FORAGE SOLUTIONS

Bunk stability preparations

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A total mixed ration (TMR) diet has long been used to consistently offer a high-quality mix to ruminants. It allows farms to incorporate almost any ingredient into the diet consistently, safely removing much of the variation from one mouthful to the next. Nutritionists and farms continually battle over the composition of that mix, though, as they strive to get the best performance from their livestock. Even when we rely on decades of science and experience to balance rations, seasonal changes can quickly challenge our plans.

Most TMRs today comprise multiple types of forages, with many of those being silage, resulting in ration moisture levels ranging from 20% to 60%. Remarkably, ruminants on these forages can provide exceptional protein products for us, but the heat of summer stresses both the forage and the animal. At the heart of this stress is fermentation.

Silage is harvested and stored with countless bacteria. When some types of bacteria are re-exposed to oxygen, secondary fermentation, or heating, can occur. Among the bacteria that resume growth in this way are wild yeasts and molds. With good management, including proper moisture, packing, facing, and forage treatment, these detrimental organisms have little chance to multiply, and they remain dormant. But even at low populations, they do begin to grow, compromising the quality of the feed.

Heat from secondary fermentation is particularly detrimental to animals already suffering heat stress. Ruminant digestion produces heat in and of itself, and cattle can begin to express heat stress when the temperature reaches about 70 F. This might seem low, but when an animal weighs 1,500 lb. and has an extra heat source within its body, a rise in ambient temperature becomes very noticeable. With increased discomfort in rising temps comes depressed appetites, resulting in smaller daily gains or lower milk production. Keeping the TMR fresh and cool will help alleviate this slump.

To help forecast feed stability issues before the seasonal heat arrives, assess the current ration and wet forages.

- Evaluate the current mix; if the feed is already heating during cooler temps, warmer days will only accelerate the heating process.
- Review current feed samples, analyzing pH, moisture, acid levels, ash content, and mold/yeast counts.
    - An abnormally high pH can indicate instability and poor fermentation after harvest.
    - Moisture under optimal levels can reduce packing density and fermentation activity, increasing the likelihood of excessive yeast and mold growth in the feed early on.
    - Acid profiles found on a feed test can further explain the overall pH while giving clues to the quality and type of fermentation that occurred after harvest and, ultimately, the stability of the silage.
    - High ash content typically means that more soil than usual was trapped within the feed. Soil carries with it an enormous number of bacteria that significantly alter fermentation.
    - Mold and yeast counts can be done at a lab and directly correlate to the length of time feed will remain stable.
- Conduct a spring forage audit. Calculate feed removal rate from storage with a goal of 6-8 inches of removal daily across the entire face. Removing less leaves feed exposed to oxygen and increased dry matter loss. Temperature depths of 6 inches and 3 feet into the silage face will provide clues on the quality of face management, indicating any possible need for packing, defacing, and overall feedout improvements.

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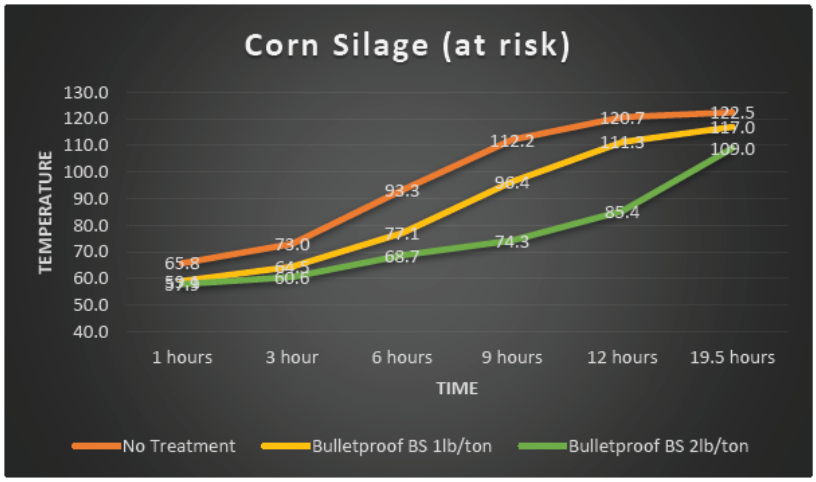
Preparing yourself before summer not only averts problems but almost always leaves you with a list of improvements to be made next harvest season. Feed quality may be one of the improvements needed, but since forage is made once a year, by summer it is too late to go back and make the feed better. Just remember any shortfalls come harvest time next year, and you can make adjustments then.

