

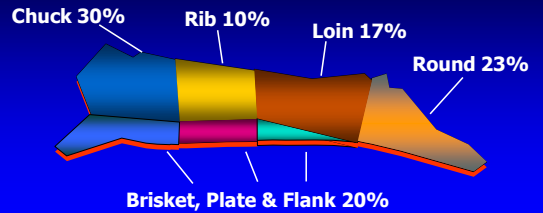
Where's the Beef? New Products & Impact of Distillers Grains on Quality

Chris R. Calkins, Ph.D.

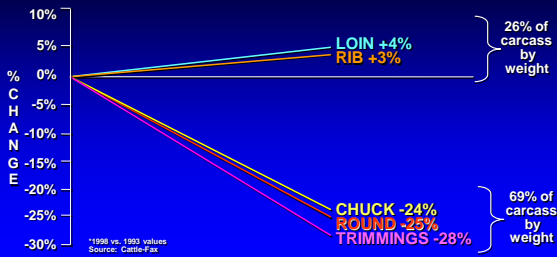
Nebraska Beef Industry Professor of Animal Science
University of Nebraska-Lincoln, USA



The Beef Carcass



Beef Primals Price Trends



Cheap Chuck Roast



Muscle Profiling - Goal

1. Increase the value of the chuck and round
2. Create an encyclopedia of knowledge of each muscle

Muscle Profiling Is:

- A comprehensive body of work that fully characterizes the chuck and round, such as:
 - Tenderness
 - Composition
 - Processing traits
 - Dimensions
 - Color
 - Others

Muscle Profiling - How

144 carcasses x 39 muscles in each = 5,616 muscles

3 quality grade classes, 4 yield grade classes, 3 weight classes

Cooperative project with University of Florida

Profiling Muscles of the Chuck and Round

		250-295 kg	Carcass Weight 318-363 kg	386-431 kg
Upper 2/3 Choice	YG 1			
	YG 2			
	YG 3			
	YG 4&5			
Low Choice	YG 1			
	YG 2			
	YG 3			
	YG 4&5			
Select	YG 1			
	YG 2			
	YG 3			
	YG 4&5			

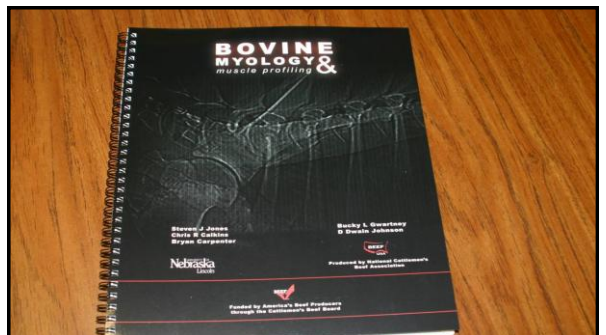
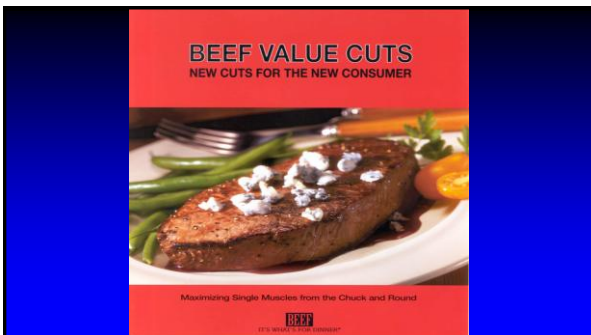




