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"Analysis You Can Grow With"®

Prussic Acid Toxicity in Feedstuffs

What is prussic acid and why does it form in plants?

Prussic acid (HCN), oftentimes referred to as hydrogen cyanide or just simply cyanide, is a toxic compound that forms in many warm season forage species. Under normal plant growing conditions the HCN molecule is bonded to a sugar molecule, called a cyanogenic glycoside, rendering the HCN harmless to consuming animals. Plant stress, that causes cell structures to rupture, initiates contact between the cyanogenic glycoside and enzymes, causing the release of the HCN molecule.

What plant species form prussic acid?

- Plants in the sorghum family, including milo, forage sorghum, cane, sudangrass, sorghum-sudan, and johnsongrass, are the most susceptible species to prussic acid formation.

What conditions and circumstances cause high prussic acid levels?

- Early, short plant growth
  - New plant tissue contains higher levels of prussic acid than old tissue
  - Leaves contain much higher levels of prussic acid than stalks and stems
- Plant stress that slows plant growth or kills plant
  - Cold temperatures, frost, drought, heat, grazing, mowing, and hail

What management strategies can help to reduce prussic acid concentration?

- Soil sample for nitrate regularly and avoid overfertilizing
- Avoid grazing short, young plants of susceptible species
- Avoid grazing or cutting plants for at least 4 days after a killing frost
- Avoid grazing or cutting new growth following a drought period
- Allow harvested forages to dry or ensile to lower prussic acid concentrations

Sampling for prussic acid

- Freeze or deliver samples to lab immediately after cutting
  - Prussic acid can volatilize from cut samples quickly, leading to lower concentration results than actual growing plant concentrations
- Sample feed piles representatively by sampling from at least 6 locations within the pile

Prussic acid analysis results and interpretations

- American Agricultural Laboratory's prussic acid analysis results are reported in mg/kg on an oven dry (dry matter) basis.
- Our guidelines for interpreting prussic acid levels are as follows:

Prussic acid, mg/kg	Risk of toxicity
0-500	Low to none
500-1000	Moderate; Combine with feeds lower in prussic acid
>1000	High; Do not feed to animals

For further information please refer to NebGuide G86-775, Kansas State-Prussic acid poisoning, or call American Agricultural Laboratory at 308-345-3670

Schneider, N., & Anderson, B. (1986). G86-775 Prussic acid poisoning. Historical Materials from University of Nebraska-Lincoln Extension, 1309.

Blasi, D., Fjell, D., & Kuhl, G. Prussic acid poisoning. Kansas State University. Forage facts publication series.