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Explaining Carbohydrates

By Dr. Wm. Tyznik

Currently there is a great concern about carbohydrates both in the area of human nutrition as well as the equine arena. All carbohydrates are used for energy in all species of mammals. Although there is a vast array of carbohydrates, they all have a basic chemical structure. One atom of carbon attached to two hydrogen and one oxygen atom. It really is chemically hydrated carbon because each carbon atom has hydrogen and oxygen found in the same proportion as is found in water. A broad range of carbohydrates exist, as far as complexity of chemical structure molecular size and digestibility. In animals, all carbohydrates that are digested and absorbed will eventually be used for energy. Plants, on the other hand, contain both structural and non-structural carbohydrates. Structural carbohydrates are those that make up the cell wells, namely cellulose and hemicellulose. These carbohydrates cannot be digested by animals but require microbial fermentation to break them down and thus allow absorption and metabolism by the body.

Non-structural carbohydrates are simple sugars as well as starches, fructans etc. These carbohydrates all eventually end up as glucose (blood sugar) or fructose (fruit sugars). Newborn animals cannot digest can sugar (sucrose) because they are not born with the enzyme sucrose. All mammals are born with the ability to digest lactose (milk sugar) as animals are converted to eating starch and molasses (sucrose) they lose the ability to digest lactose.

The recent increase in the diagnosis of cushings disease has been a concern.

As is true with any new or rediscovered metabolic condition. One wonders whether the relatively rapid increase in cushings disease may be similar to the recent in type two diabetes in humans. Too many horses are carrying excessive amount of weight. Data are not available as to whether these conditions are parallel but the conditions are suspicious in their similarities.

When we are asked to provide a low carbohydrate diet the question arises as to whether we should be concerned about carbohydrates or the type of carbohydrate. There is no doubt that horses do require fiber, which is comprised of the carbohydrate cellulose as well hemicellulose. Another fiber is lignin that is associated with carbohydrates but cannot be utilized by the horse. It is the structure of all mature plants.

The structural and non-structural carbohydrates are excellent food sources and do provide the majority of the energy requirements. The main difference being structural carbohydrate are non-fermented verses non-structural which ferment readily.