



Distiller's Grains, Corn Processing, and Beef Quality

Effects on marbling, shelf-life, and sensory attributes

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Introduction

- WDGS fed in dry-rolled corn and steam-flaked corn diets
- Performance interaction.
- Reduced starch.
- Beef quality interaction?

35% WDGS and Corn Processing Diet Composition

Item	DRC control	SFC control	WDGS DRC	WDGS SFC
DRC	75.06	-	47.18	-
SFC	-	75.06	-	47.18
WDGS	-	-	35.00	35.00
Alfalfa	10.00	10.00	10.00	10.00
CSM	3.50	3.50	-	-
Glycerin	5.00	5.00	5.00	5.00
Fat	2.96	2.96	-	-
Limestone	1.44	1.44	1.08	1.08
Urea	1.34	1.34	0.84	0.84
Supplement	0.70	0.70	0.70	0.70

35% WDGS and Corn Processing Animal Performance

Item	DRC control	SFC control	WDGS DRC	WDGS SFC	SE
Initial BW	675	683	677	678	18
Final BW	1240	1281	1282	1272	25
DMI, lb ¹	20.2	18.8	19.8	18.1	0.5
ADG, lb	3.25	3.44	3.46	3.41	0.12
F:G ^{1,2,3}	6.27	5.48	5.75	5.35	0.15

¹DRC vs SFC ($P < 0.01$)

²WDGS vs none ($P = 0.02$)

³Interaction of corn processing and WDGS inclusion ($P = 0.30$)

8.5% improvement in F:G in DRC diets

2.7% improvement in F:G in SFC diets

35% WDGS and Corn Processing Carcass Characteristics

Item	DRC control	SFC control	WDGS DRC	WDGS SFC	SE
HCW, lb	781	807	808	801	16
Rib fat, in	0.53	0.59	0.54	0.55	0.03
Marbling ¹	504 ^b	562 ^a	516 ^b	516 ^b	18
Adj. Marb. ²	505	540	525	526	15
LMA, sq in ³	13.4	13.4	12.7	12.8	0.3
YG	2.94	3.18	3.20	3.20	0.17

¹500=Small⁰; Interaction of corn processing and WDGS inclusion ($P < 0.10$)

²Ultrasound estimated marbling from trial initiation used as a covariate.

³WDGS vs none ($P = 0.02$).

