

# Equine Preventive Healthcare & Management

*"With love, comes responsibility."*

## How to get the best results from your feeding program

By Lowell E. Smalley, DVM

*Understanding how your horse digests carbohydrates is the first step to getting the results you want from your feeding program. You don't have to become an expert on the equine digestive tract to understand how it works. But it is important to grasp the basic concepts of the physiological and metabolic processes of the horse and how they affect nutritional strategies.*

### The horse is lucky heir to millions of years of nutritional heritage

The horse is a prey animal. For millions of years it was the target of flesh-eating predators. During its physiological evolution, it developed a unique digestive system as one of the crucial traits necessary for survival. It's a system designed to handle continuous limited inputs as the horse grazed up to 20 hours a day while it covered up to 30 miles a day with the herd.

The system that evolved is truly marvelous. It's a system for an animal that had to depend on speed for survival. It's a system unencumbered by the size and weight of a large stomach. It's a system that supports the metabolic processes that allow the horse to produce from forage and browse all the protein and energy it needs for growth, and maintenance.

Dr. William E. Julien, nutritionist and veterinarian, says, "I believe the cause of most horse maladies is based on nutritional mis-

**“ReStore™... should be part of every preventive wellness and management program.”**

management and refusal to accept the fact that nutrition is physiology. The problem goes way beyond simply how much protein or energy is fed each day.”

The evolution of the horse's unique digestive system supports his thesis: Nutrition must begin with physiology — the biological functions and vital processes of the living organism. Metabolism — the chemical and physical processes that convert ingested feed into metabolites that support growth, maintenance and energy — is dependent on physiology. You can't have one without the other, but you've got to consider physiology first.

### How your horse digests carbohydrates

Carbohydrates for horses can be divided into those that can be hydrolyzed and those that must be fermented. Hydrolysis is a chemical reaction in which a feedstuff reacts with water (with the help of enzymes) and is changed into one or more other substances, such as starch into glucose. Feedstuffs that cannot be hydrolyzed enter the cecum and large colon. Here they are fermented by resident micro flora to produce volatile fatty acids and structural nitrogen.

The hindgut's normal function is the fermentation of non-hydrolyzable carbohydrates. For example: hemicelluloses, cellulose and lignocellulose, and soluble fibers are all fermentable carbohydrates.

But hydrolysis has its limits. When the horse's small stomach and intestines can't handle the load, the excess hydrolyzable carbohydrate moves to the hindgut where it is fermented with the remaining non-hydrolyzable carbohydrates.

The hydrolyzable carbohydrates are now where they don't belong; this triggers rapid fermentation and disrupts the normal pH of the hindgut. This rapid fermentation and change in pH can also cause significant negative modifications in resident bacterial populations, favoring organisms that can actually harm the horse!

The digestive system now has a carbohydrate overload.

### Modern equine management causes Dietary Distress Syndrome (DDS)

The digestive system of the horse is designed for frequent, light meals. Yet, today many owners — for their own convenience or to provide extra energy for show or performance horses — feed a large meal once or twice a day. These meals are usually grain-based concentrates, rich in starch and simple sugars.

This type of program sets up a feeding/fasting cycle that often triggers a domino effect of metabolic and hormonal changes. There are no short cuts to natural metabolic pathways.

Research suggests a link between concentrate feeding and a number of metabolic diseases. These problems and others have been termed by veterinarians as Equine Dietary Distress Syndrome, or DDS.

Dr. R. M. Hoffman, in a study of *Carbohydrate Metabolism in Horses*, says "...the common practice of feeding starch-rich cereal grains in two meals a day may promote insulin resistance in horses." Insulin resistance has been associated with obesity, and laminitis. It has also been linked with colic, exertional rhabdomyolysis and osteochondrosis.

Dr. John Reagor, of the Texas Medical Diagnostic Lab, says, "The number one cause of deaths from colic is starch overload due to feeding mismanagement."

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A further concern of carbohydrate overload is Developmental Orthopedic Disease (DOD) in foals. Studies have linked high-energy intake as a risk factor that may increase DOD in foals. (The acronym DOD is used to cover all limb problems associated with bone growth and development in foals.)