Muscle Profiling - Results Chuck Summary Data

	Fat %	pH	WHC	Bind, mL	Myoglobin mg/g	Collagen mg/g	Moist, WBS	Dry, WBS
Biceps brachii	Yellow	Green	Green	Green	Green	Green	Green	Green
Brachiocephalicus omo.	Yellow	Green	Green	Green	Green	Green	Green	Green
Brachialis	Yellow	Green	Green	Green	Green	Green	Green	Green
Cutaneous omo brachialis	Yellow	Green	Green	Green	Green	Green	Green	Green
Compositus	Yellow	Green	Green	Green	Green	Green	Green	Green
Deep pectoral	Yellow	Green	Green	Green	Green	Green	Green	Green
Deltoideus	Yellow	Green	Green	Green	Green	Green	Green	Green
Dorsalis obliquus	Yellow	Green	Green	Green	Green	Green	Green	Green
Infraspinatus	Yellow	Green	Green	Green	Green	Green	Green	Green
Interosseus lateralis	Yellow	Green	Green	Green	Green	Green	Green	Green
Latissimus dorsi	Yellow	Green	Green	Green	Green	Green	Green	Green
Longissimus cap. et Atlantici	Yellow	Green	Green	Green	Green	Green	Green	Green
Longissimus costarum	Yellow	Green	Green	Green	Green	Green	Green	Green
Longissimus dorsi	Yellow	Green	Green	Green	Green	Green	Green	Green
Levator costarum	Yellow	Green	Green	Green	Green	Green	Green	Green
Multifidus & spinatus dorsi	Yellow	Green	Green	Green	Green	Green	Green	Green
Rhomboidalis	Yellow	Green	Green	Green	Green	Green	Green	Green
Scapularis dorsalis	Yellow	Green	Green	Green	Green	Green	Green	Green
Serratus ventralis	Yellow	Green	Green	Green	Green	Green	Green	Green
Spinosus	Yellow	Green	Green	Green	Green	Green	Green	Green
Superficial pectoral	Yellow	Green	Green	Green	Green	Green	Green	Green
Subscapularis	Yellow	Green	Green	Green	Green	Green	Green	Green
Supraspinatus	Yellow	Green	Green	Green	Green	Green	Green	Green
Tenderloin antibrachii	Yellow	Green	Green	Green	Green	Green	Green	Green
Torus major	Yellow	Green	Green	Green	Green	Green	Green	Green
Trapezius	Yellow	Green	Green	Green	Green	Green	Green	Green
Trochanter brachii	Yellow	Green	Green	Green	Green	Green	Green	Green

Shear G = 8.5
 Force Y = 25.11.0
 Value R = 11.0
 Fat G = 5%
 Y = 5.10 %
 R = 10%
 pH G = 5.8
 Y = 5.8 * 5.7
 S = 0.7
 Possible G = 35%
 Moisture Y = 36.36%
 (WHC) R = 38%
 Bind G = 170 mL
 Y = 190.72 mL
 R = 170 mL
 Myoglobin G = >25 mg/g
 Y = 20.25 mg/g
 R = <20 mg/g
 Collagen G = <10 mg/g
 Y = 10.15 mg/g
 R = >15 mg/g



Bovine Myology – Muscle Profiling Web Site

Univ. of NE

<http://bovine.unl.edu>

Muscle Profiling - Consequences

The Value Cuts

- Flat Iron Steak
- Shoulder Tender
- Ranch Cut (Clod Heart)
- Knuckle Center
- Western Griller

Shoulder Clod, 114 A



Shoulder Clod, separated



Shoulder

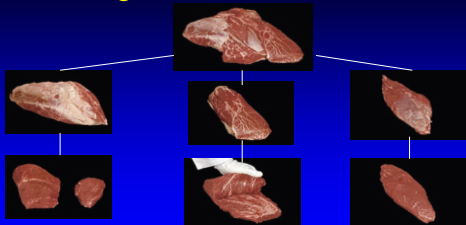


Top Blade



Shoulder Tender

Cutting the Shoulder Clod



Ranch Steaks

Flat Iron Steaks

Petite Tenders

More than 20,000 Restaurants



Volume of Cuts in Foodservice 2005 versus 2007 (million pounds)

Cut	2005	2007	Increase
Flat Iron	47	92	95%
Potite Tender	28	40	42%
Ranch Cut	31	37	19%
Total	106	169	59%

Volume - Steaks in Foodservice 2007

Steaks	Pounds in Millions	%
Ribeye and Strip Steaks	373	26
Sirloin	292	21
Other steaks	222	16
Filet Mignon	253	18
T- Bone	62	4.4
Porterhouse	35	2.5
Flat Iron	92	6.5
Potite Tender	40	2.8
Ranch Cut	37	2.6