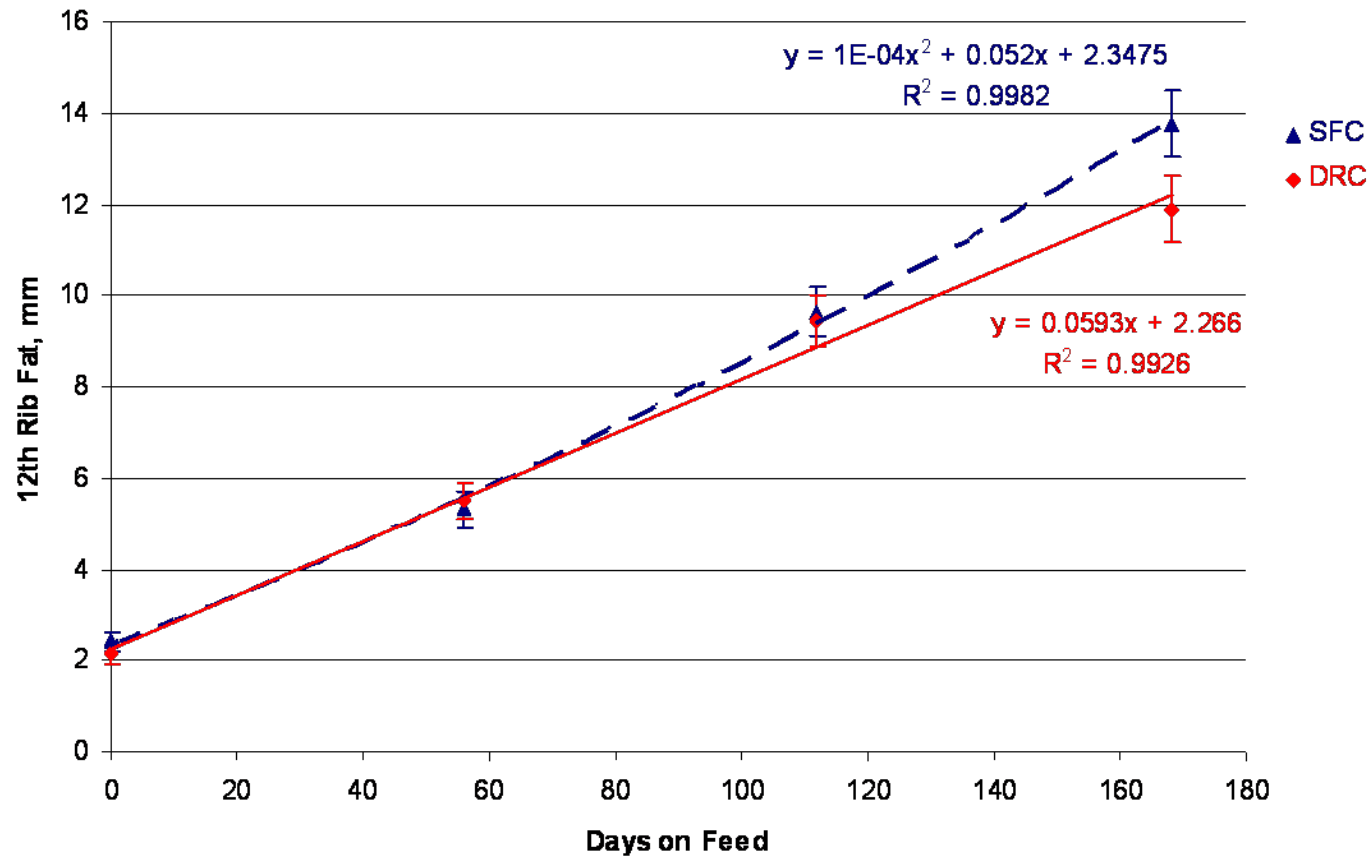
35% WDGS and Corn Processing on Blood Glucose Concentration

Item	DRC control	SFC control	WDGS DRC	WDGS SFC	SE
Blood Glucose¹	79.9	78.4	76.5	73.3	4.9
