by John Goeser

Corn silage is just like Grandma's dinner rolls

NOVEMBER and the Thanksgiving holiday are among my favorite times of the year. It's when I set aside my dairy business apparel in favor of my cooking gear and a baking apron. Typically, a deep-fried turkey or slow cooked ribs make up the protein in the holiday diet, with stuffing, pie, and my late grandmother's dinner rolls filling the carbohydrate portion. Not to be taken lightly, the dinner rolls have taken practice to master. The dough rising and proofing have not been easy to figure out.

I contend that corn silage is akin to my grandmother's rolls in a couple of ways. First, making perfect silage requires experience and practice. But second and equally important, optimal silage takes a bit of time in the silo just like the rolls need to rise and proof.

For the best rolls

We know from experience that feeding fresh corn silage leads to almost certain performance slumps in our cows. This would be like putting my grandma's rolls in the oven without allowing them to proof and rise; the outcome is flat. On average, fresh corn silage feeds to only 85% to 90% of its energy potential, and this equates easily to 2 to 5 pounds less milk per cow.

Instead, we opt to let corn silage sit in the silo and cook. During the ensiling period, fermentation acids and enzymes that break down protein soften up the grain, and silage moves toward optimal feeding potential. I'm frequently asked what the minimum or ideal time period in the silo is for silage to cook out to its full potential. Unfortunately, there is no simple answer, and each year is slightly different.

For example, 2021 silage took six to nine months to feed to its full potential, whereas 2020 silage was feeding well after only three months. This was due to different grain maturity and hardness coupled with varying fermentation potential for each year's crop. When pinned in a corner, I recommend at least three months carryover with up to six months or more being desirable for situations like 2021.

Seed genetics, growing season, agronomic practices, plant health, and harvest management — including kernel processing — all interact and influence how chopped corn ferments in the silo.

The interactions and nutritional change in quality are well-researched but still debated. Each successive year, our understanding of silage quality improves.

Corn is a cage

We know fermentation end products, coupled with protein breakdown enzymes, contribute to silage grain softening and breakdown over time. In the August 25, 2016, article "Is your corn's starch in a cage?" I wrote about how fresher corn silage starch is in a cage, but after several months this cage breaks down and the starch busts out.

The net outcome is rumen starch-digesting organisms can readily gobble up and digest the starch that's now accessible. Then there is greatly improved rumen starch digestibility, with more milk production and greater feed conversion efficiency.

The gain in rumen starch digestibility is easily 15 to 20 units over time, but the grain softening and breakdown isn't only quantified by rumen starch digestibility. Kernel processing score (KPS) also changes in the silo.

If we know that the cage-like protein matrix in the kernel breaks down and the grain softens, then it stands to reason that the grain's physical particle size changes as well. Kernel processing score quantifies the grain processing, assessing the percentage of grain that is smaller than a .22 caliber bullet.

Leaning on my University of Wisconsin-Madison colleague Luiz Ferraretto's research observations, we've recognized five-to-10-unit improvements in KPS as the silage ferments to six months and beyond. This means that benchmarking and peer group efforts need to account for length of time in the silo. The 75 to 80 KPS goal is only applicable to well-fermented silage. Freshly chopped corn KPS benchmarks need to be adjusted lower.

Cannot be a fix

While fermentation improves starch digestibility and KPS, the ensiling process cannot cure suboptimal grain or processing. Overly mature grain or harder endosperm grain are understood to be inferior in starch digestibility due to a stronger protein cage protecting the starch from the rumen.

Mature and hard grain with a stronger cage breaks down over time in the silo just like softer or less mature grain. However, the gap in starch digestibility and feeding potential between mature/hard grain and less mature/softer grain endures over time.

Think of this like a class taking an exam twice, once before learning the topic and then again after learning it. Clearly the whole class will improve in exam grades after time spent learning the topic. However, there will still be a gap in grades with each exam attributable to the abilities of the students. This is the same for grain maturity and hardness over time in the silo. Fermentation can't cure hard grain or poor kernel processing.

Corn silage represents a mix of forage and grain, as Mike Rankin, editor of *Hay & Forage Grower* magazine, rightly pointed out to me recently over lunch. The grain in silage changes dramatically, but the stover and forage portion stays relatively stable in the silo. Mother Nature, seed genetics, plant health, and cut height will each influence fiber quality prior to entering the silo.

But regardless of time in the silo, the fiber digestibility at harvest will be equivalent to that recognized during feedout. Fiber quality is locked in at harvest, regardless of how long silage has had to proof and cook.

This would be like using bad ingredients in making Grandma Alice's rolls. No amount of proofing will fix the issue. Focus on seed genetics, agronomic practices, plant health, and harvest management next year for optimal fiber quality.

In bringing this latest column to a close, I hope my late grandmother is proud seeing how we've woven her rolls into a dairy corn silage centered discussion. Making rolls and silage can be complex. Further benchmark this year's silage, then set goals to perfect your silage in years to come by better understanding the factors that change in the silo over time while your silage cooks.

"I'll need to see your ear tag for ID."

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