Source: Technomic Usage and Volumetric Assessment of Beef, 2006

More than 9,000 Supermarkets



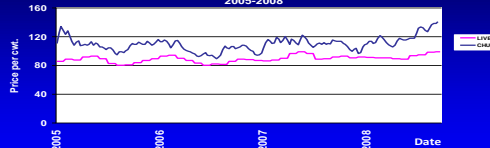
Value-added Cuts



Value of Chuck versus Live Animal
1995 - 1999



Values of Chuck versus Live Animal
2005-2008



Impact on Price of Live Cattle



The New Cuts Added
\$60 to \$70 per Head
for the Live Animal



Muscle Rank Based on Tenderness

Rank	Muscle name	Common name	Primal cut	Cortes bovino
1	Psoas major	Tenderloin	Tenderloin	Lomo
2	Infraspinatus	Top blade	Clod	Marscha
3	Spinalis dorsi	Rib cap	Ribeye	Tapo de bife ancho
4	Serratus ventralis	Boneless short rib	Chuck roll	10 costillas - Plancha
5	Multifidus dorsi		Chuck roll	Aguja
6	Subscapularis		Chuck roll	Tapo de aguja
7	Teres major	Patte tender	Clod	Aguja
8	Rectus femoris	Sirloin tip center	Knuckle	Bola de lomo (centro)
9	Longissimus dorsi	Loin eye	Loin	Bife angosto
10	Obligatus internus abdominis	Bottom sirloin flap	Sirloin	Bife grande de vacio
11	Gracilis	Round cap	Inside round	Tapo de nalga
12	Triceps brachii	Clod heart	Clod	Centro de carnaza de paleta
13	Gastrocnemius	Heel	Heel	Bavarrina
14	Rectus abdominis	Flank	Flank	Bife de vacio
15	Sacrotuberanosus/Adductor	Inside round	Inside round	Nalga de adentro sin tapa
16	Biceps femoris	Outside round flat	Outside round	Cucharda
17	Suprapinnatus	Mock tender	Clod	Chingolo
18	Semimembranosus	Eye of round	Eye of round	Pavetto
19	Splenius	Sierra cut	Chuck roll	Aguja
20	Superficial & deep pectoral	Brisket	Brisket	Pecho
21	Gluteus medius	Top sirloin	Sirloin	Candril sin tapa
22	Triceps	Lifter meat	Lifter meat	Tapo de bife ancho
23	Rhomboides	Hump	Chuck roll	Aguja

Next Frontier...Chuck Roll



Chuck Roll
NAMP 116A



Beef Chuck, Chuck Roll
NAMP 116A



Beef Chuck, Chuck Eye Roll
NAMP 116D



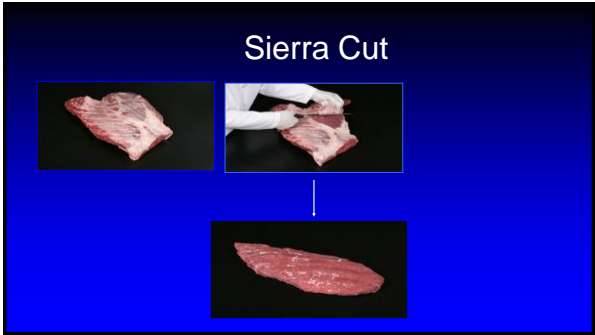
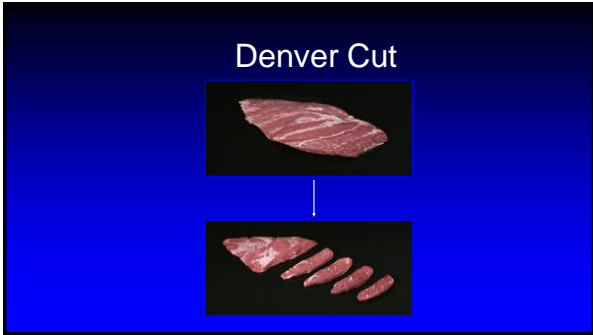
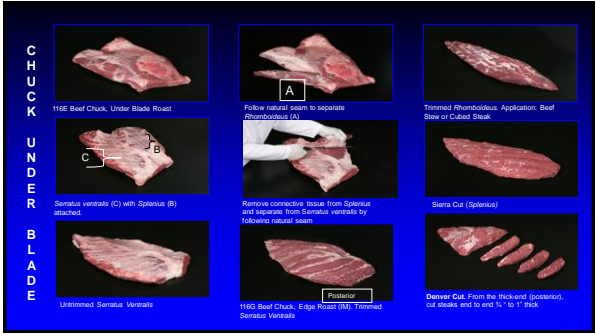
Beef Chuck, Under Blade Roast
NAMP 116E

