

Corn Alternatives

- Co-products historically used for protein; corn stover for bedding
- National energy policy
 - Over 13 billion gallons in 2011
- Incentives for higher inclusion

Optimum Inclusion rates of DGs

- Dependent on:
 - Cost vs. corn
 - Source
 - Type
 - Roughage
 - Water
 - Production system



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Diet Composition

Feed	Nutrients in 25% DDGS Diet			
	%	Protein	Fat	Sulfur
DDGS	25	7.4	2.6	0.10 - 0.28
Corn	60	5.9	2.6	0.08
Hay	10	1.0	0.3	0.02
o% CP suppl.	5	-	-	-
Total		14.3		0.20 - 0.38

Diet Composition

Feed	Nutrients in 50% DDGS Diet			
	%	Protein	Fat	Sulfur
DDGS	50	14.8	5.2	0.20 - 0.55
Corn	35	3.4	1.5	0.05
Hay	10	1.0	0.3	0.02
o% CP suppl.	5	-	-	-
Total		19.2	7.0	0.27 - 0.62



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CHALLENGES

1) Fat

2) Nitrogen

3) Sulfur



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Fat

- Corn oil
 - Unsaturated
 - In fiber
- Excellent energy source
 - Oil displacement in feed? Feeding level?
- Ruminants
 - Effects on digestibility of fiber?



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Nitrogen

- Energy cost to the animal
 - Conversion to urea
 - Large tissue size for deamination enzymes
- Environment
 - +P
 - Eutrophication
 - Nutrient management plans



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Sulfur

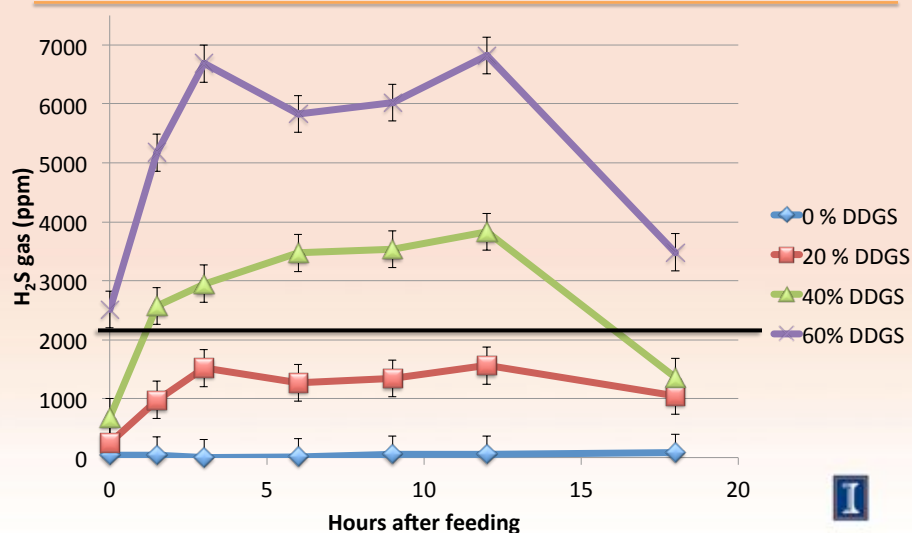
TOXICITY

- Animals decrease DMI
 - Decreased ADG
- Polioencephalomalacia
 - “Brainers”
- S variability *within* a plant may be 5-10%
- *Between* plant variation from 0.5-1.2% S