NADP- MDH²	48.1	79.4	49.2	67.7	8.8
6-PFK	77.3	79.6	85.7	80.3	11.9

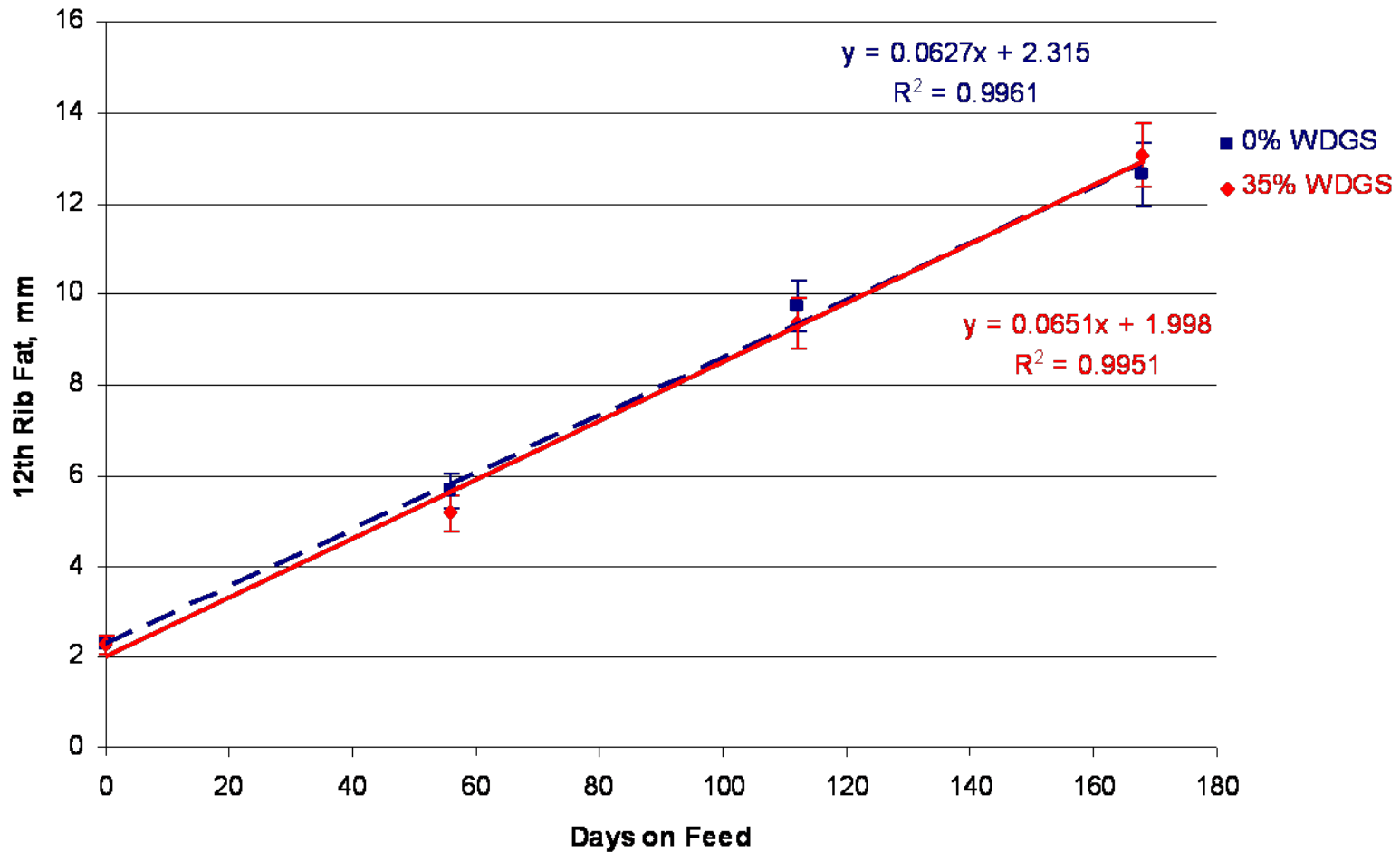
¹DRC vs SFC ($P = 0.10$) and WDGS vs None ($P < 0.01$)