Chuck Eye Steaks



Boneless, Country-Style Beef Chuck Eye Ribs

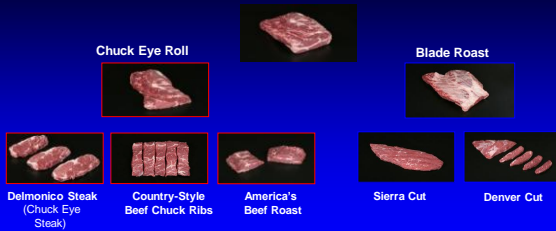




Regular Fab.		Bnls Rib Fab.	
Chuck eye steaks	10.5%	Bnls Ribs	37.3%
Bnls chuck roast	67.2%	Denver steaks	21.4%
Stew	8.4%	Sierra cut	6.0%
80/20	8.4%	Stew	13.4%
		80/20	12.3%

Regular Fab.		Bnls Rib Fab.	
Chuck eye steaks	10.5%	Bnls Ribs	37.3%
Bnls chuck roast	67.2%	Denver steaks	21.4%
Stew	8.4%	Sierra cut	6.0%
80/20	8.4%	Stew	13.4%
		80/20	12.3%
Cut Yield	94.54	90.34	
Net \$	\$147.88	\$255.35	
Net %	41.0%	53.5%	

The Chuck is on a Roll!



For Extra Information

www.beefinnovationsgroup.com

UNIVERSITY OF
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Lincoln



Effect of Distillers Grains on Beef Carcass Quality and Palatability



Chris R. Calkins, Ph.D.
Amliton S. de Mello, Jr.
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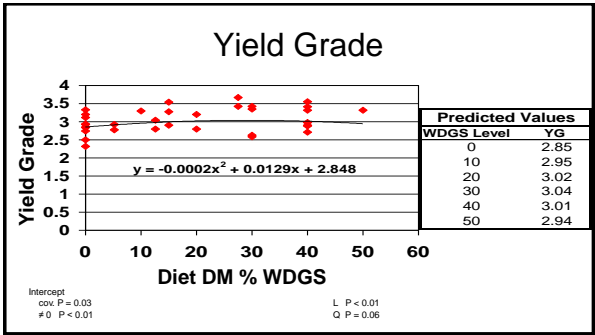
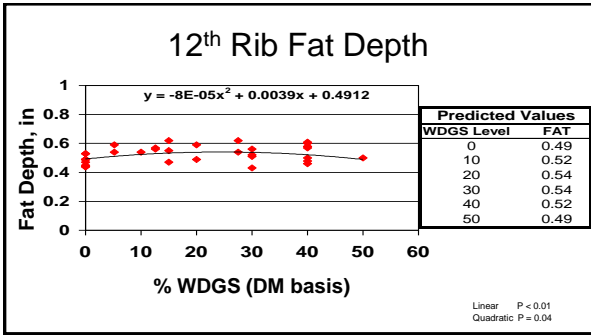
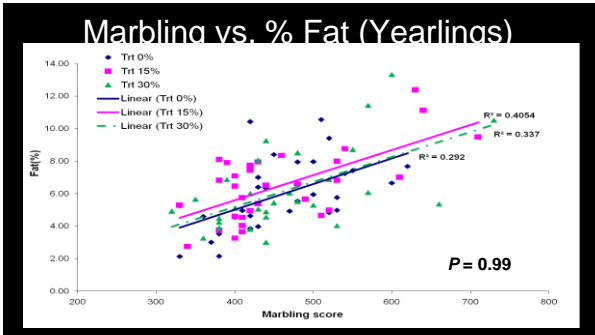
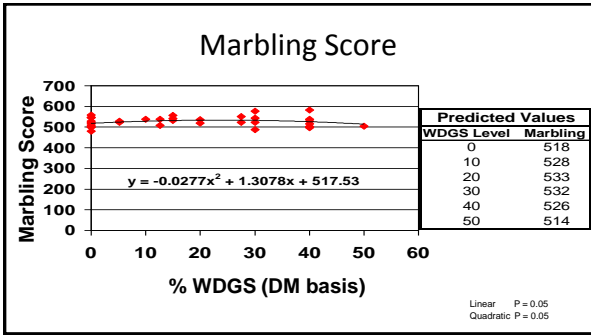
Outline

- Carcass traits
 - Marbling, carcass fatness
- Fatty acid changes
- Shelf Life
- Oxidation
- Eating Quality
- Wet distillers grains versus distillers solubles, benefits of Vitamin E
- Optimal level of Vitamin E

