

## **Carbohydrates: How Fibers and Starch and Sugars Affect Rations for Horses**

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The subject of carbohydrates (CHO) is still a very hot topic amongst horse owners, breeders and managers as the effects of starches and sugars on growth, metabolic and exercise related disorders continue to be elucidated. In the past 10 years, much research has been conducted that has shown too much sugar and starch (soluble carbohydrates or non-structural carbohydrates NSC) can have negative effects on horses. Disorders such as developmental orthopedic disease, polysaccharide storage myopathy, laminitis and insulin resistance as well as behavioral issues are all directly linked to overfeeding of starch and sugar. Many horse people have embraced the idea that “sweet feeds” are not the best concentrated feeds for horses and that natural feeds, those that contain more fiber (structural carbohydrates), should be the basis of the equine ration. Additionally, fats have been found to be highly digestible and palatable to horses and are an excellent way to substitute “safe” calories for “unsafe” calories found in grains as starch. The percentage of soluble carbohydrate in a feed or forage does not indicate how many calories are in a feed; only how much sugar and starch it contains. Digestible energy, or the total caloric value of the finished feed, is the only unit of measure that indicates how many calories a feed contains.

To clarify further, let’s explore the differences between, low, medium and high sugar feeds. Feeds that are low in soluble carbohydrates contain more fiber (cell wall) than starch and sugars which are found in the cell contents. These feeds do not cause a change in blood glucose or insulin levels. Low soluble carbohydrates feeds are forages such as grass and legume hay, and concentrate feeds that have been formulated with little to no grain but use beet pulp, soy hulls, rice bran and other fibers to provide calories. Many of these feeds will also have added fat to provide an additional source of calories. These feeds are safe to feed to horses that are prone to laminitis, muscle myopathies, insulin resistance, are high strung and/or are obese. Low starch and sugar feeds should be fed to all horses, starting at birth. Even those with normal metabolisms should receive this type of diet, as feeding high starch and sugar may cause a predisposition to developing the above mentioned disorders.

As more grain is added to a concentrate, the level of starch and sugar increases. Medium level sugar and starch feeds are acceptable for healthy horses that are working very hard and can metabolize glucose rapidly while exercising. The medium sugar and starch feeds do not cause a problem in hard working horses because they are fit, not fat and their metabolisms are functioning normally.

The old fashioned straight “sweet feeds” are not recommended for any class of horse. They are simply too high in starch and sugar for even the hardest working horses. Many horses end up with digestive problems such as colitis and colic when fed too much sweet feed and not enough fiber. Today, there are well formulated concentrates that have the look, feel, smell and taste of a sweet feed, but all the benefits of higher fiber and fats. These are the best feeds for horses of all ages and physiological states.

**Table 1. Average Sugar, Starch and Non-Structural Carbohydrate (NSC) Values of Selected Feedstuffs\*.**

Feedstuff	Sugar	Starch	NSC
Oat Hay	16.0%	6.3%	22.1%
Barley Hay	14.9%	5.8%	20.4%
Alfalfa Hay	8.9%	2.5%	11.3%
Bermudagrass Hay	7.5%	6.1%	13.6%
Grass Hay	11.1%	2.9%	13.8%
Alfalfa Pellets	7.2%	2.3%	9.3%
Alfalfa Cubes	8.3%	2.0%	10.2%
Grass Pasture	10.3%	3.4%	12.1%
Rice Bran	6.2%	17.7%	21.2%
Oats	4.8%	44.4%	54.1%
Corn	3.7%	70.3%	73.3%
Barley	6.0%	53.7%	61.7%
Beet Pulp	10.7%	1.4%	12.3%
Wheat Bran	8.7%	23.0%	30.8%
Soybean Hulls	4.3%	1.9%	6.3%
Wheat Middlings	10.1%	26.2%	32.0%
Soybean Meal	14.3%	2.1%	16.2%