

**PERFORMANCE AND CARCASS CHARACTERISTICS OF YEARLING STEERS AND HEIFERS FED AGRADO™ THROUGHOUT THE FINISHING PERIOD**

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**Summary**

A finishing experiment was conducted at a commercial feedlot facility in Larned, Kansas, using 3,295 yearling steers and heifers to evaluate effects of Agrado™ addition to finishing diets. Agrado (ethoxyquin) is a dietary anti-oxidant that protects against oxidative loss of critical vitamins and prevents rancidity and unpalatable odors. Supplementing finishing diets of yearling steers and heifers with 150 ppm Agrado had no measurable effects on growth performance or carcass characteristics.

**Introduction**

Previous research has indicated that cattle performance may be improved by the inclusion of the antioxidant Agrado™ (ethoxyquin) into cattle diets. Recently, experiments have reported slight improvements in rate and efficiency of gain in cattle fed Agrado for 28 days prior to harvest. Other studies have noted reductions in morbidity, mortality, and treatment costs when cattle were fed Agrado. Research suggests improvements in performance in cattle supplemented with Agrado may be due to an increase in organic matter digestion. Additionally, Agrado may also alter fermentation patterns and contribute to a healthier gut mucosa, as well as decrease oxidation during digestion and absorption.

Currently, information is limited regarding the efficacy of grade supplementation throughout the finishing phase. Our objective was to assess the impact of Agrado supplementation on performance and carcass characteristics of finishing steers and heifers.

**Experimental Procedures**

Steers (n=1780; 745 lb initially) and heifers (n=1515; 679 lb initially) were transported from winter cereal pastures to a commercial feedlot in Larned, Kansas. Upon arrival, cattle were eartagged, implanted with estrogenic implants, vaccinated against common viral and clostridial diseases, and treated for internal and external parasites.

Cattle within each load were split into two groups based on order of processing, such that even-numbered cattle were placed into one group and odd-numbered cattle were placed into another. Groups were placed into feedlot pens averaging approximately 165 animals per pen. Cattle were sorted by gender (steers and heifers) and blocked by date of arrival. A total of five replications of steers and five replications of heifers were used (20 pens total).

Dietary treatments consisted of 0 or 150 ppm of dietary Agrado (as-fed basis), which was included into the finishing diet (Table 1) by using a micro ingredient machine. Agrado was provided by Solutia, Inc., St. Louis, MO. Cattle were adapted to the final finishing diet within 20 days after arrival. Heifers were reimplanted with a trenbolone acetate implant and steers were reimplanted with a combination trenbolone acetate/estradiol implant approximately 50 to 70 days after arrival. Cattle were fed for an average of 131 days. Pens of cattle were shipped to a commercial abattoir in Emporia, Kansas when they achieved an estimated 12th rib fat thickness of 0.40 inch. An equal number of pens from each treatment were shipped on each slaughter date.

Data obtained for each pen of cattle included weight gain, feed intake, feed efficiency, carcass weight, dressing percentage, USDA quality grade, USDA yield grade, incidence and severity of liver abscess, and incidence of dark cutting beef.

**Table 1. Composition of Experimental Diets (DM Basis)**

Item	Agrado	
	0	150 ppm
Steam-flaked corn	64.0	64.0
Wet distiller's grains	14.0	14.0
Mixed silage	6.0	6.0
Wheat middlings	6.0	6.0
Liquid supplement <sup>a</sup>	5.3	5.3
Tallow	2.7	2.7
Corn screenings	2.0	2.0
Agrado	-	+ <sup>b</sup>
Nutrient, calculated		
Crude protein	15.2	15.2
Calcium	0.73	0.73
Phosphorus	0.40	0.40

<sup>a</sup>Provided 30 g/ton Rumensin, and 10 g/ton Tylan to complete diet (dry matter basis).

<sup>b</sup>Provided 150 ppm ethoxyquin (as-fed basis).