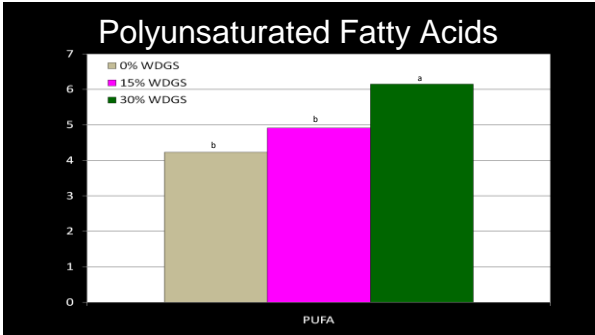
Marbling attributes (Yearlings)

Attributes	0%	15%	30%	P-value
Score ¹	Small ²⁰	Small ²²	Small ³⁰	0.89
Fat, %	5.44	5.91	5.94	0.19

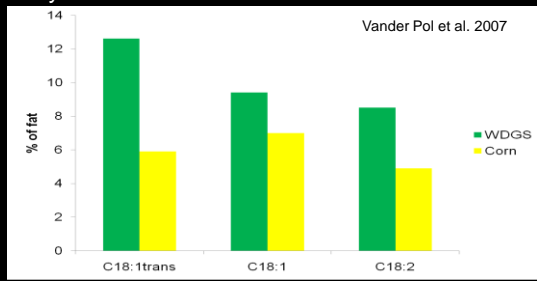
¹Slight = 300 - 399, Small = 400 - 499



- ### Take-Home Points
- Fat thickness
 - Slight increase, then back to normal
 - Yield grade
 - Slight numerical increase, then back to normal
 - Marbling
 - No negative effect on amount of marbling
 - No effect on “visualization” of marbling by the USDA grader



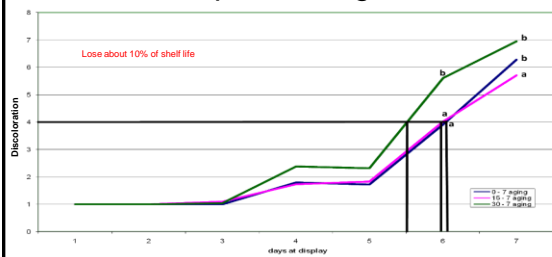
Fatty acids at the duodenum - Corn vs WDGS



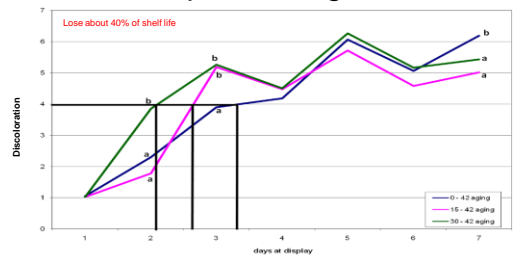
30% discoloration



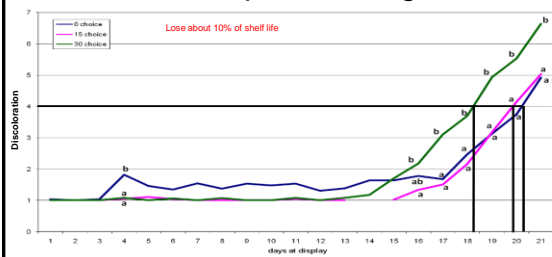
Infraspinatus, aged 7 d



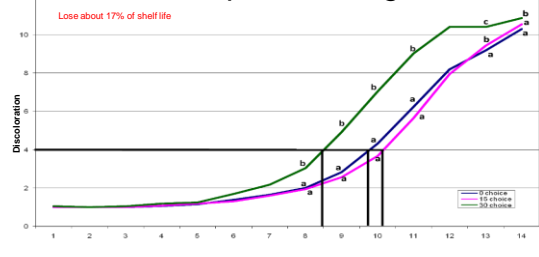
Infraspinatus, aged 42 d



Choice Strip steaks, aged 7 d



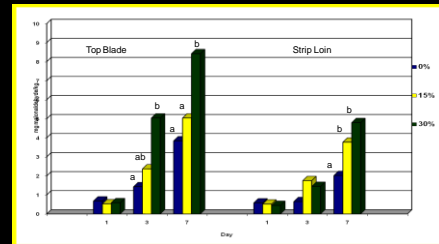
Choice Strip steaks, aged 42 d



Why Reduced Shelf-life?

