



What you can't see can hurt you

WHILE dairy nutrition consulting has significantly progressed over the past decade, we have unfortunately discovered, and sometimes been unable to fix, cow gut health challenges, compactness, and variable digestion, among other odd diet responses. In some grave cases, digestive tract hemorrhaging in cattle has even led to death.



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We've also observed cows responding differently than would be expected in some cases — seemingly coinciding with transitions to new feed or feed from the back of a silo, bag, or bunker (referenced as “back of the bunker disease”). During both of the situations referenced here, cattle often experience variable digestion and manure consistency, dry matter intakes that fluctuate, and at some level, digestive upset or odd clinical signs. In too many cases, we have not been able to diagnose the causative factors. We clearly still have a substantial amount to learn from both a nutrition and veterinary perspective in the next 10 years and beyond, so we can all understand them better.

When troubleshooting the aforementioned scenarios, we often start by critically assessing the formulated diet and taking new forage samples. Typically, the forage analyses are accurate and diet formulations are sound. With this, we can insinuate that protein, fiber, and starch are all accurately measured in the forage and that the formulated diet does not have any obvious flaws.

Yet, dairy cow health and performance are suffering, so clearly something else is robbing this dairy herd of health, performance, and profitability. In situations such as this, we turn to evaluating “anti-nutritional” components in the feeds and TMR.

Historically, a mold and yeast count along with a vomitoxin (deoxynivalenol — DON) analysis would sometimes unravel the story. Both mold and yeast are fungi and will not only degrade feed sugars and proteins but can also subsist and interfere within the rumen or lower digestive tract. Wild yeast has been shown to hinder rumen nutrient metabolism in leading rumen research by Professor Limin Kung and Professor Adam Lock's groups. Vomitoxin can be a marker for many toxins present in feed that rob dairy cows of optimal health and performance. In a sense, despite

formulating and feeding a nutritious TMR (total mixed ration), these anti-nutritional factors could negate the TMR's value as the nutrients are not absorbed by the cow for the intended growth and production.

Beyond common mold and yeast found in forages, there are nutrition-robbing bacteria categorized as “enterobacteria” and a specific mold (*Aspergillus fumigatus*) that have also been implicated in causing health challenges associated with feed transitions in the silo or “back of the bunker disease.” These anti-nutritional microbes may be more commonly assessed in the future, similar to how we currently evaluate and understand vomitoxin, yeast, and mold in feed.

Heading off enterobacteria

Coliform or enterobacteria are “gut bacteria” and can be present in huge numbers in fresh silage. Enterobacteria are generally undesirable within silage, and there are several specific species that are highly toxic to animals. *Clostridium spp.* are the most commonly referenced gut bacteria, but other potent enterobacteria include *Salmonella typhimurium*, *Listeria monocytogenes*, *Escherichia coli* (*E. coli*), and *Clostridium perfringens*. These anti-nutritional factors have the potential to emerge in crops that were fertilized with manure, where small animals (for example, feral cats or raccoons) contaminate the feed, where animal carcasses somehow interacted with the forage, or in cases of soil contamination.

We have learned from veterinarians that *Salmonella spp.* can cause fever, diarrhea, dehydration, and stunted performance, while *Listeria spp.* can negatively affect the nervous system. *Clostridium spp.* will rob the feed of energy, produce odorous intake depressing biogenic amines, and has been implicated as a factor relating to hemorrhagic bowel syndrome. Dairies that have observed any of these clinical symptoms without diagnosis should examine feeds for *Clostridium*.

Feed and TMR counts for these organisms have ranged from zero to tens of thousands of colony forming units per gram forage (CFU/g). The goal should be to have near zero CFUs of these organisms within feed (<100 CFU/g).

Manage negative enterobacteria by avoiding application of manure fertilizer on germinated or actively growing crops. Keeping small animals away from silos, sealing bunker edges well, and fixing holes in silage plastic as soon as possible can also reduce the threat of these organisms.

It strikes when they're down

Aspergillus spp. mold has also been implicated as a causative factor for digestive upset and hemorrhagic bowel syndrome. Similar to how

C. perfringens was found within deceased animals, *A. fumigatus* has also been found colonizing within sick dairy cattle examined by veterinarians. This mold species has long been known to affect immunocompromised humans, through a disease called Aspergillosis. It is also thought to affect immunocompromised dairy cattle.

Perhaps this mold should be considered as the “straw that breaks the camel's back.” For example, if high-performing (but slightly stressed) animals are eating a TMR with *A. fumigatus* present, this mold that is typically defeated by a strong immune system could take hold, colonize, and cause gut lesions. For this reason, strive for zero presence of this mold in feeds.

A lot of unseens remain

We have a substantial amount yet to learn regarding mysterious clinical responses that sometimes appear when transitioning feed or feeding out the back or bottom of silos. Yet, better identification and knowledge of fungal and bacterial anti-nutrition factors may help us understand this further. Take care to improve fermentation and feed stability to help prevent these enterobacteria and *Aspergillus spp.* from proliferating in your herd's diets.

Harvesting a high-quality crop, with adequate sugar to ensure a strong, efficient fermentation (pH<5.0), combined with consideration of research-backed silage inoculant or anti-microbial preservatives has potential to further mitigate these negative microbes. Most importantly, consult with your advisory team to determine if these unseen microbes are a potential health and performance robbing factor on your dairy. 🐄

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