



Drought-Stressed Corn for Silage

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The dry conditions in many parts of the State have greatly reduced hay and haycrop silage yields, which has reduced forage inventory on many dairy farms. In addition, corn plants are becoming stunted and grain yields are likely to be poor. Low forage inventory and the desire to salvage some value from corn fields means that much of the drought-stressed corn in the state will be chopped for silage. Drought-stressed corn silage can be a good feed for dairy cows and other ruminants if some guidelines are followed.

1. Chop at the correct dry matter: 30 to 38% dry matter. Corn plants, whether drought-stressed or not, must contain the proper amount of moisture for good fermentation in the silo. Corn plants that are chopped with less than about 30% dry matter (especially less than 27% dry matter) are at high risk of a poor fermentation (high acetic acid, low pH, etc). Corn plants chopped with much more than 38 to 40% dry matter usually undergo a limited fermentation and can mold and spoil during storage and feed out. Drought-stressed corn often is much wetter than normal corn because normal corn has more kernels and kernels are drier than the vegetative part of the plant. Before chopping drought-stressed corn for silage, cut some stalks and run dry matter analysis. If the crop is too wet to make silage, do not chop. Forage supplies are likely to be very tight this fall and winter. Do not exacerbate the situation by chopping at the incorrect dry matter concentration and making poor quality silage. *Even under severe drought, it is extremely likely that corn plants are too wet to make into silage in mid-July.*
2. Nitrates might be a problem and greenchopping corn plants is not recommended. Silage fermentation can greatly reduce nitrate concentrations. Therefore, very often silage is safe to feed even though the plants would have been toxic if fed fresh. If greenchopping must be done because of limited forage supplies, set the chopper high because nitrates accumulate in the lower portion of the stalk.
3. Nutrient value of drought-stress corn silage can be fairly high. Compared with normal corn silage, drought-stressed corn silage usually has 1 to 2 percentage units more crude protein, 10 to 20 percentage units more neutral detergent fiber (the fewer the number of ears, the higher the fiber concentration), and 15 to 25 percentage units less starch. Even though fiber concentrations are high and starch concentrations are low, energy values (TDN, net energy, etc.) of drought-stressed corn are usually 90 to 95% as high as normal corn silage because the fiber is highly digestible. The bottom line is that if drought-stressed corn silage ferments properly (see point #1), it is quite acceptable as a forage for even high-producing dairy cows. However, the nutrient composition of drought-stressed corn will be more variable than normal corn silage and it must be sampled and analyzed for nutrient composition and diets balanced accordingly.
4. Where to Test Forages for Nitrates -
Good information on this topic is available in the fact sheet "Nitrates in Dairy Rations" which can be found at <http://ohioline.osu.edu/as-fact/0003.html>

Before beginning harvest, and especially if considering grazing or green-chopping and feeding corn fodder or other forages immediately, drought-stressed plants should be tested for the presence of, and if present, level of nitrates present. The ensiling process can reduce nitrate levels present in the unensiled crop.

Most labs now offer nitrate tests, so if you currently use a particular lab for forage testing, it is likely that you can get forage plants tested for nitrates by the same lab. A number of labs are listed below that have nitrate testing available. This list is for your convenience and no labs are intentionally omitted. Check your chosen lab's web site as many are already posting information about nitrate testing and many have specific instructions about how to take and handle the sample.

Samples should be representative of the crop being harvested, and include the parts of the plant that will actually be harvested and fed to the animals. For corn silage specifically, the sample should include the whole plant cut at the height you will actually be chopping - nitrate concentrations are usually highest in the lower part of the plant.

Some labs that test for nitrates (in alphabetical order):

Brookside Laboratories, Inc., <http://brooksidelabs.com/contact.htm> pH: 419.753.2448

Cumberland Valley Analytical Services, <http://www.foragelab.com/> pH: 800.282.7522

Dairyland Labs, <http://www.dairylandlabs.com> pH: 608.323.2123

Dairy One, <http://www.dairyone.com> pH: 800.496.3344

Holmes Lab, <http://www.holmeslab.com/> pH: 330.893.2933

Rock River Lab, <http://www.rockriverlab.com/index.html> pH: 920.261.0446

Spectrum Analytic, <http://www.spectrumanalytic.com/> pH: 800.321.1562

5. Feeding Management

Forages high in nitrates generally should not be grazed or fed as green chop or hay. However, ensiling forages will reduce nitrate levels by 35 to 80 percent. Regardless of feeding method, a quantitative test for nitrates is advised if high levels are suspected. Silage and hay should not be sampled for analysis until two weeks after harvesting. Table 2 provides guidelines for using feeds with known nitrate levels. Since nitrate toxicity is dependent upon nitrate level in the total diet, water quality must also be considered.

Table 2

Guidelines for using feeds with known nitrate level.*

Unit of Measurement (DM Basis)		% NO_3	Comment
% $\text{NO}_3\text{-N}$	ppm $\text{NO}_3\text{-N}$		
<0.1	<1000	<0.44	Safe
0.1–0.2	1000–2000	0.44–0.88	Generally safe. Limit to 50% of dietary dry matter for pregnant animals.
0.2–0.34	2000–3400	0.88–1.5	Limit to 50% of dietary dry matter for non-pregnant animals and do not feed to pregnant animals (<25% if necessary). Be sure water is low in nitrates and ration is well fortified with energy, minerals, and vitamin A.
0.34–0.4	3400–4000	1.5–1.8	Limit to 25% of dietary dry matter for non-pregnant animals. Be sure water is low in nitrates and ration is well fortified with energy, minerals, and vitamin A.
>0.4	>4000	>1.8	Potentially toxic - Do not feed.

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