²DRC vs SFC ($P = 0.10$)

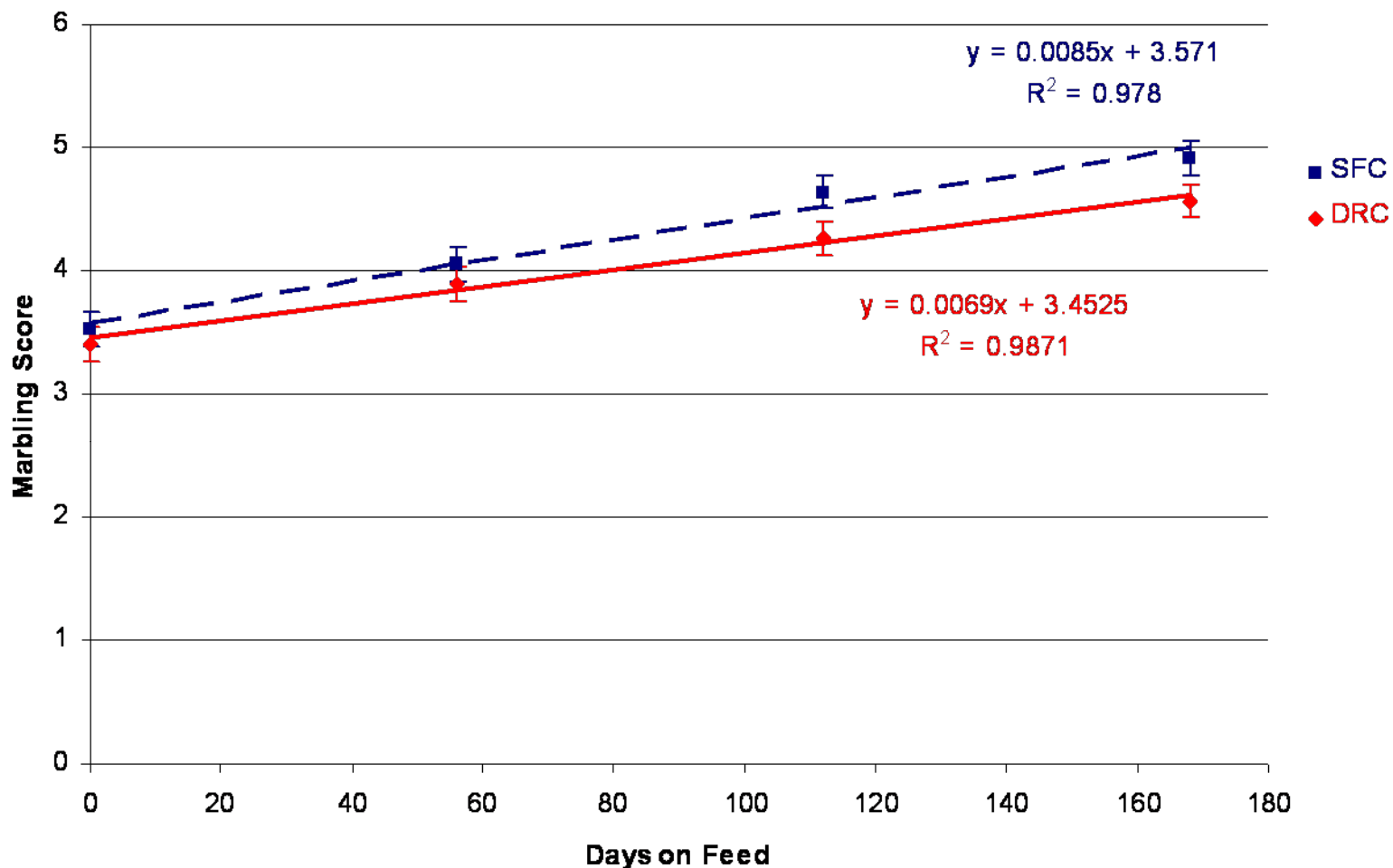
Effects of Corn Processing on 12th Rib Fat Accretion



