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Safe Pastures for Horses with Laminitis

By Dr John Kohnke BVSc RDA

The most commonly asked questions by owners of horses and ponies with a history of laminitis and founder are:

1. Which type of pasture is safe to graze and at what times is it safe to turn my horse out to graze?
2. What hays are safe for my horse with laminitis when confined to a stable or yard?
3. Is shedded hay safer than new season's hay?
4. If my horse eats weeds in the pasture, can they cause laminitis?
5. How should I manage my horse's grazing to reduce the risk of founder?

Much of this information is available in published literature. **A wealth of information is provided by Kathryn Watts, a researcher based in Colorado USA, who is a pioneer in testing pasture and hay and classifying their relative risk of causing laminitis. View her papers and guidelines at <www.safergrass.org> for updated information.**

Each horse is an individual and 'hoovering' type horses, overweight animals and 'cresty' glucose intolerant and insulin resistant horses and ponies bordering on EMS are generally more at risk of developing laminitis when grazing.

Q: What Type and When is Pasture Safe to Graze?

Laminitis is triggered by the intake of fructose sugars, insulin (a non-structural soluble sugar), Non-Structural Carbohydrates (NSCs), soluble sugars and starch contained in actively growing pasture plants. The content of these carbohydrate compounds in grasses varies relative to seasonal influences, including light intensity, weather conditions, time of day, location, moisture content and amount of nitrogen and trace-minerals in the soil. **Ideally, all grasses should be tested for Non-Structural Carbohydrates (NSCs) or Ethanol Soluble Carbs (ESCs) and other soluble sugar content before grazing laminitis-sensitive horses suffering from insulin resistance (IR) associated with Equine Metabolic Syndrome (EMS).**

Cool season (C3) grasses are most likely to contain high levels of NSC and fructan sugars in early spring, as the plants are unable to use these sugars for growth due to cold overnight temperatures. Access to graze these pastures from the mid morning to late afternoon and overnight, or especially during unlimited 24/7 turnout, can precipitate laminitis from hindgut fermentation to D-lactic acid.

In conclusion, both C3 and C4 grasses have a risk of causing laminitis in horses and ponies due to overload of soluble sugars, NSCs or starch during active growth periods, especially in 'hoovering' and 'good doers' allowed to graze 24/7. The highest risk occurs in 'cresty', overweight EMS horses and ponies with insulin resistance (IR).

Q. What Types of Hay are Safe?

All hay made in spring from C3 cool weather grass (grass or meadow hay - grass plus clover) are likely to contain a high fructan or NSC content. Ryegrass, fescue and cocksfoot hay are likely to have the highest NSC and fructan content. Curing and drying of cut pasture reduces its soluble sugar content as plant respiration continues as the plants wilt in the sun. However, once the moisture content falls below 40% moisture as the plant continues to dehydrate, enzyme activity to

Hints And Tips For Feeding Laminitic Horses

Dangerous C3 Grasses for Grazing

Ryegrass, fescues, cocksfoot, brome, paspalum and barley grass pastures, as well as common cereal grain grasses, such as oats, wheat and barley, are most likely to have the highest NSC content as they flush early in spring or after summer rains. These grasses continue to produce fructans and NSCs for growth under favourable conditions. Many native species of grasses have lower levels of NSCs and sugars, but they are often grazed out or competed with by more vigorous C3 or C4 grasses.

Dangerous C4 Grasses for Grazing

Warm season and tropical (C4) grasses store starch rather than fructan sugars and once the starch content is maximised, they do not produce more starch. These include kikuyu, couch grass, early growth Rhodes grass, Setaria species, panics, buffel grass and most other tropical grasses. They are most dangerous when rapidly growing after rain, irrigation and fertiliser application (nitrogen). Note: Clover and medics are high in NSCs and protein during flush period and an excess intake of both NSC and protein may trigger a laminitis episode.

How to Soak Hay to Remove Soluble Sugars.