You may also consider how to give your feed the longest shelf life possible. Many farms utilize a bunk stabilizer to slow mold and yeast growth and maintain the temperature of the TMR, reducing dry matter intake losses.

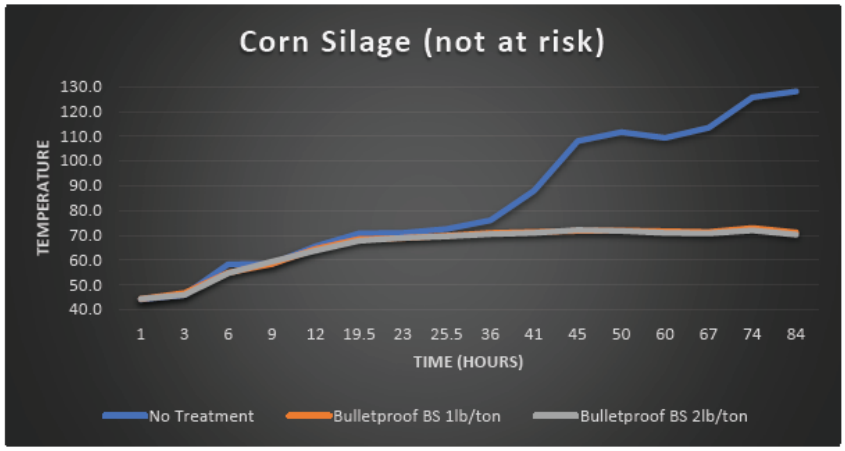
Often, a bunk stabilizer is comprised of 1 to 4 types of acid. These acids artificially drop the pH of the TMR, creating an environment where wild yeasts and molds cannot grow. Acid blends tend to work better than singular acids, due to different types of acids being more effective in separate activity bands than their counterparts. A typical powder blend will include propionic, acetic, benzoic, and citric acids, all working together to cover a broad spectrum of potential heat producers. Other farms, however, may use a liquid containing only propionic acid or a blend including only one other acid.

Preservatives such as BulletProof® Bunk Stabilizer are also highly effective when trying to extend bunk life. Rather than lowering the pH of the mix, Bulletproof Bunk Stabilizer employs sulfur-containing antioxidants that limit oxygen exposure. Since oxygen is a catalyst for microbial growth – wild yeasts and molds cannot reproduce without it – limiting it will restrict these populations. Below are two recent studies done with Bulletproof Bunk Stabilizer.

Figure 1 – In the spring of 2020, a study examined two silos of corn silage, both on the same farm and both filled the same week from the same field. One silo became very unstable and heating (at risk), and the other silo remained at a normal, cool temperature (not at risk). Results showed that although the maintenance rate of 1 lb. per ton was successful in the low-risk corn silage, the silage that was already heating required 2–3 lb. per ton to overcome that challenge.



*At-risk corn silage with high levels of wild yeast and heat potential.



