

FORAGE SOLUTIONS

Where is the corn?

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After another fantastic fall harvest, it is now time to sit back and start collecting data from this year's crop to start making decisions before pre-order deadlines expire. The data is there, but can you organize it in time? The pace of agriculture and the industry is exponentially growing, and that is down to what we can measure. When something is measured, the desire to improve pushes us, but if we do not evaluate, progress stops and content overwhelms us.

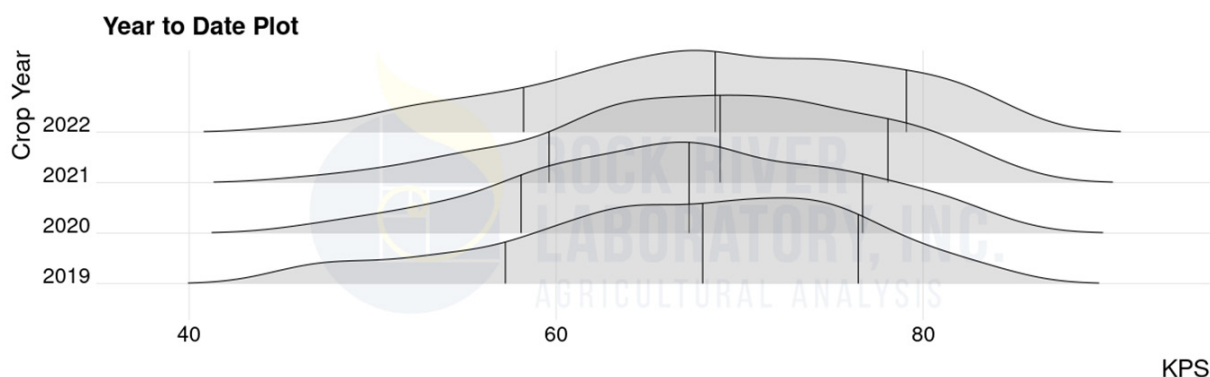
Dairy operations are overwhelmed with opportunities to record performance. While on the other hand, beef operations may not have the abundance of opportunities but are quickly closing the gap when those chances arise. Both enterprises feed large amounts, mostly forage, which is a segment that appears to make smaller and less frequent jumps in performance. One of the most recent improvements to benchmarking and forage quality came from the kernel processing score (KPS) metric.

KPS is a factor of efficiency — particularly in the dairy cow — coming from the largest portion of their daily diet, corn silage. It has become a staple on forage report cards after the findings of Gonzalo Ferriera and Dave Mertens, where they determined the relationship between the size of corn particles and their digestion rate in the rumen.

Gone are the days of the "silver dollar" chunks of corn cobs in the corn silage, as today's standards are much more precise, using fractions of millimeters to determine the quality of corn silage. Cracked kernels are not good enough anymore, as we strive to pulverize the kernels to the point of losing the corn in the plant material. Many may think the feed is low in starch, but even with today's levels of 35% or even 40%, feed is being processed so well that the corn can be hard to distinguish.

Recent KPS tracking from two large feed analysis labs, Rock River Laboratory and Dairyland Labs, demonstrates how the metric has changed over time. Figure 1 spans only four years and shows a consistent increase, especially on the upper end of processing scores. In figure 2, recorded processing scores date back 10 years, with the average score improving by nearly 10 points. Nutritionists would agree that kernel processing has continually improved as they have simultaneously watched starch digestion evolve.

