Mycotoxins in silage: An ounce of prevention is worth a pound of cure

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The presence of mycotoxins in silage can lead to considerable monetary losses for a dairy farm. Increased veterinary costs, decreased productivity, reproductive problems, exorbitant costs of additives used to reduce the negative impact on cows… Is it possible to prevent these problems rather than simply letting them occur?

Photo: Les Producteurs de lait du Québec

Although some risk factors such as weather conditions are beyond our control, several prevention strategies can be used to minimize mycotoxin problems. To succeed, best practices must be followed at all stages of silage production—as silage can be contaminated by mycotoxins before, during and after harvest.

In the field

Crop rotation is one of the most important elements within our control that can be used to prevent mycotoxin problems. If the previous crop is susceptible to the same diseases and pests as the crop that follows it, contamination risk is greatly increased. This is why it is very important to make sure that your rotation breaks the pest and disease cycle. If this is not possible, at minimum, the residues should be plowed in to reduce the risk of contamination.

The use of cultivars or hybrids adapted to local conditions and resistant to fungal infections is also a fundamental strategy to prevent mycotoxin

problems. Other prevention strategies to apply in the field include fertilizing crops properly and managing weeds and pests appropriately.

During harvest

Soil can be a significant source of mycotoxin-producing molds in silage. In grasslands, it is therefore suggested to cut at a height of 10 cm (4 in) and to work rigorously to minimize contamination.

For corn, it has been shown that harvesting too late can increase the amount of mycotoxins. It is therefore important to choose a hybrid that will not come to maturity too late for the region. Contamination from the soil must also be avoided by working rigorously.

In both cases, the time between harvest and storage must be minimized to allow as little time as possible for molds to take advantage of the ideal conditions created in unfermented forage.

Fungicides in corn silage—useful or not?

We are often asked: “Is it worth using a fungicide when growing corn?” Our answer is based on many independent trials conducted in Quebec, Ontario and elsewhere.

In general, fungicide applications to improve corn yield or nutritional value are unlikely to be cost-effective, whether it be for grain corn or forage corn.

In terms of their effect on mycotoxin levels, fungicides can sometime reduce the problem, but their effectiveness varies greatly depending on a host of factors. It is therefore not advisable to rely solely on this strategy to lower mycotoxin levels.

In conclusion: The use of a fungicide could be justified, but only when the risk of disease is high. The timing and quality of the application are key factors in increasing the chances of success.

During storage and feedout

At the storage stage, silage can be contaminated by mycotoxin-producing molds. Proper prevention in the field and during harvest will reduce this contamination. However, if storage is not optimal, molds can multiply and continue to produce mycotoxins.

The main thing to remember is that molds absolutely need oxygen to grow. This means oxygen must be removed quickly from the silage, and that anaerobic conditions must be maintained throughout the storage period. In addition, dry matter at harvest, chop length, density and silo tightness are essential elements to check.

Another strategy to help prevent mold growth is a rapid pH drop. To achieve this, the sugar content must be maximized to provide the fuel needed by the good bacteria that will produce lactic acid. In the case of grass silages, a homofermentative or combo inoculant can also be used to lower the pH level even faster.

Finally, feedout must be done properly to prevent mold development at this stage. Check the feedout rate and silo face, and consider using an appropriate additive if your silage has a history of heating up.

Overview of recommendations

In the field

- Ensure adequate crop rotation
    - If adequate rotation is not possible, plow in the residues
- Use cultivars/hybrids adapted to local conditions and resistant to fungal infections
- Fertilize properly
- Manage weeds and pests appropriately

During harvest

- Minimize silage contamination from the soil
- Avoid a late harvest for corn silage
- Minimize the time between harvest and storage

During storage and feedout

- Rapidly eliminate oxygen and maintain anaerobic conditions
- Promote a rapid pH drop
- Prevent silage from heating up during feedout

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PRACTICAL FACTS AND FIGURES: Mycotoxins