

The Relevance of Glycemic Index or Load

Recently, there has been a lot of interest in low glycemic, (a.k.a. low starch/sugar) diets for horses. Instead of the traditional oats, barley & corn diets, people have to work out diets based on feeds with a low glycemic index. The term "glycemic" refers to the rate at which the soluble carbohydrate portion of food is digested and absorbed into the blood stream, thereby raising the blood levels of glucose.

In human nutrition, research in population studies has shown a relationship between high glycemic diets, obesity, insulin resistance, coronary heart disease and possibly cancer. This is particularly so in older people who lead a sedentary lifestyle and are overweight.

This same correlation has not yet been clearly shown in horses but there is some evidence that in certain types of horses, a high glycemic diet leads to problems such as obesity, and a tendency toward laminitis and founder. This appears to apply mostly to horses that are 'pasture potatoes,' i.e. those only ridden occasionally, elderly horses, those horses with Cushing's syndrome, and those horses with a genetic tendency to be 'easy keepers'. The situation is different for hard working horses such as racehorses or event horses. These horses burn so many calories in the course of their training that they are usually not at risk for the condition. Low glycemic diets are not usually recommended for hard working horses. Mares in early gestation, Draft cross foals and those with pony blood in them can also benefit from a low GI diet.

The Glycemic Index (GI) for food is the degree to which a 'serving' of that food raises the blood level of glucose and how quickly. It was developed for human nutrition in the 1980s. The idea was that the chemical analyses of the food did not give an accurate picture of the rate of digestion of a food nor did it predict the effect that a serving of that food had on blood glucose levels. The GI is calculated by measuring the response (rate and amount) of change in blood glucose following the ingestion of one serving of that food as compared to a 'standard' food. (In humans the standard food is white bread, in horses it is whole oats). The standard food is given a GI of 100. Foods that raise the blood glucose more quickly or to a higher level than the standard food are given a GI number or index in excess of 100 and are called high glycemic foods. For humans, foods that do not raise the blood glucose as high or as quickly are given an index

below 100 and are considered low glycemic foods. Foods that are roughly similar to the standard food are around 100 and are moderate glycemic foods. Foods are divided up by their GI into three categories; low, moderate, or high glycemic foods.

The exact numbers are not that important. What matters most is that the bulk of the diet is taken from the low group and a little bit of the diet is from the moderate group. Horses naturally tend to have feeds that are lower in glycemic index than humans and thus the normal human values cannot be applied to horse feeds.

There is also the problem of huge variation in glycemic index for similar feeds both due to variation in the feed, and variation in individual response to the food from the horses used to test it (Table1). Thus we divide the feeds roughly into the three groups and recommend that you select the diet from the feeds that are moderate or low.

Low Glycemic feed - feed fairly freely up to energy requirement

- Grass hay, Timothy or orchard grass (esp. if 1st cutting)
- Bermuda grass hay
- Oat or barley Straw (not oat hay)
- Mixed grass and legume hays - as long as there is not too much legume and it is 1st cutting.
- Plain (unmolassed) beet pulp
- Soy hulls
- Rice bran
- Whole flax seed

Moderate glycemic - feed sparingly and only if the energy or other nutrients are needed.

- Fiber mixes
- Alfalfa cubes
- 2nd cutting grass hays
- Alfalfa hay

High Glycemic Feeds - avoid

- Sweet feeds
- Grain feeds
- Anything with molasses on it

It is also important to recognize that the GI is only one index or measure of nutrients in the feed and many low glycemic feeds are unbalanced with regard to nutrients such as protein or minerals. Thus making up a low glycemic diet is not as easy as just feeding sugar beet pulp and rice bran, you need to make sure that the horse is getting an adequate amount of minerals and vitamins in the appropriate ratios. Making up the diet with a selection of different low GI ingredients will help with this, but you will also probably need to feed one good vitamin/mineral supplement to make sure that there isn't a deficiency. Of course you need to make sure that that supplement isn't itself based on molasses or is not sweetened with molasses. An example of a suitable vitamin/mineral

supplement that is low carb is LinPro from Foxden Equine.

