TMR management for a Healthy Rumen

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4 Rations that exist

• Ration on paper
• Ration you feed
• Ration your animals eat
• Ration your animals digest (utilize)

A healthy rumen = a healthy animal

• Rumen Mat formation requires “Particle Length”
• Rumination (chewing) requires "Scratch"
• Sorting causes these to fail.

Checking particle size of a TMR with the Penn State particle separator (Shaker Box)

“2 screen Shaker Box”
How it works

• Designed to mimic the lab method for measuring forage and TMR particle sizes but for “on farm”
• Forage particle size analysis begins with harvesting forages at the proper stage of maturity.

“2 screen Shaker Box”
How it works

• The main goal is to measure the distribution of feed and forage particles that the cow actually consumes + “texture & scratch”
  – Ideally 10% or more of the material should be greater than 0.75 inches (top sieve).
  – Many rations have only 3% to 8% of the TMR particles in the top sieve
“2 Screen Shaker Box”
How it works
• 6% to 10% of the particles in the top sieve
  – Length in top sieve: <3” long
  – Ideal length in top sieve: 1.5” long
  – Too much = sorting
• 30% to 50% in the middle sieve
  – More = Less sorting
• 40% to 60% in the bottom pan
  – High = Fast rate of passage, acidosis

“3 Screen Shaker Box”
Why another screen?
• On average, 58% of the material passes through both sieves in a 2 screen set
• 3 screens provide a better analysis of smaller feed particles
• 3rd screen has a pore size of .05 inches
  – Particles smaller than this are either rapidly digested in the rumen or passed through it

“3 Screen Shaker Box”
How it works
• Guidelines for high producing dairy cows
  – 2% to 8% of particles in the upper sieve (lower than the original range)
  – 30% to 50% in the middle and lower sieves
  – <20% in the bottom pan.

“Shaker Box” Limitations
• Very wet samples (<45% DM) may not separate accurately.
• The separator is designed to describe particle size of the feed offered to the animal
  – Moisture, molasses, etc will alter your results

Particle Length Importance
• Adequate fiber and forage particle length are necessary for proper rumen function
  – Reduced particle size decreases time spent chewing
  – Less time chewing means less saliva and therefore less natural rumen buffer
  – Match TMR PS with chewing time.
  – Variable chewing = sorting

Particle Length Importance
When feed particles are too long, animals are more likely to sort:
  – Ultimately the diet consumed is very different than the one originally formulated
If rations are too fine feeding some long hay or balage could help:
  – Farms feeding 5 or more pounds of long hay per cow daily would not likely have problems with overall particle size.
Other Uses for Particle Separator

- Aid in trouble-shooting feeding, metabolic, or production problems
- Monitor feed bunk sorting
  - Measure the TMR remaining in the bunk several times throughout the day
    - (4, 8, 12, and 24 hours after feeding)
- TMR mixing consistency
  - First, middle, and last out of the TMR

“Shaker Box” top screen

Questions?