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Wet Weather Conditions?

Clostridia Fermentation During Wet Weather

from Cumberland Valley Analytical Services

Will there be enough rain for the crops to grow? Is it going to rain today? These are common questions asked by all producers when planting and harvesting. For the last eighteen months, the answer to these questions has more frequently been "yes". Looking at precipitation data for central Pennsylvania over the last four years, 2018 had almost 20 additional inches of rain than each of the previous three years. The 2019 crop year is starting off with record rainfall, in some areas more than 200% of historical levels. With higher rainfalls, harvesting at proper dry matter levels becomes a challenge due to the inability to access wet fields. Balancing harvest times for the best dry matter and the best nutrition can be difficult when this happens.

> "With the challenge of unprecedented rainfall, wet fields and wet forages, it will be a challenge to ensile haycrop at appropriate dry matter levels."

When ensiling legume, grass, and small grain silages, it is common to have clostridia bacteria on the crop. There are two main sources of clostridia contamination – through manure and soil. Manure application to fields can introduce clostridia onto plants prior to harvest. To avoid this, manure should be applied to fields shortly after cutting to avoid possible contamination. Clostridia can also be introduced to the plant from soil when lodged forages are harvested and through rain splash during wilting. Soil contamination in the form of iron and ash relates to butyric acid levels. As the amount of butyric acid in a sample increases, there tends to also be an increase in iron and ash.

If the introduction of clostridia is coupled with a low level of dry matter (below 32%) at ensiling, there is an increased risk of the clostridia bacteria producing butyric acid during the fermentation process. During typical fermentation, the lactic acid produced will lower the pH of the ensiled crop enough to prevent clostridial growth and the production of butyric acid. In the presence of low dry matter however, the quick pH drop that the lactic acid bacteria would normally produce is difficult to obtain, which allows the growth of clostridia and the subsequent production of butyric acid. Table 1 illustrates the difference in butyric acid production of forages harvested in the northeast and ensiled with a low dry matter or

Table 1 LEVELS OF BUTYRIC ACID IN HAYCROP FORAGE (CVAS)					
	2015	2016	2017	2018	2019
All Haycrop	0.54	0.52	0.59	0.73	0.87
Greater than 32% Dry Matter	0.38	0.35	0.46	0.57	0.56
Less than 32% Dry Matter	0.89	0.90	0.93	1.13	1.38

typical dry matter. Forages ensiled lower than 32% dry matter display a marked increase in the amount of butyric acid produced.

There are many detrimental effects when clostridia are present during forage fermentation. In addition to the lower dry matter, there is typically reduced overall feed intake by the cattle. This is thought to be caused by the breakdown of the proteins into ammonia nitrogen, amines and amides, which cause the feed to be less palatable. Feeds with higher butyric acid levels will have decreased energy as well as potentially causing health and reproductive issues.

Take Aways

- Obtain a laboratory analysis to determine the amount of butyric acid in your forage in order to identify how much can be fed safely. Butyric acid levels will not remain stable but will continue to increase over time. Test frequently if you plan to feed forage high in butyric acid.
- Do not feed forages high in butyric acid to pre- and post-fresh cows.
- If possible, partition higher butyric acid forages to non-critical groups such as lower producing cow groups and bred (but not springing) heifers.
- If you must ensile your forage while they are wet, begin feeding them as soon as the active fermentation phase is complete (about two weeks).
- Do not feed more than 50g of butyric acid per head per day. For instance, if your forage is 1.75% butyric acid on a dry matter basis, limit feeding to 6.31lbs of dry matter per head per day. If necessary, dilute forages high in butyric acid with other feeds to minimize exposure.
- Prior to feeding it is possible to decrease the amount of butyric acid and ammonia in forages by spreading the forage out for a few hours allowing the butyric acid and ammonia to volatilize. The forage will not decay as butyric acid makes silage very aerobically stable.
- Dispose of silages very high in butyric acid. These forages can become good fertilizers.

With the challenge of unprecedented rainfall, wet fields and wet forages, it will be a challenge to ensile haycrop at appropriate dry matter levels. When it is necessary to utilize silage with butyric acid, test to understand the levels present and feed in a manner to minimize the impact on animal productivity and health.

CVAS
Cumberland Valley Analytical Services

Cumberland Valley Analytical Services is committed to providing innovative and cost-effective forage and feed laboratory testing for the agriculture industry.
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