Increasing the feeding value of rice straw

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The culmination of 3 years

Wrapped and stacked
Assigned reps

Stacked in feed barn by treatment/rep

Consumption/waste measured

Height, width, weight

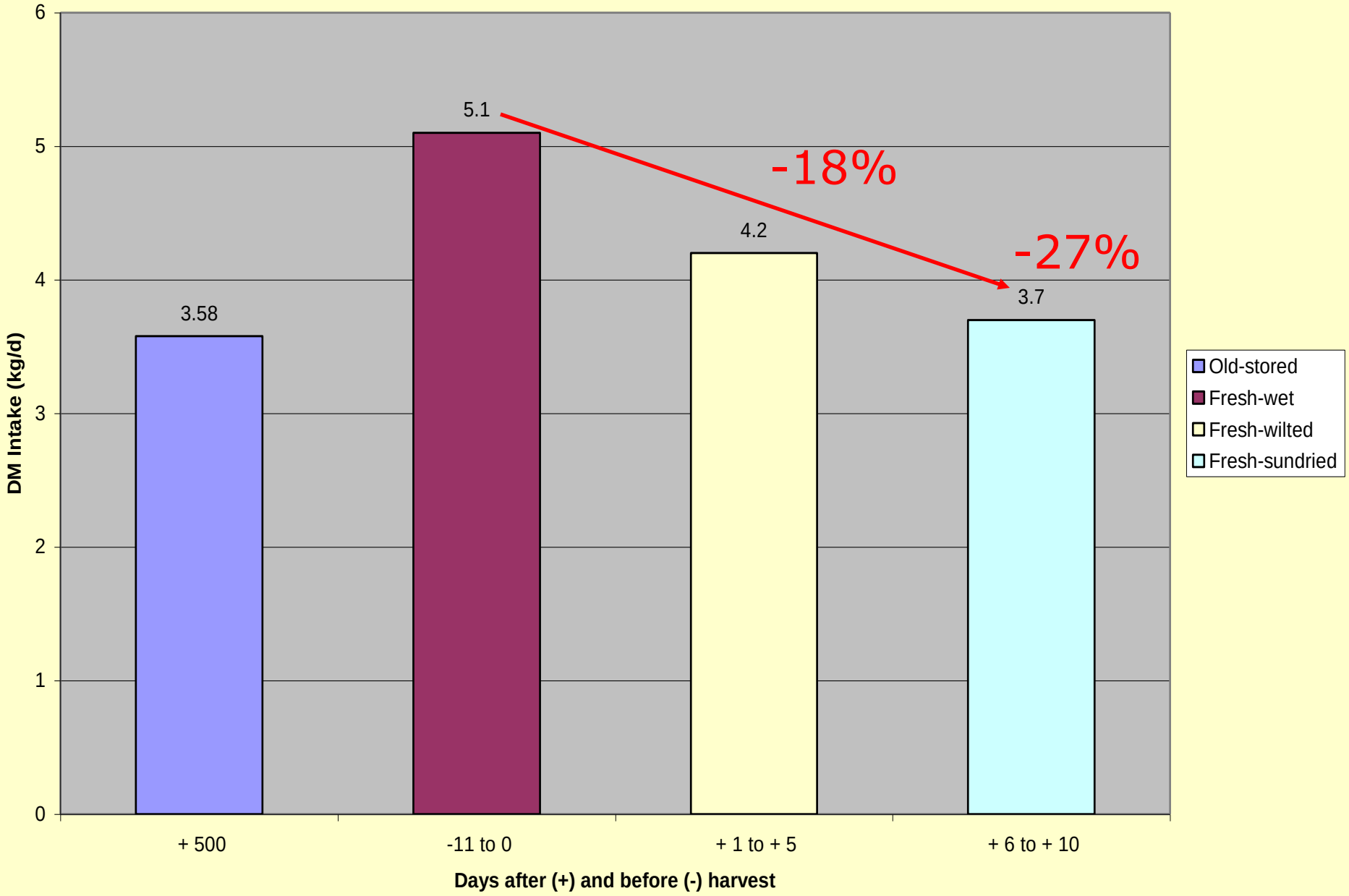
We didn't starve them

- Flaked corn = 84% – 5.6 lbs/head/day
- Cottonseed = 15% – 1 lb/head/day
- Calcium carbonate = 0.7% – 0.05 lbs/head/day

Total grain ration of 6.65 lbs/head/day

Cattle started at 650 lbs

Mean dry matter intake from old-stored, fresh-wet, fresh-wilted and fresh-sundried rice straw



Why?