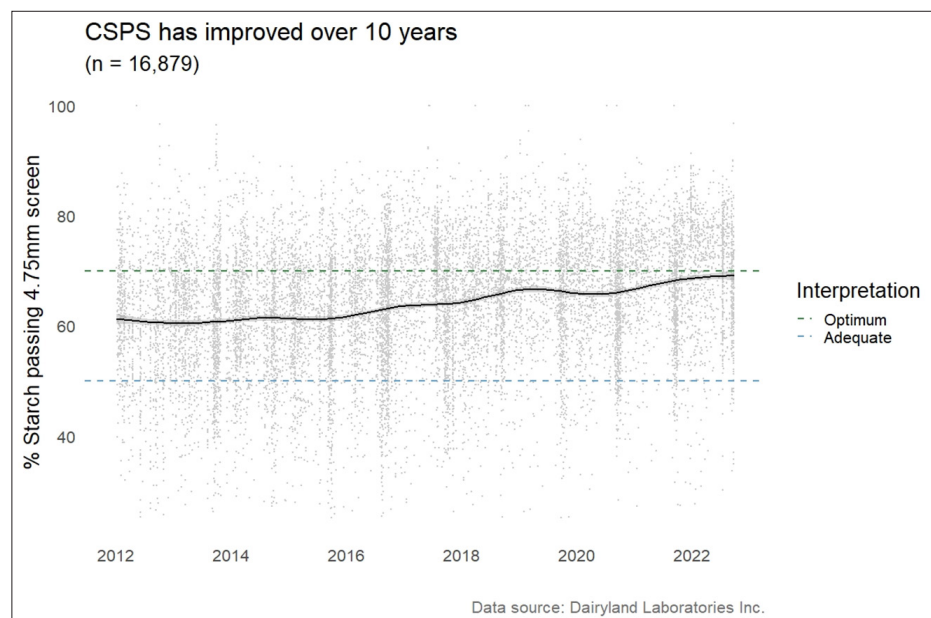
Figure 1: Rock River Laboratory, Kernel Processing Score: 2019–2022



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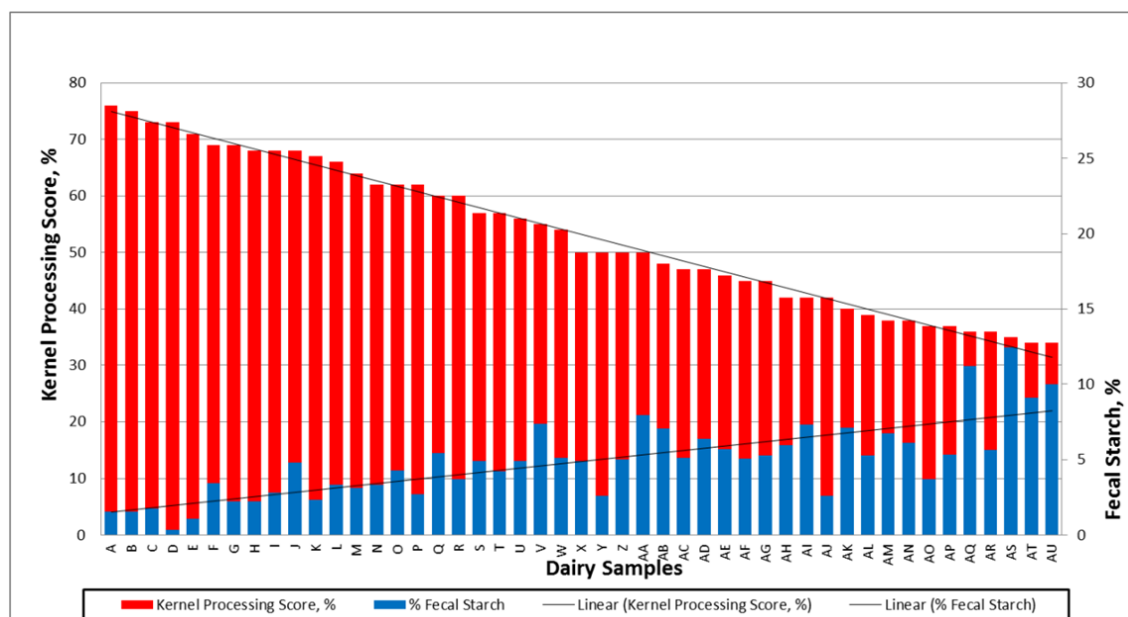
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Figure 2: Dairyland Labs, Kernel Processing Score: 2012–2022



What does kernel processing mean to me?

Better processing means a more complete digestion with less waste and more money per cow. As the industry progresses, today's efficiencies can be harder to detect, but technology has allowed us to measure those small but impactful differences. In 2012, William Braman and John Kurtz evaluated the relationship between kernel processing score and fecal starch in dairy cows. As you can see in the red and blue graph below, as the KPS decreases, the fecal starch percentage increases. The relationship between smaller particle size and improved digestion is the same reason why not all dry corn is considered the same. Ground corn can follow the same trend, requiring a smaller and more consistent micron size to maximize utilization.



