Effect of Concentrate Starch Level on Glucose and Insulin Responses in Horses

Starch and sugar in the horse’s diet can cause an increase in blood glucose, which, in turn, results in greater secretion of insulin. A high blood insulin level is a symptom of insulin resistance and has been associated with the development of laminitis or founder in the horse. Also, since insulin resistance is common in horses with Equine Metabolic Syndrome and Equine Cushing’s Disease, selection of a horse feed to minimize increases in blood glucose and insulin is important in managing these problems. Currently, there is little evidence about the amount of dietary starch and/or sugar that cause significant blood glucose and insulin increases to occur.

A CRF research study was conducted at Michigan State University and eight mature horses were used to evaluate the effect of starch levels in the concentrate portion of the diet on the horse’s blood plasma glucose, insulin and cortisol levels. The four concentrate levels were 8, 20, 32 and 44% starch (sugar was constant at about 3%). Each horse received each feed in a random sequence and the results were summarized and statistically analyzed.

The results of this study clearly demonstrate marked differences in how individual horses respond to starch levels in the diet (Graphs 1 & 2). In addition, results show increasing concentrations of insulin released into the blood as the percentage of starch in the diet increases (Graph 3). Similar trends, or near trends, exist with glucose (Graph 4).

What Does This Mean for Horse Owners?

Cooperative Research Farm (CRF) is actively involved in equine nutrition research to develop safer and more effective feeds for your horses. The high variation in insulin responses among individual horses has been seen in other studies and suggests horse owners may have to work with their CRF member feed company to find the appropriate starch level for their particular horse’s situation.

Both blood glucose and insulin levels increased with greater starch levels in the feed, as expected. Significant differences from the 8% starch diet do not occur until the 32% starch diet. Only at the 32% and 44% starch levels do the plasma glucose and insulin values exceed those expected after a meal in a “normal” horse.

The data suggest that starch levels of 20% or less in the feed are safe for most horses and that a starch level below an arbitrary level, such as 10%, is not warranted. Horse feeds with 20% starch content or less should be safe for horses with insulin resistance and laminitis and can be used for nutritional management of Equine Cushing’s Disease and Equine Metabolic Syndrome.

Tribute Equine Nutrition offers a number of products formulated to be under 20% starch. Tribute Essential K® is formulated at 9% starch and designed to supply all other essential nutrients at a low feeding rate (often 1-2 pounds per day) minimizing total starch intake. Other Tribute products with less than 20% starch are Kalm N EZ® Pelleted, Kalm N EZ® Textured and Maturity Pelleted.

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Benefit From a Large Scale Partnership

Research of the magnitude needed to be statistically valid is inherently expensive. So it’s smart for feed manufacturers to join forces and spread these fixed costs over millions of tons of feed.

It’s also smart to buy from these cost-savvy feed producers. Because when we’re watching out for our dollars, we make sense for your operation.

Through innovative partnerships and cost sharing, CRF has proven to be able to turn its collective knowledge into profits and increased productivity for its members since 1954.