



## Horse Extension

# Low sugar forages

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Sugars supply forages with energy required for re-growth, and are a nutritional component needed by both forages and horses. However, some horses, like some humans, are sensitive to the sugar content of hay and pasture forages, which can lead to potential health problems.

These problems include: laminitis (founder), equine metabolic syndrome, Cushing's syndrome, or forms of tying-up. In general, horses with obesity, metabolic syndrome, Cushing's disease, and pasture-associated laminitis are unable to take up sugar in the form of glucose into their tissues because they have developed a diminished response to the hormone insulin ("insulin resistance"). Obese or fat horses, and horses over 15 years of age are more predisposed to insulin resistance. Because some forages can contain high sugar content, whether hay or pasture, they may be problematic for horses with these specific conditions. Most cool-season grass forage species, commonly found in horse pastures and hay fields around the upper Midwest, may be high in sugar. These sugars are in the form of fructans as well as simple sugars like glucose. When basic techniques were developed to analyze forages for "sugar", most did not distinguish between the proportions of fructan and simple sugar. The differences may be important for horses because glucose is absorbed in the small intestine and triggers an insulin response, whereas fructans are passed to the horses' hindgut and fermented without triggering insulin.

Diets high in simple sugars, and the type of starch found in grain, are not good for horses with insulin resistance as they result in very persistently high blood sugar. Horses with a predisposition to laminitis should not be fed forages high in fructans. This is because fermentation of fructans in the large intestines by microbes can upset the microbial balance, and makes the gut environment more acidic which releases toxins into the bloodstream which exacerbate laminitis. Unfortunately, there is no grass that is consistently low in sugar. Most cool-season grasses, like orchardgrass and fescue, can have high sugar content. Timothy and crested wheatgrass tend to be medium in sugar content, as are most warm season (native) grasses. However, warm season grasses are usually not winter hardy for the upper Midwest, and cannot compete with cool season grasses in the spring and fall. This creates a dilemma for horse owners with horses who are sensitive to high sugar content or have been diagnosed with one or more of the above problems. Alfalfa hay/pasture is not the solution for horses that are sensitive to sugar content. Alfalfa tends to be higher in digestible energy, calories, and protein content than grass. More calories can result in weight gain, and high levels of protein can lead to glucose production in the liver.

Currently, it is thought that a safe sugar content for sensitive horses is 10% or less. Testing is a good starting point for determining sugar content in hay, but caution should be used to ensure that a representative sample is taken. Just looking at a forage sample or knowing the species will not give you an estimate of sugar content. As a last resort, up to 30% of the sugar content can be flushed from most grasses by soaking in water (60 minutes in cold water and 30 minutes in hot water). Care should be taken to ensure all soaked hay is eaten, as unconsumed damp hay will eventually mold.

Determining sugar levels in pastures is extremely difficult because of the many factors that must be considered. Until more cool-season grasses with low sugar content become available, careful pasture management and forage testing by horse owner with sensitive horses is essential. Currently, a hay feeding research project at the University of Minnesota is underway to better understand the role sugars play in sensitive horses.

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