Equine Digestion

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Equine Digestion

Horses are classified as herbivores, or roughage eaters. They are grazing animals with digestive systems designed for constant consumption of plant food.

Unlike most other herbivores, the digestive system of the horse is considered monogastric rather than ruminant. Digestive organs include the stomach, small intestine and large intestine. The stomach and small intestine are commonly referred to as the upper gut, and are where most of the protein, fat, vitamins and minerals contained in feed are digested and absorbed.

Although the horse lacks the complex forestomach of a ruminant, unique characteristics of its large intestine, or hindgut, allow the horse to utilize cellulose and other fermentable substrates in much the same way as ruminants.

The large intestine of the horse has a greatly enlarged cecum which serves as a fermentation vat. Billions of bacteria and protozoa produce enzymes that break down plant fiber. In the horse, this fermentation process occurs posterior to the area where most nutrients are absorbed, and as a result, horses do not obtain all of the nutrients synthesized by microorganisms in the large intestine.

The Stomach

After feed particle size is reduced through chewing and feed is mixed with saliva in the mouth, it moves down the esophagus and into the stomach. The stomach stores, mixes digests and propels feed into the small intestine. Very little of the feed nutrients are absorbed in the stomach. Proteins and carbohydrates are only partially digested in the stomach, and fats are only slightly hydrolyzed before the food passes into the intestine.

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The Large Intestine (hindgut)

The horse has the largest and most complex large intestine of any domestic animal. Its large intestine is made up of two large organs: the cecum and the colon. Together they represent about 60% of the horse's digestive tract. The cecum makes up about 25-30% of the large intestine.

The horse's large intestine is designed to utilize plant fiber. Insoluble carbohydrates such as cellulose and hemicellulose from forages, as well as starch and other soluble carbohydrates that were not digested in the small intestine, flow into the large intestine. As feed leaves the small intestine it first enters the cecum. Here the undigested nutrients are fermented in a process similar to that which occurs in the forestomach of ruminants. After fermentation, feed enters the colon for further digestion and absorption. Microbial fermentation in the hindgut results in the production of volatile fatty acids which are an important nutrient source for the horse. The hindgut also serves as a reservoir of water and electrolytes which are vital to sustain exercise performance.

The rate of feed movement through the colon is relatively slow. Because the colon folds back on itself several times and its diameter varies, horses are predisposed to digestive upsets when nutrient flow is abnormal. Since the horse's digestive tract is primarily designed to digest forages, fewer problems occur when the diet is predominately hay or pasture.

Colic

The horse's digestive system is susceptible to impaction, twisting and other types of colic. Colic can result from the formation of gaseous products derived from microbial fermentation. If large amounts of soluble carbohydrates, such as starch, reach the microorganisms in the hindgut, large amounts of gaseous compounds are produced. Since these gases are being produced faster than they can be absorbed or released, swelling occurs. This swelling can, and often does, cause the horse to develop colic.
Nutrient Requirements

With its small, simple stomach and large fiber-digesting hindgut, the horse is designed to eat small portions in a continuous fashion. By design, forages should predominate the horse’s diet. Grain, fat, supplemental protein, vitamins and minerals are important, but should make up a smaller portion of the diet.

Mature horses consume about 2.5 to 3.0% of their body weight in feed each day. A mature 1000 lb horse will eat about 25 to 30 pounds of feed each day. Ideally, horses should consume a minimum of 1% of their body weight in hay or pasture each day. As a general rule, forages should comprise at least 1/2 of the total weight of daily feed consumption for optimum growth and development.

A horse’s nutrient requirement varies depending on its activity and function. Generally, nutrient requirements are presented according to the following classifications: maintenance, work, growth, gestation and lactation.

A maintenance ration allows a mature, idle horse to maintain its weight and body condition under average climate conditions. Nonworking adult horses can be maintained on high quality forages without grain supplementation. However, the horse’s requirement for energy increases 25%, 50% and 100% as its work level increases from light, to moderate, to heavy. Growing, breeding, working and performance horses require grain or concentrate supplementation to meet their additional nutrient requirements.

During the last three months of gestation, a mare’s requirement for protein, minerals and vitamins increases. As pregnancy moves through the ninth, tenth and eleventh month, the mare’s need for energy increases 11%, 13% and 20%, respectively. Lactation also means additional requirements for protein, minerals and vitamins.

Stress associated with a horse’s environment may also affect its nutrient requirements. Changes in temperature, moisture and humidity as well as muddy lots with little or no housing are a few examples of situations that can lead to stress. These and other factors can alter the horse’s need for various nutrients.

Good Management Practices

1. Provide plenty of clean, fresh water. A horse will drink between 2 to 4 lbs of water for each pound of ration consumed.

2. Ensure your horse has enough feed to eat.

3. Feed all feeds by weight, not by volume.

4. Have the hay analyzed and develop the rest of the diet based on the forage quality. If this is not possible, feed hay that smells clean, has fine stems, lots of leaves with minimal seed heads or blossoms and is not damp or weedy.

5. Feed at least 1 to 5 lbs of forage for each 100 lbs of body weight. Total daily feed should be about 2.5 to 3.0 lbs per 100 lbs of body weight.

6. Avoid dusty and moldy hays and grains. Dusts and molds can lead to indigestion and respiratory diseases.

7. When needed, feed concentrates at least twice daily.

8. Use top quality feeds and choose rations that are balanced to your horse’s nutrient requirements.

9. Feed horded individually if possible to prevent aggressive horses from overeating and submissive horses from undereating.

10. Feed at regular time intervals and make major changes in the ration gradually over several days. Do not increase grain feeding faster than 1/2 lb per day.

11. Allow horses one hour after feeding to digest the meal before forced exercise.

12. Allow a hot horse to drink frequent small amounts of water after exercise. Never give grain to water to a hot horse in large quantities.

13. Watch your horse closely as it eats for changes in appetite. Sudden changes alert you to potential health of feed problems.


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