- Color is compromised by oxidation.
- Myoglobin is oxidized to brown.

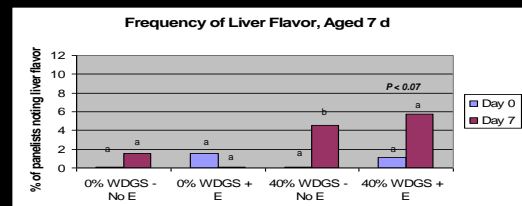
Rancidity (TBA) during Retail Display



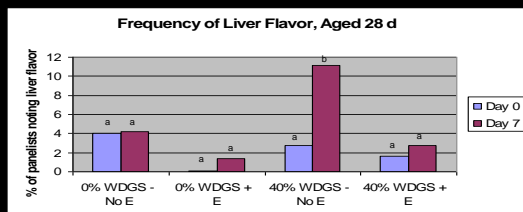
Eating Quality

- Trained Evaluation (Jenschke et al., 2007)
 - Cattle fed 0, 10, 20, 30, 40, and 50 WDGS
 - No effect on tenderness
 - No treatment effects noted for:
 - Metallic, sour, charred, oxidized, rancid or livery
- However, that research was done with meat directly removed from the vacuum bag
 - no retail display (no exposure to oxygen)

Liver Flavor



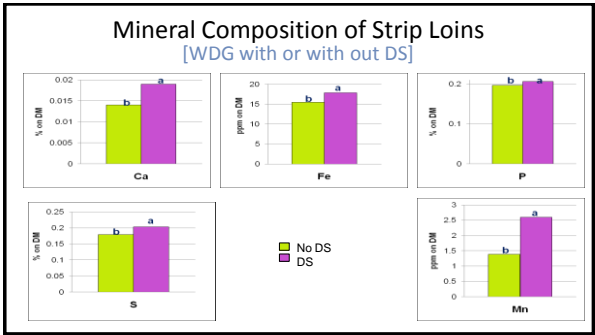
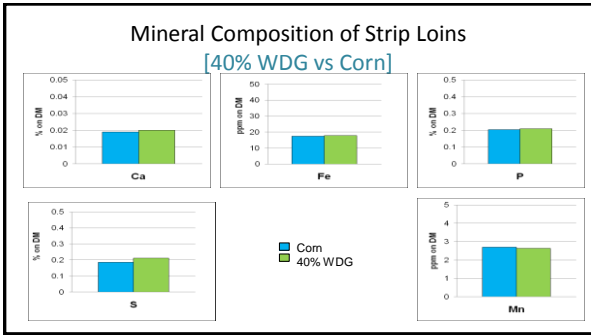
Liver Flavor



How to Address the Issue?

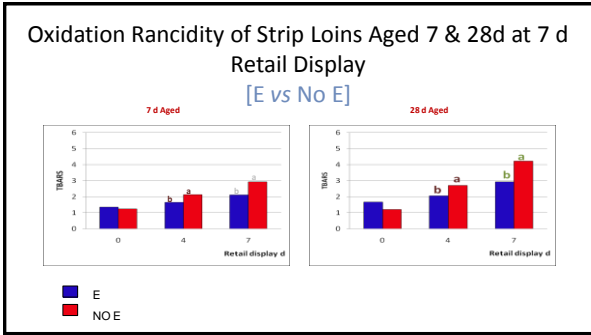
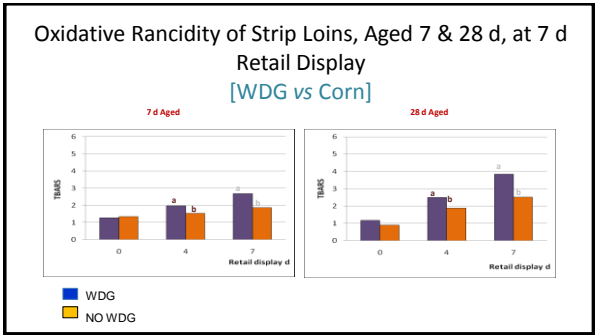
- Vitamin E is an antioxidant
- Can be fed during the finishing phase
- Question – can feeding high doses of vitamin E help to address the issue?
- Study – WDG at 0, 20 or 40%
 - With or without solubles
 - With or without vitamin E

(fed at 500 IU/head/d for entire feeding period)