## Results and Discussion

Supplementation of Agrado to yearling steers and heifers at 0 or 150 ppm in finishing diets resulted in similar dry matter intakes, average daily gains, and feed efficiencies (Tables 2 and 3). Carcass weights were essentially the same for control and Agrado-supplemented steers and heifers ( $P>0.90$ ), but dressing percentage was lower for Agrado-supplemented heifers than for controls (64.0 vs. 64.3%, respectively;  $P<0.05$ ). However, these differences can be attributed to the slightly higher number of pregnancies among Agrado-supplemented heifers compared to controls (2.2 vs 0.8%, respectively). Percentages of USDA Prime, Choice, Select, and Standard carcasses were not influenced by Agrado supplementation. Furthermore, percentages of USDA Yield Grade 1, 2, 3, 4, and 5 carcasses were similar for control and Agrado-supplemented groups.

Responses to antioxidants are likely dependent on degree of stress and the nutritional background of the cattle. The yearling steers and heifers used in this experiment were healthy, low health-risk cattle that previously grazed high-quality annual cereal pastures, perhaps limiting the potential for response to antioxidant supplementation.

**Table 2. Finishing Performance and Carcass Characteristics of Heifers Fed Diets Containing 0 or 150 ppm Agrado**

Item	Agrado		SEM	P-value
	0	150 ppm		
No. of heifers	758	757	-	-
No. of pens	5	5	-	-
Average days on feed	128	128	-	-
Initial weight, lb	680	677	4.0	0.61
Final weight, lb	1126	1133	4.6	0.33
Dry matter intake, lb/day	20.24	20.64	0.28	0.34
Average daily gain, lb	3.49	3.56	0.06	0.38
Feed:gain	5.82	5.82	0.04	0.97
Dressing percentage	64.32	64.03	0.07	0.03
Hot carcass weight, lb	725	726	2.9	0.94
USDA Yield grade 1, %	16.1	14.0	2.1	0.49
USDA Yield grade 2, %	27.5	30.4	1.4	0.17
USDA Yield grade 3, %	47.8	46.8	2.3	0.77
USDA Yield grade 4, %	7.7	8.0	1.0	0.82
USDA Yield grade 5, %	0.8	0.7	0.27	0.91
USDA Prime, %	2.1	1.5	0.63	0.53
USDA Choice, %	49.2	53.2	4.3	0.52
USDA Select, %	44.0	40.0	3.7	0.47
USDA Standard, %	3.2	3.8	0.55	0.51
Dark cutter, %	0.8	0.8	0.57	1.00
Liver abscess, %	6.0	7.8	1.4	0.38

**Table 3. Finishing Performance and Carcass Characteristics of Steers Fed Diets Containing 0 or 150 ppm Agrado**

Item	Agrado		SEM	P-value
	0	150 ppm		
No. of steers	890	890	-	-
No. of pens	5	5	-	-
Average days on feed	133	133	-	-
Initial weight, lb	742	747	3.4	0.42
Final weight, lb	1248	1247	6.5	0.92
Dry matter intake, lb/day	20.94	21.15	0.14	0.31
Average daily gain, lb	3.85	3.82	0.02	0.36
Feed:gain	5.45	5.55	0.05	0.22
Dressing percentage	64.35	64.44	0.18	0.72
Hot carcass weight, lb	803	804	5.4	0.91
USDA Yield grade 1, %	15.5	19.5	2.8	0.34
USDA Yield grade 2, %	35.9	36.9	2.4	0.76
USDA Yield grade 3, %	39.8	37.6	3.2	0.63
USDA Yield grade 4, %	8.5	5.8	1.0	0.11
USDA Yield grade 5, %	0.2	0.2	0.09	0.95
USDA Prime, %	0.8	0.5	0.26	0.42
USDA Choice, %	35.7	37.8	2.1	0.50
USDA Select, %	56.0	54.8	1.7	0.63
USDA Standard, %	7.1	6.4	1.2	0.66
Dark cutter, %	0.1	0.0	0.12	0.42
Liver abscess, %	10.4	8.6	1.2	0.32