Soaking high risk grass hay in double its volume of luke-warm water for 60 minutes can reduce the soluble sugar content by 30 - 35%. Drain and air dry before feeding. Soaking lucerne hay in the same way can reduce its soluble sugar content by 25%. Good quality lucerne hay is lower in sugars and NSC's to start with, and it too is much safer when soaked as compared with good quality grass hay. First cut lucerne hay with a high C3 grass content must be soaked for high risk horses.

If all the hay is soaked, then some of the soluble trace-mineral, vitamin and salt content can be leached out into the soaking water. Daily supplementation with **Kohnkes Own Cell-Provide, Cell-Vital or Aussie Sport**, as well as **Cell-Salts** will help to replace these essential nutrients for health and vitality.

Soaking Good Quality Oaten Chaff

In the majority of horses with IR induced laminitis, it is important to remove the cereal grain bi-products such as bran, pollard, or rice bran or feeds based on millrun, such as equestrian or pony pellets, from the ration, as these feeds contain starch and soluble sugars. Often cereal chaff, such as oaten chaff, is used to make up a 'hard' feed' for a stabled or confined horse or pony. Wheaten chaff, with minimal grain content, if it is available, is generally safer as it is a more mature plant at harvest as compared with good quality oaten chaff. Oaten chaff can be soaked to reduce soluble sugars and fructans by placing the oaten chaff into a bag made by doubling over nylon fly wire and clipping the edges with plastic clothes pegs and then immersing the oaten chaff in the bag into a tub of warm water to soak for 60 mins. Then remove the bag, take off the pegs and fold the flywire open to allow the chaff to drain and air dry before feeding.

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convert sugars to cellulose and normal cell respiration stops, so that relatively high NSC and fructan content will be retained in the cured, good quality 'sweet' grassy hay.

Cereal grain hays, such as oats, barley, rye or triticale hay are all high in NSCs and starch content during their growth phase. When cut at the optimum pre-bloom stage (before flowering) for hay, they can contain in excess of 30% NSC and sugars. Once they seed, sugars are transferred to the seed head to form starch in the grain, leaving the stems with less sugar content. Good quality oat hay is likely to be the most dangerous as it is often cut and cured before or at milk seed stage.

Lucerne hay (a legume) generally has a lot lower content of NSC and sugar. However, good quality 'prime' lucerne hay can contain 20% NSC, often as pectin which is a safe form of carbohydrate. Lucerne contains little, if any, fructan sugars and it is safe to feed 20 - 25% of the ration in weight as lucerne hay to sensitive horses. First cut lucerne-grass mixes are much more risky, as the grass is often still in its growing stage when the lucerne in its early bloom stage is cut for hay.

Good quality clover hay can contain a higher content of sugar as compared to lucerne hay because it grows in early spring and also more digestible protein which can increase blood sugar levels in EMS and IR susceptible horses and ponies.

Q. Is Shredded Hay Safer than New Season's Hay?

Storage of hay once cured at 10 - 14% moisture does not degrade the fructan or NSC content once the plant is dead. This means that good quality shredded grass hay remains a risk. Mould in damp hay can reduce the sugar content, but this type of hay is not suitable for horses, although cattle can tolerate lightly moulded hay. Shredding and storing hay, however, significantly reduces its content of heat sensitive or easily oxidised nutrients. This includes the carotene content, with up to an 80% loss in 6 months storage under hot conditions, reducing the Vitamin A synthesis from carotene during digestion. Up to 60% of the Vitamin E content is also lost during curing and long term storage of hay.

Q. Are Weeds a source of NSCs and Starches?

Weeds, like most pasture plants, can be relatively high in fructans, NSCs and starches during their growth phase to seeding. They often persist under dry or hostile conditions unfavourable to native grasses or common pasture plants. Some weeds, such as flat weed, dandelion, chicory, wireweed, thistles and barley grass are attractive to horses. These plants often contain a high NSC and sugar content. Horses grazing flatweed and dandelions have an additional risk of developing Stringhalt and these plants appear to be addictive to grazing horses. Seasonal control of weeds by broad-acre spraying and spot spraying weedy patches, as well as maintaining more competitive pasture growth by not over grazing will help reduce the risk that weeds can pose to hungry horses in the early spring and summer period.