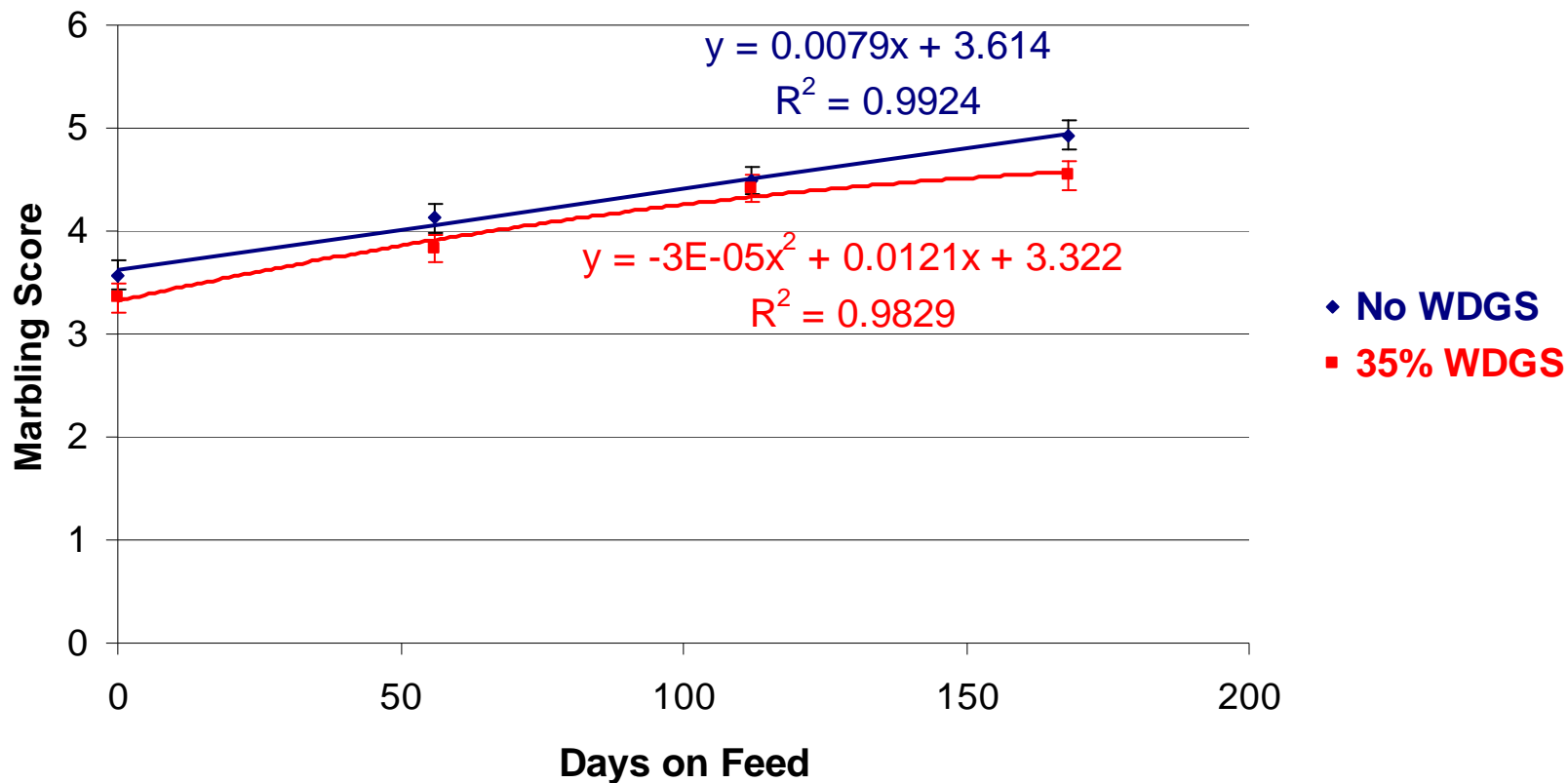
Effects of WDGS Inclusion on 12th Rib Fat Accretion



