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Managing the Prussic Acid Hazard in Sorghum

Forage sorghum, sorghum-sudangrass and sudangrass are important forage crops throughout the United States. Sorghum forage has many important traits, including high drought tolerance, less need for fertilizer, lower production cost as compared to corn, and a variety of usable forms (hay, silage, greenchop, and pasture).

While sorghum is a valuable forage crop, sorghum species can produce prussic acid, which can be toxic to livestock. Prussic acid, also known as hydrogen cyanide (HCN), can cause acute toxicity and death. Hydrogen cyanide interacts with cellular respiration and leads to the body's inability to utilize oxygen for respiration to do work. Symptoms include shortness of breath and convulsions. Death can occur within minutes after the onset of symptoms, if toxic sorghum is consumed in large enough quantities. Concentrations (on a dry matter basis) between 500-750 ppm HCN can be toxic and should be fed with another source of feed; concentrations above 750 ppm are very dangerous to

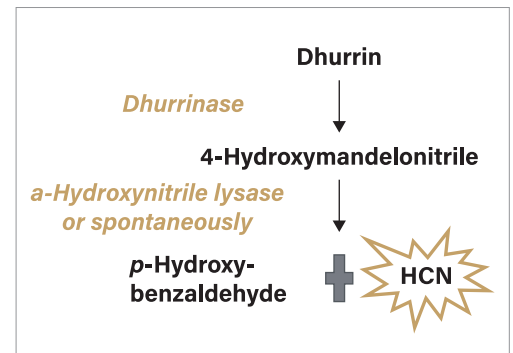


Figure 1. The pathway of dhurrin conversion to HCN. The enzymes that result in the breakdown of dhurrin are italicized.

livestock and should not be fed (Cope, 2021).

Potential of HCN toxicity (HCN potential) is directly related to dhurrin content, which is the precursor to HCN. Dhurrin likely serves as an insect deterrent by facilitating the release of HCN. Dhurrin is broken down through cell disruption, such as chewing or freezing, which causes rapid HCN release. Figure 1 illustrates the steps in the breakdown of dhurrin to HCN.