Q. How to Manage Pasture and Hay Feeding

This will be answered in 2 parts...

Managing Pasture Grazing: The safest time to graze fructan and high NSC C3 pastures is for the 3-4 hours in the early morning until 10 am when these sugars are at their lowest level in grasses. Although the levels decrease once photosynthesis stops in the early evening, the plants still retain dangerous levels of NSCs until midnight. Horses and ponies can consume 40% of their total daily intake in the 3 hours after dark. Therefore, it is important that they are confined to a stable or yard overnight during high risk periods and fed on soaked hay.

Managing Hay Feeding: Avoid grassy hay at all times, particularly ryegrass, cocksfoot and cereal grain hay, unless it is soaked. Oaten hay is more dangerous than mature wheaten or barley hay. First cut lucerne hay can contain winter grasses and weeds, which may contain more short chain sugars. Good quality clean oat straw without mould, fed as 20% of the hay, is a suitable roughage when soaked for 10 minutes and air dried prior to feeding.

Suitable Hay for an EMS or IR horse

Shredded hay contains an almost similar content of NSC and sugars as compared with new season's hay. Soaking all hay for 'cresty' ponies with a high risk of elevated blood insulin (IR), which is likely to trigger laminitis, is essential. Feeding 30% soaked lucerne hay for protein and the remainder as soaked grass hay is safe. A daily supplement, such as **Kohnke's Own TRIM**, will help to maintain more normal blood sugar and insulin levels in EMS and IR affected horses and ponies. It will help to soften a cresty neck and trim tail-butt fat in 10 - 14 days. Refer to label for full directions.

Graze Shaded Areas under Trees

Grasses growing in shaded areas have less soluble sugars and NSC as compared with the same plants growing in full sun areas. The lower moisture content and less sunlight filtering through in the shaded areas under trees, reduces the vigour of plant growth and hence fructan and NSC content. It is good management to confine high risk horses and ponies to shaded areas under trees. A portable electric fence is convenient to erect and shift to confine these horses to a shady area. Generally, areas with native grasses have less risk as compared with common broad-acre pasture grasses. Studies have shown that horses prefer to graze open grass areas in full sun, rather than pasture in shaded areas. This is because the plants growing in the full sun are more 'sugary' and palatable to eat.

Avoid Frosted Pastures.

Stress from frosts causes wilting and triggers storage of sugars and NSC in the bases of plants so that they can survive. Grass which was growing actively after a rain and then rapidly dries off during a hot, dry period is also dangerous as the stressed grass stops growing and stores sugars in its base to allow it to survive. Horses find these grasses more palatable and even on a sparse, over-grazed dry pasture, they will fossick enough to overload sugars and NSCs in insulin resistant (IR) horses if left out to graze 24/7.

Consider Using a Grazing Muzzle on Pastured Horses

It is not always possible to restrict grazing to the early morning on high risk pastures if, as an owner, you have to go to work, take children to school or do not have a suitable day yard to confine a horse during the high risk period from mid morning to late afternoon. In this case, consider fitting a grazing muzzle on an EMS sensitive horse or 'cresty' pony after around 10 am to limit the animal's 'hoovering' or continuous grazing habit on high risk pasture during the day. On return home after 5pm, the mask can be removed or 30 minute grazing until twilight. The animal should then be confined to a yard or stable overnight and fed soaked hay to limit soluble sugar intake. It is not wise to fit the grazing muzzle overnight as restricting feed intake for as little as a 12 hour period, could trigger a potentially fatal metabolic syndrome, such as hyperlipaemia, in an over-weight or 'cresty' pony within a few days.

Making Lucerne Safer to Feed

Besides soaking lucerne hay, simply bashing it on the floor or over the edge of a drum to remove the leaves and leave the stems, significantly reduces NSC content for horses with EMS or IR. The stems can be fed to high risk horses, with the leaves being mixed into the feed as lucerne chaff for other horses.

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