----- % DM basis -----			
Barley	59.16	59.01	38.73	29.30
Field peas	12.91	12.88	12.67	8.27
Corn silage	15.30	15.27	22.53	22.06
Oat hay	9.40	9.36	23.06	37.63
Barley malt sprouts	1.39	1.40	1.38	1.35
Potassium chloride	0.20	0.20	0.20	0.20
Salt	0.12	0.12	0.12	0.11
Dicalcium phosphate	0.05	0.05	0.05	0.05
Vitamin A	0.01	0.01	0.01	0.01
Vitamin D	0.01	0.01	0.01	0.01
Vitamin E	0.01	0.01	0.01	0.01
Rumensin	0.017	-----	-----	-----
Bovi-Sacc	-----	0.267	0.267	0.267
Nutrient composition, %				
Crude protein	13.75	13.80	13.23	12.59
Calcium	0.52	0.52	0.44	0.42
Phosphorus	0.37	0.37	0.31	0.25

Cattle were slaughtered at Tyson Foods (Dakota City, NE) when body weight for the treatment was estimated to be 1175 lbs. Hot carcass weight, fat thickness, percentage kidney, pelvic and heart fat, longissimus muscle area, and USDA quality and yield grades were determined by qualified personnel 48 h after slaughter.

Cattle fed 85% concentrate diets (conventional and natural) spent the least ($P < 0.01$) amount of time in the feedlot (154 days), followed by cattle fed a 70% concentrate natural diet (180 days) (Table 2). Cattle fed the 55% concentrate natural diet spent the most amount of time in the feedlot (210 days). Cattle fed the 85% concentrate diets (conventional and natural) gained the most overall ($P < 0.01$). Cattle fed the conventional 85% concentrate diet gained 4.8 % more than cattle fed the natural 85% concentrate diet (3.07 vs. 2.93 lbs/d), but gains did not differ statistically. Cattle fed the natural 55% concentrate diet gained the least in each period ($P < 0.01$), and overall ($P < 0.01$). Cattle fed the natural 55% concentrate diet consumed the most dry matter per day, and cattle fed the natural 85% concentrate diet consumed the least dry matter per day ($P < 0.03$). Cattle fed the 85% concentrate diets (both conventional and natural) were the most efficient ($P < 0.01$), followed by cattle fed the 70% concentrate diet. Cattle fed the natural 55% concentrate diet were the least efficient overall.

Table 2. Effect of natural vs. conventional feeding on performance and carcass characteristics of steers.						
	Conventional 85	Natural 85	Natural 70	Natural 55	SE	P-value
Days on feed	154 ^a	154 ^a	180 ^b	210 ^c	0.0	0.01
Weight, lb						
December 10, 2003	725.1	717.5	722.4	714.9	10.4	0.89
Slaughter	1198.5	1168.2	1173.8	1190.1	14.3	0.40
Average daily gain, lb/d	3.07 ^a	2.93 ^a	2.51 ^b	2.26 ^c	0.07	0.01
Dry matter intake, lb/d	21.7 ^{ab}	21.4 ^a	21.8 ^{ab}	22.0 ^b	0.1	0.03
Feed efficiency, lb/lb	7.0 ^a	7.3 ^a	8.7 ^b	9.7 ^c	0.5	0.01
Hot carcass weight, lb	707.4	690.6	690.5	678.0	9.7	0.15
Marbling score	454.7 ^{ab}	482.7 ^a	424.4 ^b	421.6 ^b	18.9	0.06
% Choice	75.0	70.0	59.3	62.5	9.1	0.57
Fat thickness, in.	0.46 ^a	0.43 ^a	0.36 ^b	0.32 ^b	0.02	0.01
Rib-eye area, in ²	11.9 ^a	12.1 ^a	11.8 ^{ab}	11.4 ^b	0.2	0.07
Kidney, pelvic, heart fat, %	2.3 ^a	2.2 ^a	1.8 ^b	2.3 ^a	0.1	0.01
Yield grade	2.97 ^a	2.78 ^{ab}	2.62 ^b	2.70 ^b	0.1	0.06

^{abc}Means within a row without common superscripts differ.

Hot carcass weight did not differ among treatments ($P > 0.15$). Marbling score tended to be ($P < 0.06$), and fat thickness was ($P < 0.01$) greater for cattle fed the 85% concentrate diets (both natural and conventional) compared to cattle fed the natural 70 and 55% concentrate diets. Rib-eye area tended ($P < 0.07$) to be greatest for cattle fed the natural 85% concentrate diet and lowest for cattle fed the natural 55% concentrate diet. Yield grade tended ($P < 0.06$) to be greatest for cattle fed the conventional 85% concentrate diet, and lowest for cattle fed the natural 70% concentrate diet.