Effects of WDGS Inclusion on Rate of Marbling



Effects of WDGS Inclusion on Rate of Marbling



35% WDGS and Corn Processing Fatty Acids of Loins

Item	DRC control	SFC control	WDGS DRC	WDGS SFC	SE
16:0	25.7	25.8	26.3	25.0	0.6
16:1 ¹	2.82	3.09	2.60	2.68	0.13
18:0 ²	14.9	13.3	14.9	13.8	0.4
18:1 t11 ^{1,2}	2.10	4.63	6.19	6.19	0.66
18:1 c9 ¹	36.6	35.5	33.6	32.4	0.9
18:1 c11 ^{1,2}	1.38	1.47	0.99	1.31	0.09
16:1/18:0 ^{1,2}	0.192	0.238	0.182	0.199	0.014
MUFA:SFA ¹	0.905	0.868	0.762	0.766	0.031
Total Fat ¹	13.9	13.7	16.7	16.0	1.5

¹WDGS vs none ($P < 0.10$)

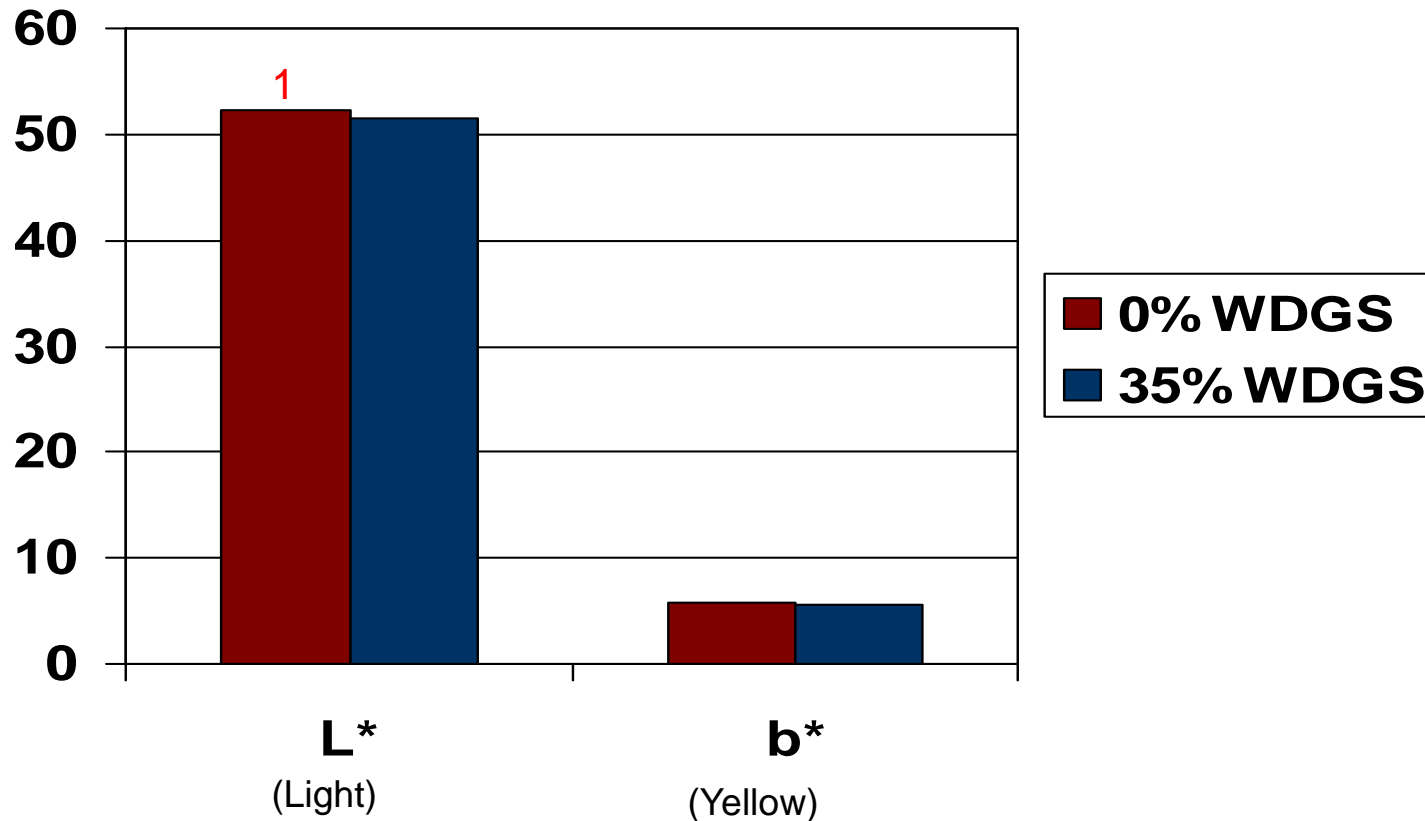
²SFC vs DRC ($P < 0.10$)

35% WDGS and Corn Processing Palatability Attributes

Item	DRC control	SFC control	WDGS DRC	WDGS SFC
Juiciness ¹	13.5 ^c	12.2 ^a	12.6 ^b	12.4 ^{ab}
Muscle fiber tenderness ¹	13.6 ^c	13.1 ^{ab}	13.0 ^a	13.3 ^b
Connective tissue amount ¹	14.5 ^c	14.2 ^a	14.3 ^{ab}	14.4 ^{bc}
Overall tenderness ¹	13.6 ^b	13.1 ^a	13.1 ^a	13.3 ^b
Overall flavor intensity ¹	12.5 ^b	12.3 ^a	12.2 ^a	12.3 ^{ab}