- **Dry down is associated with a change in rice straw that:**
  - **depresses intake by ~30%**
  - **depresses energy level ~20%**

- **Changes a forage with modest nutritional value to one with a very low nutritional value**

Year 1

2014	All treatments baled 2-3 hours post rice harvest at 48% dry matter	Treatment intentions
Lactic acid	1.0 g/ton	Prevent mold formation
Propionic acid	3 lbs/ton	Prevent mold formation
Control	high moisture straw not treated	

Forage quality results

	Control	Propionic acid	Lactic acid bacteria
Intake lbs/hd/d	11.4[a]	11.3[a]	17.7[b]
Dry matter, %[1]	60.9[a]	63.6[a]	61[a]
pH	8.06[a]	7.54[a]	7.96[a]
ADF, %	40.7[a]	38.1[b]	39.0[b]
aNDF, %	61.7[a]	58.9[b]	59.1[b]
Crude protein, %	5.3[a]	5.0[a]	5.4[a]
Mold, million cfu/g	3.4[a]	2.6[a]	1.5[b]
Yeast, million cfu/g	2.8[a]	2.5[a]	2.0[a]

[1]Within a row values with the same letter are not different (P>0.05)

Mold guide

- 1 = <500,000 (low mold level)
- 2 = <1,000,000 (safe to feed)
- 3 = <2,000,000 (caution is advised)
- 4 = <3,000,000 (observe cattle closely for abnormal symptoms)
- 5 = <4,000,000 (dilute prior to feeding with mold free feed)
- 6 = >5,000,000 (do not feed unless at very low levels and in a
- really well mixed ration)

Average daily gain

Average Daily gain	Control	Propionic acid	Lactic acid bacteria	Standard error
Period 1[1]	1.9[b]	1.44[a]	1.4[a]	
Period 2	0.23[a]	0.33[a]	1.33[b]	0.132

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Period 1 includes day 0-45, period 2 includes day 45-90

Year 2

Straw flail chopped after rice harvest and baled with dew moisture at 20% dry matter		
Lactic acid	1.0 g/ton	Prevent mold formation
Lactic acid + molasses spray	1.0 g/ton + 1.5 gal/1,000 lbs of straw	Prevent mold, increase protein , energy, and palatability
Ammonization of stack	NH_3 at 2% of forage weight	Increase protein and palatability
Control	No treatment added	

Treated and baled in the field

Ammonia – 2% by wt

Results of low moisture straw

Measures	Control	Ammonia	Lactic acid	Molasses
Average Daily gain, lbs/d	1.15[a]	1.72[b]	1.26[a]	1.12[a]
Intake, lbs/d	7.7[a]	9.7[b]	8.09[a]	8.7[a]
Gain to feed ratio, %	8.5[a]	11.0[b]	8.9[a]	7.7[a]

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Culmination – Year 3

High moisture treatments at 51% dry matter, low moisture at 9% dry matter (chopped as in 2015)		
High moisture control	No treatment added	
High moisture + lactic acid	Treatment dropped due to inability to bale forage	Prevent mold formation
Low moisture + ammoniation	NH_3 at 2% of forage weight	Increase protein and palatability
Low moisture control	No treatment added	

Measure	*Control - low moisture*	*Ammoniated - low moisture*	*High moisture*
Average daily gain, lbs[1]	1.1[b]	1.7[c]	0.3[a]
Hip height change	1.6[a]	1.4[a]	1.1[a]
Hip width change	1.4[ab]	2.1[c]	0.7[a]
Intake lbs/hd/d	9.6[b]	12.0[c]	7.8[a]
Crude protein, %	3.98[a]	8.42[b]	4.86[a]
NEg, Mcal/lb	0.18[b]	0.19[b]	0.07[a]
total digestible nutrients, %	50.3[b]	50.6[b]	44.4[a]
Neutral detergent fiber, %	58.4[a]	58[a]	60.4[a]
Mold, million cfu/g	0.48[a]	0.01[a]	4.5[b]
Yeast, million cfu/g[2]	1.9[b]	0.002[a]	0.42[a]

[1]Within a row, measures with the same letter are not different

[2]Although low moisture yeast levels were higher in the first two samplings, no difference between treatments was seen in the third sampling (all treatments <0.5)

Unexpected outcome!

Synopsis

- High moisture straw may be more than can be handled…
- Ammonia treatments significantly work after multiple years of testing
  - Move the probe or leave the wrapping loose
- Chopping also seems to help
- Other methods may not amount to a lot of benefit

Dry straw treatments wrapped