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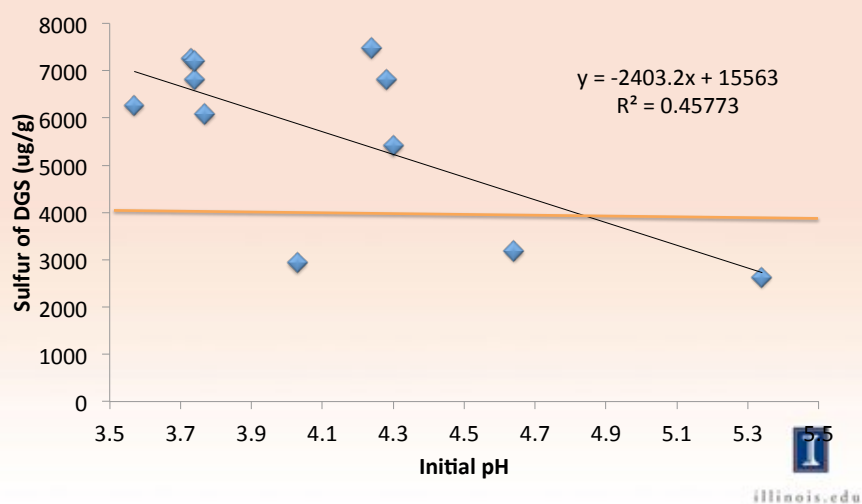
The effect of DDGS on H₂S gas concentration



Sulfur

- Know S levels in coproducts
- Water S
- Increase roughage?

Correlation between pH and S



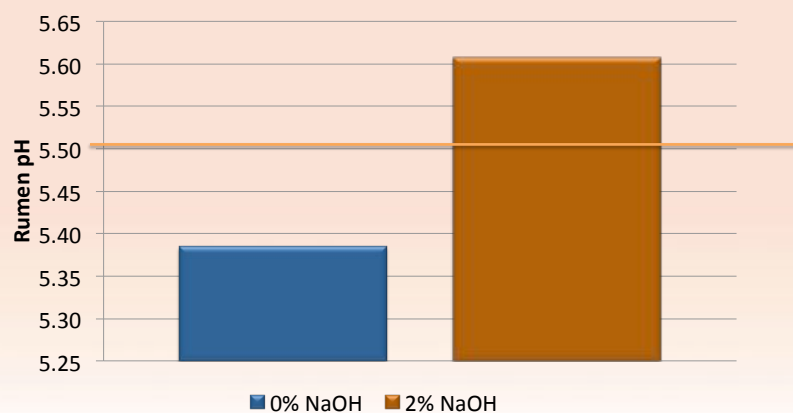
Acidity and Coproducts

- Sulfuric acid used in production
 - MUCH stronger than the VFA in the rumen
- Animals unable to buffer all the acid
 - Affecting performance?
- Can we buffer before/during feeding?



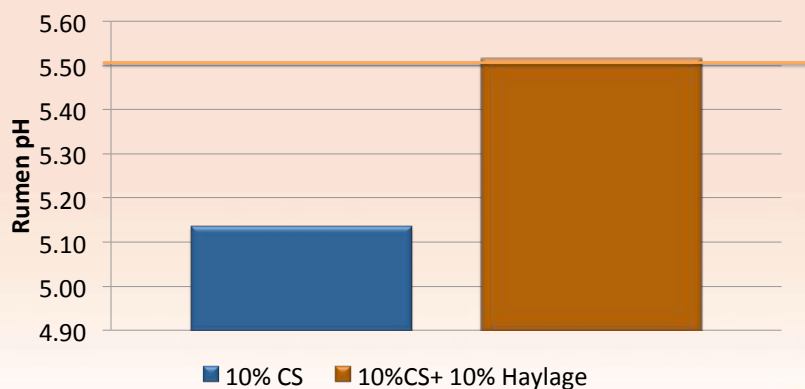
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Neutralizing Acid with NaOH



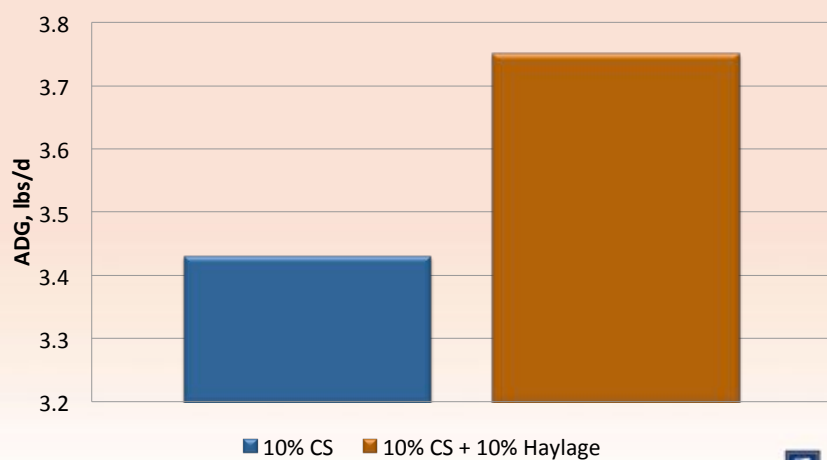
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Neutralizing Acid with Forage



