

Don't Let Nitrates or Prussic Acid Cost Cattle Lives

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Will you be feeding cane hay, corn stalks, milo stalks or other grass hay to your cows this winter? If so, do not let high nitrate levels kill your cows or cause abortions.

Nitrates occur naturally in all forages. At low levels, either nitrates are converted into microbial protein by bacteria in the rumen or they are excreted. However, when nitrate concentrations get too high, they can kill cows and maybe abort calves.

Some plants are much more likely to be high in nitrates than others are. Annual grasses like cane, millet, and oats often have elevated nitrate levels. In addition, certain weeds like pigweed, kochia, and lambsquarter. Corn and milo stalks also can be risky.

That does not mean these feeds always are toxic, nor does it mean that high-nitrate hay cannot be fed safely. However, always test these feeds for nitrates in a lab to determine how to feed them safely. Remember, there are many ways to feed high nitrate hay safely. Diluting with grain or low nitrate forages is most common. Frequent, small meals that slowly increase the amount of nitrate fed helps cattle adapt to high nitrate hay and make sure cattle have plenty of clean, low nitrate water at all times.

Prussic acid is also a concern. It is also known as hydrocyanic acid or hydrogen cyanide (HCN). Ingesting plants that have produced excess cyanide causes prussic acid poisoning. Sorghums, sudangrass, sorghum-sudangrass crosses, and closely related species are most commonly associated with prussic acid poisoning. Most sorghums and sudangrasses contain a prussic acid precursor (dhurrin) in their epidermal cells. Dhurrin in itself is not toxic. The mesophyll cells located below the epidermis contain an enzyme that under certain conditions converts dhurrin to prussic acid (HCN). The prussic acid is toxic to livestock.

Grain sorghum generally has higher concentrations of dhurrin than forage sorghums or sudangrass. Under normal growing conditions, the dhurrin concentration is low enough that animals can detoxify it before it causes toxicity. Dhurrin concentrations are highest in young plants, new regrowth, and following rapid regrowth after a period of stunted growth, such as rapid growth of drought-stressed plants following a rain, or regrowth following a frost or freeze. Under these conditions, dhurrin concentrations can be high enough to poison livestock.

Appropriate management of these forages combined with sample analysis can minimize poisoning risks and allow safe use of these forages. Prussic acid concentrations can be reduced by delaying grazing until minimum plant heights are achieved or until injured or stressed plants have had adequate time to recover or by proper ensiling or conditioning and drying hay. After a killing frost, wait at least five days or until the frozen leaf tissue has completely dried out before grazing to allow the released HCN gas to dissipate. Prussic acid poisoning is most commonly associated with regrowth following a drought-ending rain or the first autumn frost. New growth from frosted or drought-stressed plants is palatable but can be dangerously high in cyanide. For further information, please contact your local K-State Research and Extension Office.