With the possible exception of the grass hays, none of the low glycemic feeds are balanced for minerals and several of them (rice bran and beet pulp) are very unbalanced, so it is important that a good vitamin/mineral supplement be fed when feeding these feeds. The most common minerals in need of supplementation are calcium, magnesium, and sodium. These horses also benefit from chromium in the diet. As most low glycemic diets are high in fat, extra magnesium should also be added. Addition of a balanced mineral supplement is most important when using low GI feeds for young growing horses that need the minerals to help in bone formation. Most horses on very low GI diets usually need a source of better quality protein. Giving them flax seed and or whole roast soy, as a protein source is a good option.

Before you start adding in minerals at random, it is important to get your hay analyzed so that mineral supplementation matches the feed that is being used. The best places to get your hay analyzed is at one of the commercial labs such as Dairy One or use your local land grant university, via the extension service. Use the body score system to help you to assess how well your diet is faring.

One thing that causes much confusion is the effect of adding fat. Adding fat to a ration, either in solid form, such as flax seed, or in liquid form, such as corn oil, slows the digestion of the simple carbohydrates and thus lowers the GI of that feed. By the same token, adding even a small amount of molasses also raises the GI. So if you have to feed some grain or sweet feed, then make sure you add in some fat to reduce the GI as much as possible.

If you have to give your horse something at feed time for behavior and/or social reasons, try using hay cubes they have the same feed value as the hay but can be served up at meal-times into a bucket. The chopped hay products (such as Dengie) can be useful here but be aware that they do have added molasses--mix in a little fat or oil with these.

If you don't want to mess with mixing up your own low glycemic diet there are a few more enlightened companies that are finally putting out feeds that are low in starch and sugar. BUT be aware that so far no one has tested the glycemic response to these feeds, so while they are better than conventional sweet feeds or grains, don't be complacent. Triple Crown has out on the market a 13% starch feed called a low starch feed, www.triplecrownfeed.com/

(Continued on page 23)



("Low Starch Feeds" - Continued from page 22)

ADM also has a low starch feed out. www.admworld.com/naen/ahn/equine.asp

There are also dehydrated hay pellets from Ontario Dehydrators, www.ontariodehy.com. These hay pellets have been balanced for minerals.

Sterett Bros Hay & Feed LLC, have a low carb mineral balanced hay pellet www.sterettbroshayandfeed.com

These low starch feeds are becoming more and more common. One reason for using these commercial feeds is that you do not need to balance the minerals, as the feed company has done it for you. This makes your life much simpler.

In summary, if your horse is overweight and/or has a tendency to founder, then it may well benefit you to pay attention to the GI of the feeds you use and to change to a low GI feed. Also, if you are feeding young horses or draft horse or part draft horse breeding it may well be worthwhile feeding them a low GI diet.

Disclosure: LinPro is a product of Foxden Equine, which is owned by the author Dr. Melyni Worth.

GI Index References from Dr. Ann Rodiek, Dr. David Kronfeld, Dr. Pat Harris. et al.

Glycemic Index of Selected Horse Feeds, by Category

	GI Values from research trials	Mean GI
Concentrates		
Oats (various)	100, 100, 100, 76	94
Sweet Feed	129, 129, 111	123
Sweet Feed & 10% Corn Oil	56	56
Oats & 10% Molasses	105	105
Oats & 1% Corn Oil	86	86
Corn, various	117, 105, 95, 90, 90	99
Corn: Alfalfa	90	90
Barley (various)	101, 100, 66	89
Wheat	71	71
Forages		
Fiber Mix	86	86
Fiber & Fat	85	85
Alfalfa & 10% Molasses	85, 83	84
Alfalfa Hay/Cubes	46, 30, 26, 12	29
Bermudagrass Hay	23	23
Vetch Blend Hay	53	53
Other Feeds		
Beet Pulp & 10% Molasses	95	95
Beet Pulp Dry	72, 20	46
Beet Pulp Washed	34	34
Wheat Bran	55, 37	42
Rice Bran	21, 11	16