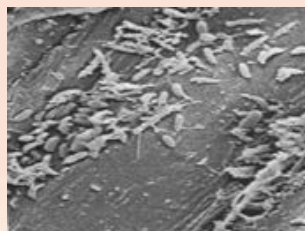
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60% DDGS-based diets



Roughage and DDGS

- Increasingly important with higher inclusions
- Rumen motility
- Sustain rumen microbial function and survival



CORN STOVER TREATMENT AT BRU



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What we get at the farm





Ground in a Haybuster tub grinder through a 1" screen



Ground stover before treatment



Loading dry stover into truck



Adding water while the truck mixes



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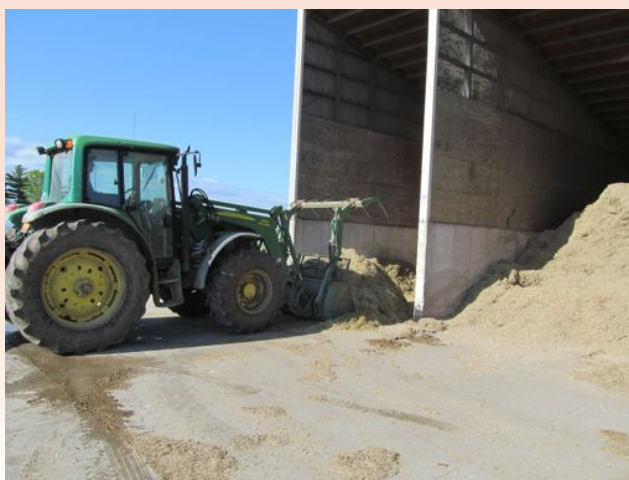
Adding CaO from Mississippi Lime



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Filling a bay



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Treated with CaO



Before and After (same day)



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Bagged stover 9 months old



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Comparing Stover and Corn

	Corn control	5% CaO Stover
ADG, lbs	3.22	2.85
DMI, lbs	19.39	17.00
Feed:Gain	6.01	5.96

- Average of 2 trials at UIUC
- Similar feed:gain conversion



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Comparing Stover and Corn

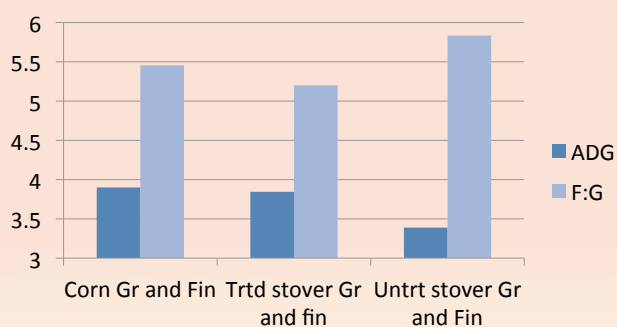
	Corn control	5% CaO Stover
ADG, lbs	3.78	3.83
DMI, lbs	25.81	26.11
Feed:Gain	6.83	6.82

- UNL
- Corn and stover compare similarly



Adapted from Erickson, 2011 illinois.edu

Comparing Stover and Corn



- ISU
- Corn and treated stover compare similarly



Adapted from Russell et al., 2011 illinois.edu

Comparing Stover and Silage

	Untreated Stover	5% CaO Stover	Silage
ADG, lbs	2.88	2.43	3.27
DMI, lbs	19.8	16.4	18.9
Feed:Gain	6.89	6.75	5.78

- Stover wetted to 50% moisture
– ensiled
- Silage at 40% diet DM, stover at 20%



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Questions



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