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What does the small amount of additional digestion equate to?

Other articles on the topic mention Dr. Jim Ferguson's work, where he found that a 1% change in fecal starch equates to 0.72 lbs. of more milk. In other words, when improving a pen or a herd's fecal starch score from 3.5% to 2.5% on average, you can expect an additional 0.72 lbs. of milk in the tank. Here are the economics of what that can mean for the bottom line.

If we assume today's milk is at \$21.00/cwt, that is \$0.21/lb. of milk:

$\$0.21/\text{lb. of milk} \times 0.72 = \textbf{15.12 cents of additional revenue per cow}$

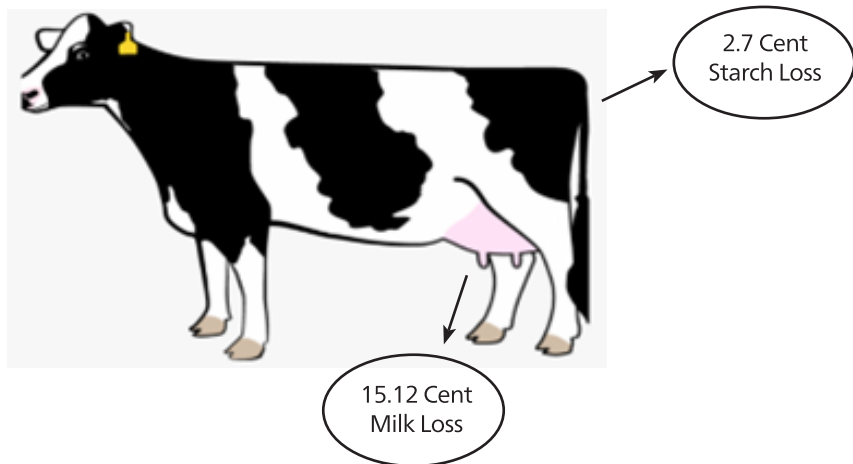
If we consider the 1% value of that corn not being digested:

Assuming a 52 lb. dry matter intake and 26% dietary starch, 0.135 lbs. of DM starch is undigested.

If corn is 70% starch and \$7/bu., **0.222 lbs. of corn goes undigested, with a value of 2.7 cents**

Given the value of lost milk and corn from elevated fecal starch levels this could cost nearly 18 cents/cow/day.

Dietary starch and milk yield must add up, regardless of where the energy comes from, and processing corn correctly can make a big impact.



Are you on target?

If you have not checked the KPS on your corn silage lately, take a look at it the next time you sample the feed. This metric needs to be checked throughout the year to get a good baseline. John Goeser, in his recent Hoards Dairyman article, "Have processing scores topped out?" discusses how for many years, the grading scale for KPS has been measured as 50, 60 and 70%:

50% = Substandard

60% = Average

70% = Optimal

Today, as John would put it, "the goalpost has moved." Recently, Hubbard, and others in the industry, have moved those gradings up 5–7%, with benchmarks now near 55, 65 and 75%.

With larger machines that cover more acres and require the need for precise management, processing is going to continue to be a hot topic and increasingly more important when looking at the list of feed quality benchmarks going forward. Starch digestibility is not equal, and having learned more about it gives us one more opportunity to dairy better. Although very little of this has been measured on the beef side, largely because of the overall quantity of corn fed to finishing animals, there is the same relationship of fecal starch levels to the quality of forage fed, and I expect to see more on this in the beef industry.

Dairies and custom harvesters alike can track feed quality and performance with the help of a good quality forage audit several times a year. KPS, feed stability and fermentrics, along with many other benchmarks found in forage, can be invaluable for success in the dairy industry. Developing that database and putting numbers into all aspects of the operation drive improvement. For help on your dairy or forage management, please contact your local [Hubbard representative](#).

Resources:

<https://hoards.com/article-32817-have-kernel-processing-scores-topped-out.html>

<isfqcbrazil.com.br/proceedings/2015/effect-of-corn-silage-kernel-processing-score-on-dairy-cow-starch-digestibility-35.pdf>