



# Reimagining corn's role in dairy rations

**A**S YOU read this, think in terms of concepts, not details. Like many of us, I live and work in a world focused on details. So, this is difficult for me, but let's stay at 30,000 feet for a few minutes. While in the conceptual frame of mind, let's agree that we live in a different world than we did a few short years ago. With the expectations of continued change, solutions to new and unexpected problems usually start with concepts rather than details.

Now, I will get right to the point. I will pose a question and then discuss concepts that perhaps do not answer the question but highlight some principles worth considering that might hold the solution.

**Question No. 1:** Can the modern dairy farm remain viable without corn or corn silage in the diet? We will first avoid the quick answer related to seasonal, pasture-based production systems that survive on near 100% forage diets. More specifically, think about this question in terms of a modern dairy production system with high capital input cost and the need for high production for economic success.

**Question No. 2:** Why think about this question as yet another corn silage harvest season has already started its annual march north and shelled corn harvest is just around the corner? Contingency planning is required for long-term business and investment success. Thinking about the various "what-ifs" should be part of routine business planning.

In the dairy industry, with an animal that requires a significant part of the diet as roughage, we have long had contingency plans for drought and forage farming failures. This is especially true if you dairy in the West. In 2011, I remember French-speaking truck drivers bringing poor quality hay to Texas from Canada, and we were just glad to have it.

Roughage level minimums for continued cow health is probably 30% of the ration intake. It is not ideal, but it

can work. Securing at least a year and a half of roughage needs for another such drought is good business.

**Question No. 3:** Guess what else makes up 30% or even as high as 40% of many dairy rations? Corn. Don't get lost in the details, but a 25% starch ration with corn grain and corn silage supplying the vast majority of that means that a common dairy ration contains 35% corn kernels! For a high milk production cow consuming 55 pounds dry matter intake (DMI), that is a whopping 19 pounds of DM corn. In such a ration, corn grain from silage and processed dry corn supplies a substantial 57% of the diet's energy.

**Question No. 4:** What if corn becomes severely limited or even unavailable to use in dairy rations? Or, what if it is available, but at a price point that is not workable? I think it is good business to consider this unlikely event and think about how we would react. What would a ration look like without corn or corn silage? How much would production and reproduction suffer in such a situation? Remembering that we are talking about concepts not details, let's look at a few options.

First, as soon as you hang up the phone from finding out you can't get corn, you would immediately call the soybean hull (SBH) supplier. Soy hulls are not the same as corn, but they are probably the most digestible option at your disposal. Soybean hulls don't contain any starch, though. Instead, they contain a lot of very digestible fiber. The federal government's plans to require more biodiesel have resulted in a significant buildup of soybean processing. This is the best news for any contingency plan for a dairy ration with little or no starch from corn grain.

Rations based on a very high feed rate of SBH would need to be supplemented with higher levels of added fat to augment energy needed for lactation and body condition. Also,

since milk protein is strongly driven by dietary starch, perhaps these rations would need to be carefully supplemented with higher amounts of rumen-protected amino acids or other high-quality proteins. Remember, concepts, not details.

We should note that a no-corn diet doesn't need to be a no-starch diet. Taking time to look through the various by-product options that exist can result in meaningful, though modest, levels of starch and sugar in rations. The starch left in products like wheat midds and corn gluten feed would be very helpful.

Other carbohydrates like sugar in molasses or glycerin offer opportunities. Perhaps a subject of another article all together is how milo grain (grain sorghum) can figure into this conversation. Though research has been completed on this topic, large-scale feeding of milo grain to dairy cows has failed to gain traction.

In such a world where corn was unavailable to cows, we would truly be letting the people eat first and the cows eat next. The magic of the rumen makes this not only possible, but perhaps preferable. With the world population headed toward 10 billion and weather that seems to be more often against us than for us, finding ways to get more milk out of human food and fuel by-products seems to be the path forward.

Improving the digestibility of forage products through plant genetics can be a significant help if the weather and water availability will allow. Various enzymes and other rumen modifiers can possibly help us as we try to improve the milk production potential of higher fiber forages and by-products.

**Question No. 5, 6, and 7:** Is the ration with no corn the same as the current 25% starch diet? No. Are the rumen volatile fatty acids produced the same? Also, no. Can we produce significant amounts of milk with no corn? Yes.

In the unlikely situation posed in this column, the dairy sector would fare better than beef feedlots, poultry farms, and swine producers. Our beloved dairy cow is poised to make butterfat from the acetic acid produced when fiber is fermented in the rumen.

A skilled formulator can address the challenge of milk protein production. Milk fluid yields would decline at a higher rate than milk solids, but with most milk being used for butter and cheese, this seems to be a small issue. Cow health and longevity could be an upside of the diet we are contemplating. Perhaps a different breeding strategy might be a good fit for a no-corn ration. We have much at our disposal to figure this out if the need ever arises.

Planning for an unlikely event such as this would likely have other positive consequences. Perhaps planning and thinking about a no-starch ration makes us more successful at feeding a low-starch ration. It could simply be that a low-starch ration is a preferred economic reality in a less apocalyptic situation. Using local by-products along with corn silage and avoiding long-hauling dry shelled corn is a pretty good fit for some situations.

We should be thankful that the cow, with its amazing digestive system is extremely flexible on what it consumes to make milk. The wide variety of diets fed is much more diverse than the slight differences in milk solids produced. As long as we have a lot of options to feed our cows, economics will decide what is best. If options are taken off the table, the cow's flexibility will be the secret solution. 🐄

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