Animal Health International Inoculant Team Newsletter

ENHANCING FEED QUALITY

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Silage Contaminants from the Field: Fungi

Do you know the best practices to prevent yeast and mold contamination?

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Silage Contaminants from the Field: Fungi

Keith A. Bryan, PhD, Technical Services Specialist, Silage & Dairy, Novonesis

During harvest of crops to be ensiled we generally don't think about what else we may be bringing in from the field. Likely, we are harvesting fungi that bring unique challenges to the harvested feed and when fed to high-producing dairy cows.

There are two main classes of fungi that can be observed during the harvest, storage and feedout of ensiled forages: single cell yeasts and multicellular filamentous colonies of molds. In the field, fungal diseases of corn are characterized by yield and quality loss, and mycotoxin contamination. Contaminant concentrations vary by year due to variation in growing conditions, plant stressors and storage differences. Although the ensiling of forage, due to rapid rates of lactic acid production and subsequent decrease in pH, often controls numerous naturally occurring microorganisms, this is not the case for yeast as many are able to tolerate pH 2 or below.

Yeasts in fresh or poorly ensiled forage are undesirable for three reasons:

1. They compete with lactic acid bacteria for sugars which are fermented into ethanol,
2. They are responsible for "heating" of TMR and loss of vital additional nutrients, and
3. High levels of wild-type yeasts in rations for lactating dairy cows have been repeatedly associated with lower or inconsistent dry matter intake, milk fat depression, rumen upset and general lack of optimal performance.

Molds originating on the crop in the field or resulting from poor ensiling practices are undesirable for two primary reasons:

1. They result in spoilage that alters nutrient composition, feeding values and feed inventory, and
2. They produce a variety of mycotoxins that can cause acute toxicity or chronic, sub-acute mycotoxicoses in lactating dairy cows due to low-level consumption over time. Mycotoxicosis is characterized by reduced dry matter intake or feed refusal, decreased nutrient absorption and impaired metabolism, suppressed immune function and altered microbial growth. The presence of molds does not guarantee the presence of mycotoxins, nor does the absence of molds guarantee the absence of mycotoxins!

Best management practices for silages with potentially high yeast and mold contamination:

1. Use a science-based, research-proven inoculant like SiloSolve® FC to mitigate potential yeast and mold issues.
2. Periodic laboratory testing of silages for the presence of yeasts and molds. Subsequent mycotoxin screening or analysis may be warranted.
3. Remove at least 6-12 inches per day in cold weather months, 12-18 inches per day in warmer months, and minimize the time between silage removal and feeding.
4. Daily initial removal from the silage face should be set aside and fed to heifers and far-off dry cows, leaving fresh, minimally oxygen-exposed feed for the highest-producing groups of cows.
5. Discontinue feeding aerobically unstable feed and discard any visibly moldy feed.
6. Consider feeding a science-based, research-proven, multi-component probiotic, like Bovamine Dairy Plus, that should help combat the deleterious effects of yeasts, molds and mycotoxins in lactating dairy cows while stabilizing inconsistencies in the rumen, leading to improved energetic efficiency and ROI.

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Why Should You Worry About Silage Hygiene?

Felipe X. Amaro, PhD, PAS Global Technical Support and R&D, Passion Ag

Silage is a vital component of your animals' diets, and a key component for the success of your livestock operation. However, improper hygiene during harvesting, packing and feedout can lead to harmful bacteria contamination, reduced feed quality, spoilage, and potential health risks for livestock.

Key Risks to Silage Hygiene

Silage hygiene is defined by practices implemented before, during, and after harvest to minimize contamination that comes from:

- **Soil and manure** that have the potential to introduce clostridia and other spoilage organisms.
- **Poorly maintained equipment** that carries mold spores, pathogens, and residual plant material.
- **Environmental exposure:** Rain, dust, and mud increase harmful microbial loads.
- **Delayed and poor packing** which allows for aerobic spoilage organisms to multiply in the initial stages of ensiling.
- **Cleanliness of the silage pit/bunker area:** Dirt, manure and spoiled silage carry harmful microbes that increase feedout spoilage and can decrease intake and animal health and performance.

These factors reduce lactic acid production, increase spoilage microorganisms and harmful compounds, and lead to unpalatable or unsafe silage.

Best Practices for Harvesting

1. Field Hygiene:
- Avoid harvesting in too wet or muddy conditions.
- Ensure manure is incorporated well in advance (4+ weeks) to minimize pathogen load.

2. Cutting and Wilting:
- Maintain a cutting height of at least 3-4 inches to reduce soil uptake.
- Wilt forage rapidly to reach 30-40% dry matter (for grass) or wait until 32-38% (for corn), reducing effluent and clostridial fermentation risk.

3. Equipment Cleanliness:
- Clean choppers, trailers, and conveyors daily. Check for dirt and forage buildup, especially in hard-to-clean spots.