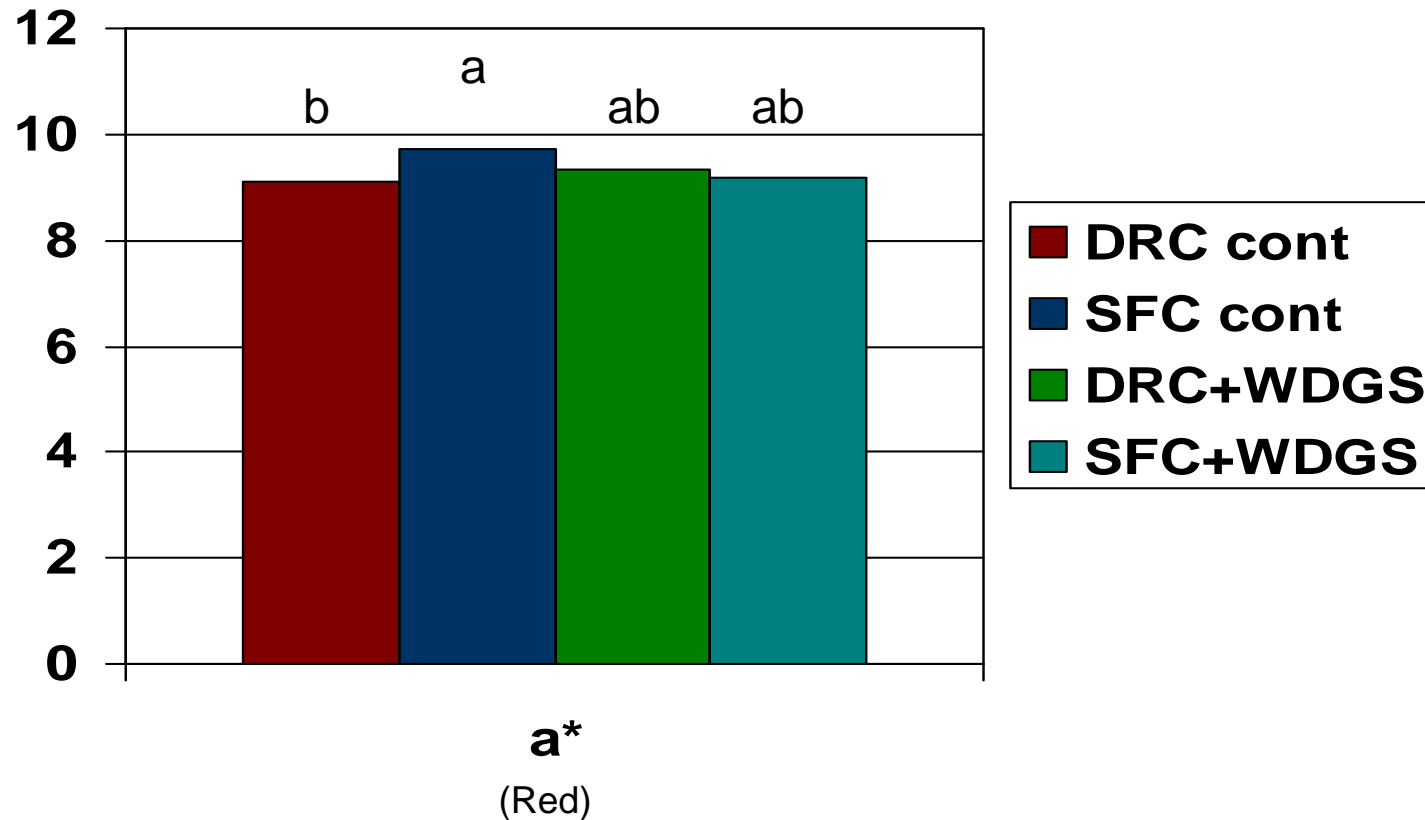
¹Interaction of corn processing method and WDGS inclusion ($P < 0.01$)

