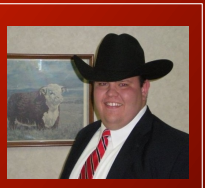
Effects of long-term feeding of corn co-products on composition, tenderness, and shelf-life stability of beef strip steaks



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INTRODUCTION

- Recent volatility of feed prices and economic instability has forced beef cattle producers to re-evaluate nutritional programs
- Limited access to economical sources of corn and soybean meal has prevented the development of a feedlot industry in the SE
- Demand for locally-grown beef has increased interest in developing Southeastern beef cattle production systems utilizing corn co-products
- There is limited research on meat quality from cattle fed dried distillers grains plus solubles (DDGS) and corn gluten feed (CGF) from weaning to slaughter

OBJECTIVES:

- Evaluate performance and compositional development of steers fed corn co-products from weaning through slaughter
- Compare carcass characteristics, meat quality, and shelf-life of strip steaks from steers fed corn co-products

MATERIALS AND METHODS

- Angus-based beef steers (n=36) were fed at the UGA Wilkins Beef Cattle Research Unit for 100 d
- Individual intake was measured usig a Calan© gate system
- Feedlot diets were formulated to be isonitrogenous so that protein supplement accounted for 25% of the diet
- Supplements included DDGS, CGF, and soybean meal with corn (SBM)
- After the 100-d feeding trial, steers (n=36) were slaughtered at the UGA Meat Science Technology Center
- Carcass data were collected 24 h post-mortem by trained personnel
- At 48 h post-mortem the strip loin was removed and fabricated into 2.54-cm steaks
- Proximate analysis was used to determine moisture, protein, and lipid content
- Warner-Bratzler shear force was measured over 21-d aging period
- Steaks were also used to determine differences in shelf-life and lipid oxidation over a 9-d aging period

CONCLUSIONS & IMPLICATIONS

- Feeding dried distillers grains or corn gluten feed yield similar meat quality characteristics to feeding soybean meal
- Dry distillers grains or corn gluten feed have no adverse effects on shelf-life or tenderness of strip steaks
- Corn co-products maybe utilized to develop a locally grown market for beef in the Southeast

RESULTS

Table 1. Carcass Yield Characteristics

	Protein Supplement			
Item [1]	CGF	DDGS	SBM	SEM
HCW, kg	354	350	341	7.33
DP,%	63.8	62.9	63.5	0.59
REA,cm^2	77.65	77.68	79.23	3.25
FT, cm	1.20	1.11	1.20	0.07
KPH, %	2.3	2.2	2.2	0.11
YG	3.10	3.11	3.05	0.18

[1]DP=dressing percent, REA=ribeye area, FT=12th rib fat over the ribeye, YG=yield grade

Table 2. Carcass Quality Characteristics

	Protein Supplement			
Item	CGF	DDGS	SBM	SEM
Marbling[1]	494.2	432.5	457.5	23.44
Texture[2]	1.42	1.75	1.50	0.17
Firmness[3]	1.67	1.42	1.67	0.20
pH	5.57	5.64	5.59	0.05
Overall Maturity	A36	A31	A45	6.57

[1] 300=slight, 400=small, 500=modest,

[2]1=very fine, 5=course

[3]1=very firm, 5=soft

Table 3. Proximate Analysis of Strip Steaks

	Protein Supplement			
Item	CGF	DDGS	SBM	SEM
Moisture, %	71.38	73.11	72.29	0.52
Protein, %	22.83	23.08	23.51	0.39
Lipid, %	5.31	3.83	4.22	0.54

Table 4. Meat Color Characteristics

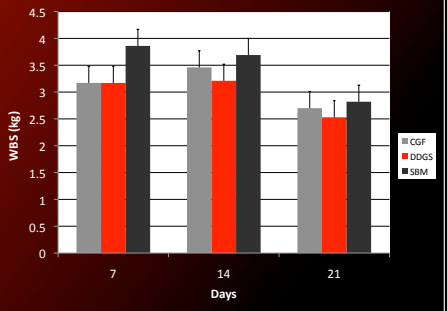
	Protein Supplement			
Item	CGF	DDGS	SBM	SEM
Lean Color				
L*	43.73^a	41.21^b	40.67^b	0.78
a*	31.29	29.54	30.74	1.17
b*	12.68^a	10.96^b	11.02^b	0.38
Fat Color				
L*	73.08^{ab}	72.14^b	74.30^a	0.63
a*	10.32^a	9.47^{ab}	7.35^b	0.93
b*	16.50	13.37	14.46	1.38
Lean Color Score[1]	6.42	6.25	6.17	0.25
Fat Color Score[2]	1.83	1.61	1.75	0.17

^{ab} Within a row means without a common superscript differ (P<0.05)

[1]1=extremely dark red, 8=extremely bright cherry red

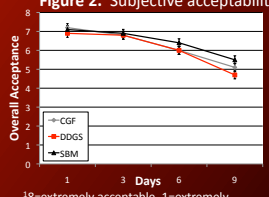
[2]1=white, 5=yellow

Figure 1. Warner-Bratzler Shear force



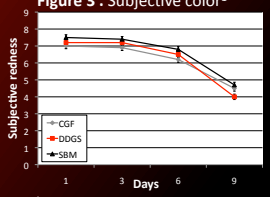
Shelf-life Trial

Figure 2. Subjective acceptability[1]



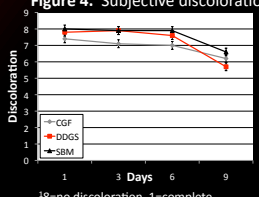
[1]8=extremely acceptable, 1=extremely unacceptable

Figure 3 . Subjective color[1]



[1]8=light cherry red, 1=extremely dark red

Figure 4. Subjective discoloration[1]



[1]8=no discoloration, 1=complete discoloration

Figure 5. Lipid Oxidation

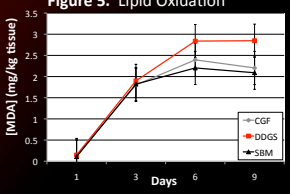


Figure 6 . L*

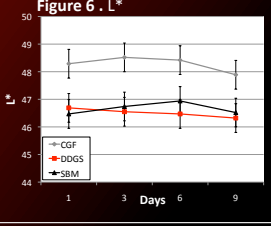


Figure 7. a*

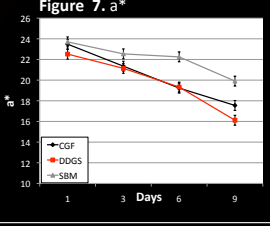


Figure 8 . b*