## Low glycemic index feeds may improve feeding program

The glycemic index (G. I.) reflects the plasma glucose and insulin response to a feed. It's important because it's used to rank carbohydrate-based foods; and it predicts the rate at which ingested feed will increase blood sugar levels

The glycemic index of a feed can have a positive or negative impact on the health, performance and temperament of your horse. In recent years observation and experiments have linked the starch overload of high glycemic index feeds to serious digestive and metabolic disorders, and "hot" behavior. At the same time, researchers found low glycemic index feeds eliminated or mitigated many problems while they improved health, performance, and temperament.

In feeding programs, the higher the glycemic index the more likely the meal will cause a spike in blood plasma glucose. Glucose occurs widely in most plant and animal tissues. It's the principal circulating sugar in blood and the major energy source for the horse's body. But sudden elevations in glucose levels can trigger a host of problems.

The glycemic index scale was developed to reflect the plasma glucose and insulin response to a meal: The higher the index, the more likely the meal will cause a spike in glucose levels.

In 2004, Biovance Life Sciences introduced **Revolution-Rx™** prescription diet, fortified with **ReStore™**. It offers horse owners a low glycemic index feed as a safe alternative to grain-based diets. The product is not yet available in all markets, but **ReStore™**, which is available in all areas, can be used to fortify other low glycemic index feeds as well as to reduce the risk associated with feeding diets rich in soluble starch and sugars.

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## Low glycemic index feeds are no guarantee against DDS

Even with low glycemic feeds, many factors can still cause carbohydrate overload and dietary distress. For example, the type of forage consumed can vary widely in the amount of hydrolyzable carbohydrates. Without constant monitoring, there's no assurance that the forage may not upset your carefully balanced supplementation.

If you don't actually feed the horse yourself, there's always the risk your directives are misdirected. Jessica Jahiel, in her excellent book *The Horse Behavior Problem Solver*, cites a personal experience: She was boarding a mare that suddenly became spooky. When she investigated, she found the person who normally fed her horse had been replaced. The new stable hand was feeding her mare ten pounds of alfalfa and five pounds of sweet feed instead of her usual ration. Once back on her regular ration, the mare regained her calm disposition.



Professional barrel racer Tandi Rider competing on Pocahontas Dawn, aka "Cricket," at the Logandale Fair.

Sometimes your personal management decision to push energy to get a competitive edge pushes your horse over that edge. Champion barrel racer Tandi Rider, discussing feeding programs, echoes the dilemma of many when she says, "...we find ourselves pushing their minds and bodies to that fine line."

It is a fine line and it's easy to go too far, trigger DDS, and erase the edge you sought to gain.

True, low glycemic feeds can improve your feeding program, but they do not totally eliminate the risk factor. Some research has shown additional fat may lower the negative impact of a feed high on the glycemic index scale. However, not all researchers agree. What's more, some easy keepers may simply store the added fat as adipose tissue.

## Conclusions

As witnessed by the frequency of dietary related illnesses, the delicate balance of the equine digestive system is easily disrupted. Every effort within the bounds of practical management must be made, not only to stabilize the digestive system, but also to enhance its efficiency.

Until recent years the few nutritionists who addressed the implications of hindgut fermentation — providing substrates to nourish microbial populations, and establishing homeostasis to avoid dietary distress — were like voices in the wilderness. Now those pioneers are being heard.

It has been 16 years since the National Research Council (NRC) issued feeding guidelines for equines. Perhaps its new feeding recommendations now under consideration will address the role of hindgut fermentation in more detail.

## Recommendations

1. It's old advice, but good advice: Make any dietary changes gradually.
2. When evaluating any feed, feeding program or nutritional supplement, don't rely solely on anecdotal evidence. Anecdotal evidence can be selective. Ask to see the scientific data that support the product or program.
3. Discuss **ReStore™** with your veterinarian and nutritionist, or contact Biovance Life Sciences toll-free at **877-246-7500**, e-mail to [info@biovance.com](mailto:info@biovance.com), or visit [www.biovance.com](http://www.biovance.com).

**ReStore™**, an oral nutritional supplement from Biovance Life Sciences, was developed by veterinarians to enhance the natural digestive processes of the horse.

It has proven its efficacy for prevention of DDS. It has proven its efficacy as therapy for many maladies. And, it has proven its efficacy as a performance enhancer.

"**ReStore™**," says equine veterinarian Gerry Huff, of Las Vegas, "is an idea whose time has come. It should be part of every preventive wellness and management program."

## ReSTORE™ Nutritional Supplement

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- Reduce the risk of digestive upsets such as colic and chronic diarrhea
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- Restore and maintain body condition
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