35% WDGS and Corn Processing Color of Loins



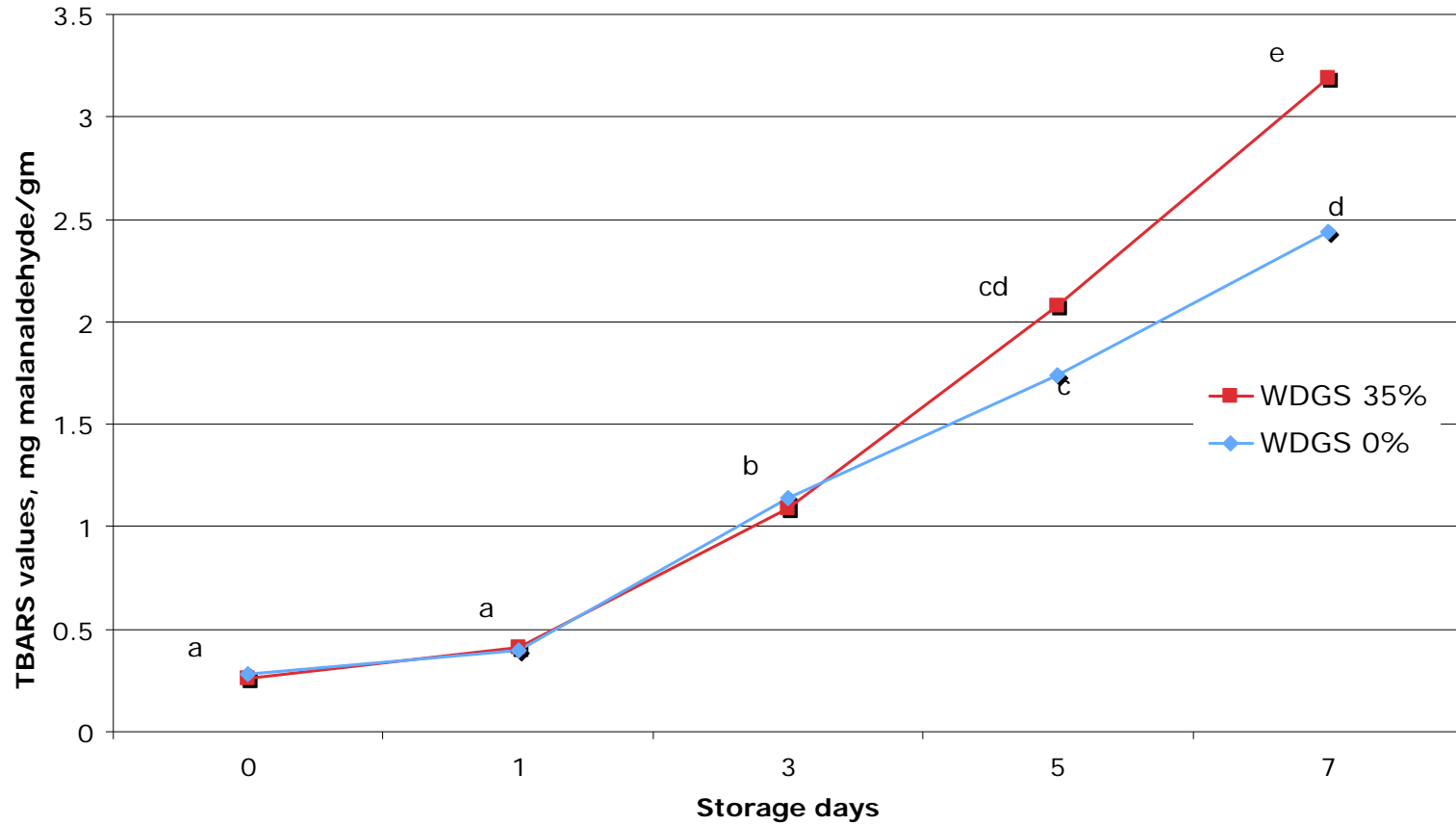
¹WDGS vs none ($P < 0.10$)

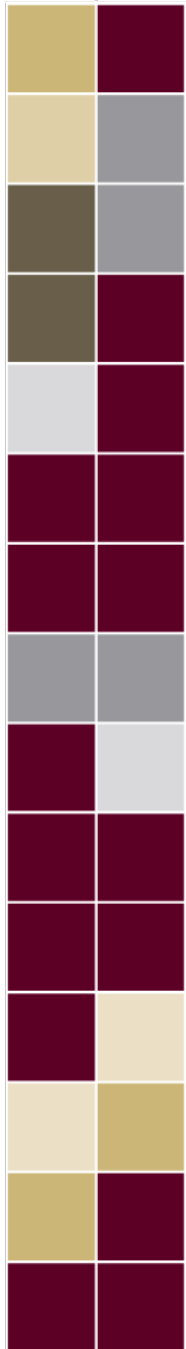
35% WDGS and Corn Processing Color of Loins



Interaction of WDGS and corn processing method ($P < 0.001$)

35% WDGS and Corn Processing Shelf Life





WDGS Conclusions

Improved feed efficiency 2.7 – 8.5%

Evidence for reduced delta 9 desaturase activity.

Ultrasound estimates suggest reduced marbling at end of feeding period.

Increased total fat content.

No difference in marbling scores.

Equilibrated differences in palatability attributes due to corn processing.

Darker steaks.

Increased lipid oxidation after 5 days of storage.



Collaboration



- Dr. Ted McCollum, AgriLife Extension
- Dr. Steve Smith, TAMU Animal Science
- Dr. Rhonda Miller, TAMU Animal Science
- Dr. Ty Lawrence, WTAMU Agriculture
- Dr. Andy Cole, USDA-ARS
- Dr. Karla Jenkins, AgriLife Research
- Emalee Buttrey, AgriLife Extension and WTAMU PhD student
- Jennifer Lewis, WTAMU undergraduate student

Beef and veal producers through the checkoff!

Improving Life through Science and
Technology.