



# LOW CARB FORAGE OPTIONS

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The statement, “I need low carbohydrate hay for my horse”, has become popular in recent years. The reasons, or potential reasons, for wanting low carbohydrate hay could be many. Included in the list of reasons for horse owners to want a low carbohydrate feed for their horse include the desire to influence or modify behavior, or sensitivity to so-called carbohydrate diseases including Tying-up, Cushing’s Disease, Laminitis, Insulin Resistance (IR) and Obesity. But before we recommend that our clients try to reduce or eliminate carbohydrate from the equine diet, we should understand more about carbohydrates in forages.

Structural carbohydrates (fiber) are typically found in the the cell wall of the plant and are often referred to as fiber. Analytically the major carbohydrates associated with the cell wall are cellulose, hemicellulose and lignin. Baled hay, mature pasture grass, beet pulp and soybean seed coats are good sources of structural (fibrous) carbohydrate. Structural carbohydrates are resistant to

enzyme digestion in the small intestine and must be fermented by bacteria in the horse’s hindgut.

Non-Structural Carbohydrate (NSC) is carbohydrate associated with the inner portions of the plant cell, or plant cell contents. NSC is made up sugars, starches and fructans. This can be further broken down into the analytical terms water soluble carbohydrates (WSC; sugar + fructan) and ethanol soluble carbohydrates (ESC; sugar). Non-Structural Carbohydrate then becomes the sum of WSC and Starch.

During photosynthesis, green plants ‘fix’ atmospheric carbon dioxide in the presence of light, resulting in the production of energy. When energy is produced in excess of the requirement of the plant for growth and development, it is converted into storage, or ‘reserve’ carbohydrates. In warm season grasses (native grasses; Big bluestem, Indian-grass), starch is the primary storage carbohydrate, whereas in cool season grasses (e.g. Orchard grass or Timothy) sugar and fructan are the primary stor-

age carbohydrate. As a practical point, commonly fed legumes such as clover and alfalfa also store carbohydrate as starch. Starch production and storage occurs in the chloroplasts of the leaf, this is a self-limiting process with starch productions ceasing once the chloroplasts become saturated. Legumes and warm season grasses typically have lower NSC contents than other grasses due to this self-limiting function.

Studies have shown that environmental conditions cause significant changes in the amounts of NSC that accumulate in forage plants. Factors that reduce growth, but do not affect energy storage result in the accumulation of elevated concentration of NSC. Conversely factors which encourage growth generally result in a reduction of NSC content. Standlee Hay Company scientifically monitors soil fertility and irrigation of all their forages which results in optimal plant growth rates and typically lower NSC contents.

## APPROXIMATE NON STRUCTURAL CARBOHYDRATE CONTENT OF STANDLEE PREMIUM WESTERN FORAGE®

Product	Carbohydrate Content		
	WSC %	Starch %	NSC %
Alfalfa cubes	8	1	9
Alfalfa pellets	7	1	9
Timothy pellets	11	.8	12
Alfalfa/Timothy cubes	8	1	9
Alfalfa/Timothy pellets	10	2	12
Alfalfa/Oat cubes	9	2	10
Orchard grass pellets	12	2	14
Apple Berry Cookie Cubes™	10	1	11
Orchard grass forage	10	2	11
Timothy grass forage	11	.8	12
Alfalfa forage	8	2	9
Alfalfa/grass forage	11	1	12

### Recommendations for horses at risk for, or suffering from carbohydrate sensitive disorders:

Evaluate the WSC + Starch value of the total ration (forage, concentrate & supplements).

- Sick horse: WSC + Starch = 10% or less
- Non-sick sensitive horse: WSC + Starch = 10% or less
- Concerned client: WSC + Starch = 12% or less