

Checking for Abnormally Fermented Corn Silage

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In many parts of New York and the Northeast, a significant quantity of corn acres intended for silage were flooded. Even though there was considerable debate as to whether or not to harvest and ensile this corn, some farms did harvest and store this material in silos. The next question is how to assess fermentation quality, potential contaminants and potential feeding value of this material. As farms start to open these silos, the following guidelines may be useful in assessing the quality of the fermented corn silage.

1. Use your senses of sight and smell:
 - a. Does the silage have a “normal” corn silage color?
 - b. Is there variation in color at various spots in the silo?
 - c. Does the silage have a good fermented silage smell?
 - d. Is there a vinegar type odor? (high acetic acid)
 - e. Is there a pungent or butyric acid smell?
 - f. Does the silage have an ammonia smell?
 - g. Is the face cool or warm to the touch?
 - h. Is the silage behind the face cool or warm?

Cautions:

- *Working at the silo face of a bunker silo can be very dangerous. Never do this alone! A better option is to have the silage removed with the loader bucket or defacer and placed on the concrete apron away from the silo face. Be at least as far from the silo face as the height of the silage in the bunker.*
 - *If you have any respiratory problems, don't directly smell the silage as there could be compounds in the silo (molds, yeasts, etc.) that could trigger respiratory problems. It might be good to wear a mask as a preventative measure.*
2. Take a good, representative sample of the silage. See the cautions above regarding sampling from the silo face. A better approach is to have someone on the farm use the loader or defacer to remove silage and place it in a pile. They can also stir or mix the pile before taking your samples. This should make it easier to obtain a representative sample.
 3. Forage analysis-
 - a. Do the typical DM, protein, fiber, NDF digestibility and fermentation analysis. It might be good to use wet chemistry rather than NIR on these samples in the early part of the season as the labs verify or update their NIR calibrations. Check with your forage lab on this.

- b. Consider mold counts and mycotoxin analysis. If doing mold counts, check with the lab for handling and shipping instructions. One option would be to use a vacuum food sealer to remove oxygen and seal the bag before sending.
 - c. Consider having the sample analyzed for heavy metals if there were high levels of visible silt or soil contamination at the time of harvest. Check with your forage lab to see if they offer a heavy metal analysis option.
 - d. These analyses will probably cost >\$100/sample. This may seem high but may be a good investment if it provides data to minimize or alleviate potential animal intake, performance or health issues.
4. Interpretation of the results –
- a. Dry matter – Values < 32 or > 40% are more likely to have altered fermentation or palatability.
 - b. Ash – Values > 6 or so probably indicate soil contamination and risk of altered fermentation, bacterial problems or lower feed value.
 - c. pH – The goal is a final pH < 4.2. If this pH is attained, most bacteria that may have been on the silage at harvest are probably dead.
 - d. Ammonia – Well fermented corn silage should be < 10-12% of the total N as ammonia. Higher levels of ammonia indicate higher levels of rapidly available nitrogen in the rumen.
 - e. VFA profile –
 - i. Lactic acid – Goal is >4-5%. Values < 3-4 may indicate an inefficient fermentation and loss of dry matter and energy.
 - ii. Acetic acid – Goal is 3% or less. Higher values may indicate an inefficient fermentation with loss of dry matter and energy. If an inoculant containing *L. buchneri* was used, this guideline may not fit.
 - f. IVTD – The average 30 hour IVTD from the Dairy One Forage Lab was 79.75% with a standard deviation of 3.9. This is for sample analyzed between May, 2010 and April, 2011. As IVTD values decrease, feed energy value will be lower.
 - g. NDFD – The average 30 hour NDFD from the Dairy One Forage Lab was 52.2% with a standard deviation of 6.08. Lower NDFD values indicate less digestible fiber and feed energy value.
5. Feeding strategies –
- a. If the above parameters look good, then use corn silage in rations as you normally would.
 - b. If some of the parameters listed above indicate an abnormal fermentation, the following approaches could be considered:
 - i. Feed a smaller amount of corn silage in the ration to decrease potential problems. In some situations, it may be best to not feed the silage to any animals.
 - ii. Use the corn silage in rations for less sensitive animal groups (bred heifers, low producing milk cows).
 - iii. If possible, avoid or minimize the use of this silage in dry cows, fresh cows and early lactation cows. These animal groups are highly sensitive to

forage quality, fermentation end products, etc. Animal signs of problems include:

1. Low or variable dry matter intakes.
2. Lower milk production.
3. Decreased milk fat tests.
4. More variable manure.
5. Increased incidence of fresh cow problems.

Summary

There is a risk that some of the flood damaged corn silage could have some unusual fermentation patterns that could link to animal intake or performance. There is essentially no research data available that can be used as a base of information. The best advice is to obtain forage analysis data, be conservative in the amount of corn silage fed and monitor animal responses.