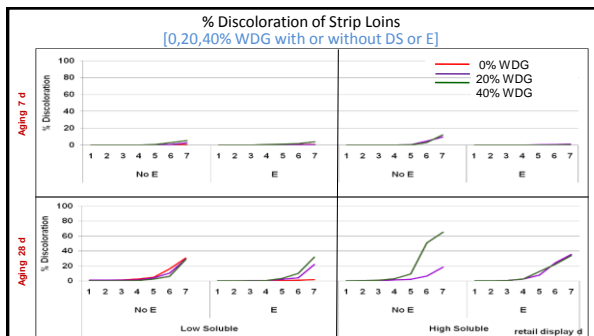
Take Home Point

- The solubles cause an increase in the mineral content of the muscles – minerals which support oxidation



Take Home Points

- Feeding WDG causes an increase in oxidation
- The effect is mitigated through feeding of vitamin E

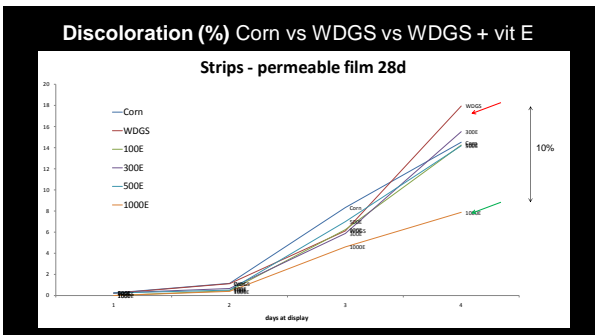
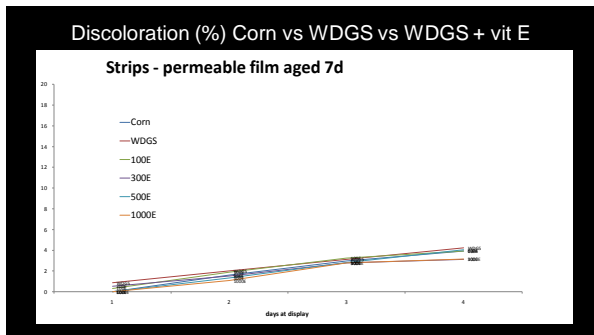
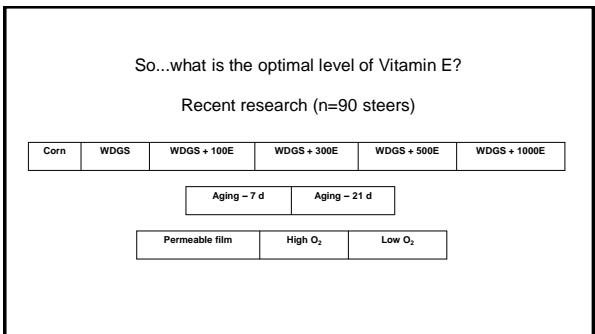


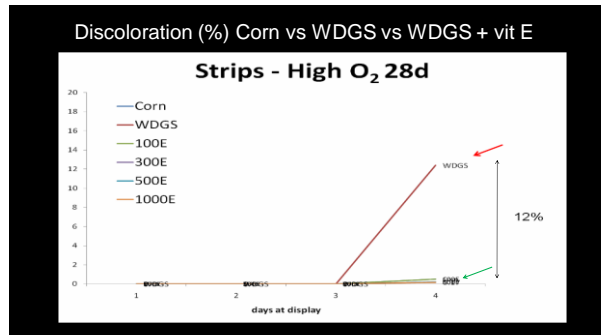
Take Home Points

- Retail color stability is less a problem if the beef is aged just 7 d. When beef is aged longer, discoloration is an issue.
- Solubles exagurate the discoloration

Take Home Points

- Vitamin E?
 - Vitamin E helps to minimize problems with oxidation, discoloration and off-flavors when fed with WDG
- What is the optimal level of vitamin E?





- ### Take Home Points
- The ideal level of vitamin E depends on the packaging system to be used
 - With minimal aging (7 d), little to no vitamin E is needed
 - With extended aging, up to 1,000 IU/head/day are necessary.

- ### Summary
- Carcass traits
 - No negative effects on marbling traits
 - Meat traits
 - Increased PUFA
 - Decreased shelf life
 - Increased off flavors
 - Vitamin E helps to mitigate these issues
 - Levels up to 1,000 IU/head/d are needed



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