Best Practices for Ensiling and Feedout

1. Silo Filling, Layering and Packing:
- Fill the silo continuously and use the wedge method to minimize oxygen exposure.
- Apply forage in thin, even layers (6-8 inches) and compact thoroughly.
- Aim for a packing density of 40-45 lb/ft^3 of fresh weight (35% dry matter).

2. Edge and Surface Management:
- Pay extra attention when sealing sidewalls and top layers – common sites of spoilage.
- Use a Passion Ag oxygen barrier film and high-quality plastic sheets. Seal promptly with gravel bags that are not dirty to avoid contamination.

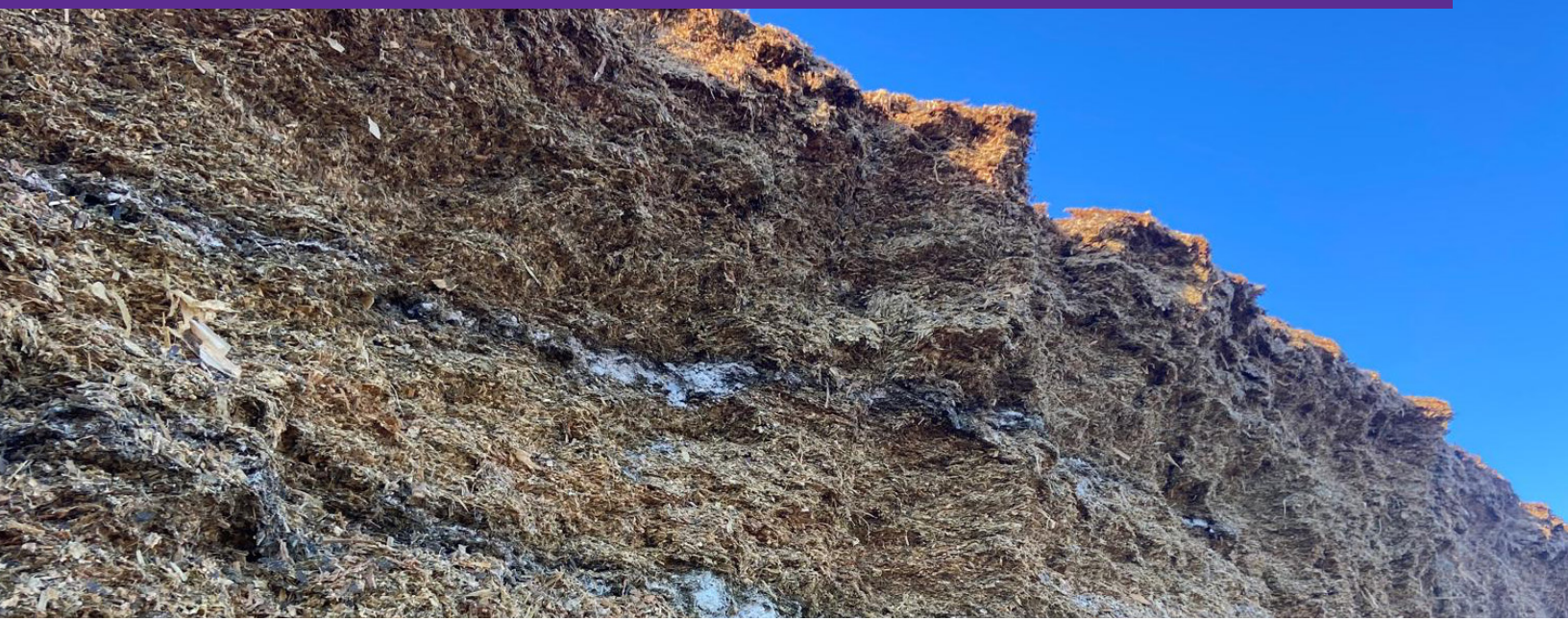
3. Feedout Management:
- Maintain a consistent feedout rate of approximately 8 inches per day.
- Make sure the silage pit or bunker area is thoroughly cleaned of any dirt or manure brought in by tractor traffic.

Maintaining silage hygiene during harvesting, packing and feedout is critical to preserving feed quality and protecting animal health. Practical steps – clean equipment, minimizing soil and manure contact, timely processing, effective sealing, and efficient feedout – offer high returns in nutritional preservation and animal performance. Silage hygiene is not an extra step, but a core component of high-quality silage management.

PASSION AG

Renato Schmidt, PhD – Forage Products Specialist at Lallemand Animal Nutrition

Ash Contamination in Silage Results in More Than Just Energy Loss



When a crop is harvested for ensiling, it's crucial to minimize losses and preserve dry matter and nutrients like digestible fiber, protein, and energy. Successful preservation requires absence of oxygen and sufficient production of organic acids, and lactic acid. In this complex microenvironment, soil contamination can be a significant factor affecting the ensiling process, which is measurable through ash content.