*Normal corn silage without risk of heating

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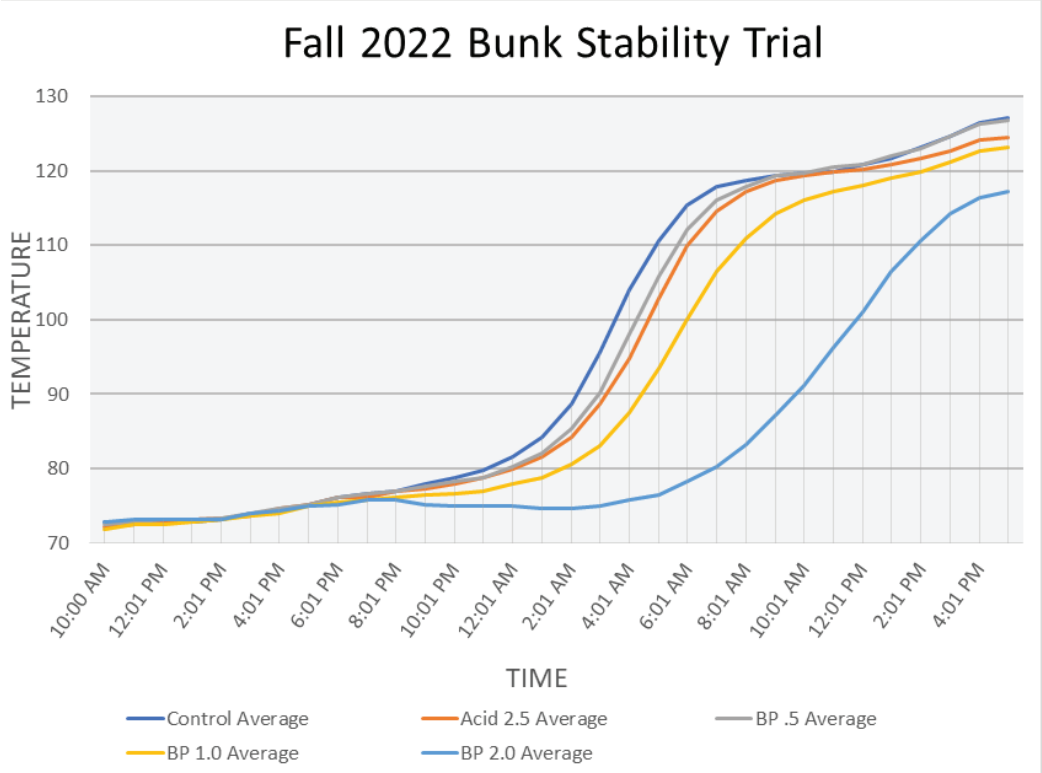

Figure 2 – In the fall of 2022, a bunk stability trial was done on a lactating dairy cow ration with 5 different treatments: a control, a 2.5 lb./ton acid blend treatment, and Bulletproof Bunk Stabilizer treatments at .5 lb./ton, 1.0 lb./ton, and 2.0 lb./ton.

	Control	Acid 2.5#	BulletProof 2.0
Mold Count	11,000	8,000	5,000
Yeast Count	174,000,000	156,000,000	96,000,000

From the graph we can see that the control, acid, .5 lb., and 1 lb. treatments yielded relatively similar results, while the ration treated with 2 lb. Bulletproof Bunk Stabilizer allowed the mix to remain stable much longer, adding an additional 6 hours until the TMR rose 10 degrees from its starting temperature. At the end of the 31 hours, the yeast and mold counts in the 2 lb. ration were well under those from the control and acid treatments.

Not only are extended bunk life and smaller yeast and mold counts important for maintaining dry matter intake, but they mean that the animal is consuming less bad bacteria. This is important because ruminants rely on a good microbiome for their fermentation digestion, and wild yeasts and molds impede that process.

To keep your animals healthy and operating at peak performance, start evaluating your summer plans now. Many farms will include a bunk stabilizer in their mill mix throughout the season, rather than having to add it on-farm. Some operations will begin to plan for fall by doing a forage audit now, looking at last year's performance, and they may consider using *Lactobacillus buchneri* or a BulletProof forage treatment to mitigate the risk of bunk stability issues in the coming year. To learn more about how Hubbard can help you with your on-farm forages, please contact your nearest dealer or account manager.

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