Ash in Silage

Plants' internal ash provides minerals like magnesium, calcium, and potassium, but adds no calories. Average ash content is around 3% in corn, 6% in grass, and 8% in legumes. High ash content from soil contamination includes iron, aluminum, and silica. Haylage samples typically contain about 4% ash contamination.

Soil contaminates plants through weather (rain splashing from the ground, flooding, wind), plant lodging, mechanical operations, and dirt pads around storage areas. Lowering cutting height increases yield but also ash content, reducing forage quality and potentially the stand life of crops such as grasses. Setting the height between 2.5 and 3 inches is a good compromise or baseline. Heavy rain and extreme weather can cause contamination, while dry weather and drought contribute through dusty winds and dirt roads.

Swath width impacts ash contamination, with wide swathing sometimes causing issues. Research shows no significant differences in ash levels, likely due to wet narrow swaths sagging to the ground. Keep forage off the ground to avoid contamination.

Disc mower knives affect soil contamination: curved knives pick up more ash, while flat knives create less suction. Mergers are better than rakes, reducing ash by 1-2%. Adjust rake tines to avoid ground contact. Scalping fields is more likely in uneven terrain or at high speeds.

Storage structures can also cause contamination. Bag silos and wrapped bales add minimal ash in dry conditions but mix mud into silage when wet. Pile and bunker silos on the ground incorporate soil during filling or feedout. The use of a green carpet or apron could be helpful in reducing the formation of dust clouds by the forage trucks. Contamination depends on silo design, drainage, and especially operator skill. Muddy conditions can bring more dirt into forage via tractor and truck tires.

Feeding Implications

Dirt is not a nutrient. Excess ash replaces nutrients in the diet on almost a 1:1 basis, posing issues especially for high-producing cows or low-fiber formulations. Up to 4 pounds of dirt could be fed per cow daily, reducing forage quality and milk production.

Soil contamination affects the fermentation process, but corn can be forgiving due to the natural low buffering capacity and high soluble sugars. Soil-contaminated silage has higher ash, iron, and aluminum, and lower digestibility and energy. Feeding compromised silage can lower intake, milk production, and milkfat, and increase somatic cell counts and breeding issues. Soil contamination often brings spoilage microorganisms, poor fermentation, and impaired silage quality.

LALLEMAND

Chuck Butt, Regional Forage Consultant – Upper Midwest

Minimizing Mold in Baled Corn Stalks

Corn stalks are often baled and used as a feed source for dairy cows and beef cattle. Corn stalks often have high levels of mold, which can impact cattle performance and create health issues.

Effect of mold on cattle performance

- Moldy feeds are less palatable, which may reduce dry matter intake. This can lead to a reduction of nutrient intake, reducing weight gain and/or milk production.
- Moldy feed may have reduced digestibility and energy levels may need to be adjusted down by 5-10%.

Impact of mold on cattle health

- Moldy feeds may cause health problems such as mycotic abortions and respiratory disease. Molds are thought to cause 3-10% of abortions in cattle.
- Feeding cattle moldy feed is also hazardous to human health. Farmer's lung may result from breathing in mold spores.

In 2015, an on-farm trial was conducted in South Dakota to see if Silo Guard II could help reduce the level of mold in baled corn stalks.

Table 1:

Analytical Description	Silo Guard Treated	Untreated	Silo Guard Advantage
Moisture, %	18.1	16.2	
Yeast, cfu/g	500,000	1,000,000	50% less
Mold, cfu/g	70,000	1,100,000	15 times less
Mold identification: Both treatments contained 50% *Mucor* and 50% *Monascus*			

Amount of Silo Guard applied – 2 pounds per ton of stalks. Type of Bales – Round

TRIAL RESULTS

The results of the trial were that Silo Guard II significantly reduced the amount of yeast and mold in treated bales compared to untreated bales (Table 1).

Silo Guard II is a non-acid preservative which contains a combination of sulfur-based compounds. Upon application, the sulfur compounds are activated and eliminate the oxygen trapped in the bale. Without oxygen, mold and yeast can't grow. Silo Guard II is applied at the baler with either a liquid or granular preservative applicator system.

For more information on Silo Guard II, contact your Animal Health International representative or visit our website: animalhealthinternational.com/producer-offerings/inoculants/conventional-hay

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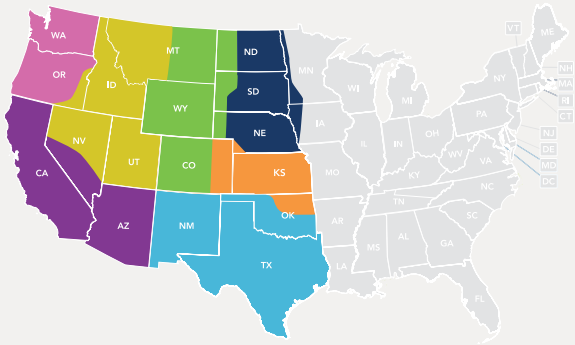

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