

BIOTIN BASICS

Biotin has become commonplace in feed rooms across the world because of its reputation as an effective hoof supplement. And while this is true, some horsemen believe it to be a man-made and mystical creation. Nothing could be further from the truth. Like the more familiar niacin, riboflavin, and thiamin, biotin is a B-vitamin. Biotin is similar to other B-vitamins in that it is essential in the conversion of feedstuffs to energy so horses can grow, work, and reproduce. Biotin is found in virtually every cell in the body and is an essential coenzyme in carbohydrate, fat, and protein metabolism. This B-vitamin is also important for normal thyroid and adrenal gland function, reproductive tract health, nervous system stability, and most dramatically, growth and repair of skin and hooves.

Biotin occurs naturally in many feedstuffs commonly fed to horses such as oats, soybean meal, alfalfa, rice bran, and molasses. However, horses derive most of their biotin requirement from the fermentation of forages by the microbial population in the hindgut. Interestingly enough, speculation surrounds exactly how much of the biotin produced in the lower portion of the digestive tract can be absorbed, as the hindgut is typically an inefficient zone for nutrient uptake. In fact, only water seems to be absorbed well from the hindgut. Further, any factor that interferes with normal functioning of the microbial environment would affect biotin synthesis, resulting in less biotin availability. Biotin presented in the diet may have a better chance of being absorbed as it passes through the upper portion of the digestive tract, where the majority of vitamin and mineral absorption occurs. For this reason, commercially produced biotin and other B-vitamins are often added to high-quality horse feeds. The amount typically found in feeds and produced by microbial fermentation is enough to prevent any outright biotin deficiency.

Researchers found normal blood levels of biotin in horses with poor-quality hoof horn, so unhealthy hooves are not a result of deficiency. Despite normal blood levels, horses responded to megadoses of biotin given orally, which led scientists to believe that this is one of the few nutrients where more may actually be better. Biotin content in fortified feeds is typically less than 1 mg per day when feeds are given at recommended amounts.

Hoof supplements, on the other hand, offer 5 to 25 mg of biotin per daily serving.

Research focusing on biotin as a means of improving hoof quality of the horse started in the mid-1980s. Over the intervening years, various studies have found a statistically significant improvement from biotin supplementation on overall hoof condition with 15 to 25 mg per day. Normal blood values of biotin average around 350 ng/l, but within 24 hours of feeding large doses of biotin, blood levels were greatly increased to more than 1000 ng/l. Biotin only improves the growth of new hoof horn, not existing hoof. Because of this, the results of biotin supplementation took eight to 15 months to complete, depending on the growth rate of the hoof. This is the length of time necessary for the hoof wall to completely grow out and replace itself.

Throughout some studies, differences were noted in hoof growth rates among numerous breeds as well as individuals, and several factors were thought to cause contrasts in growth. Colder environmental temperatures

Photo by Catherine Bishop



Photo by Mark Llewellyn

slowed growth, as did high body temperatures. Other conditions accelerated growth. For instance, the additional concussion experienced by the hooves of horses in regular work may increase the growth rate. In other studies, biotin supplementation did not change growth rate, but the quality of the hoof improved. Hoof quality was determined by measuring hardness, integrity, conformation, and tensile strength (the ability of the hoof to withstand pressure from spreading). One study found growth rates and hardness were greater when horses were dosed with 15 mg per day than with 7.5 mg per day. Intermittent feeding of biotin did not result in rings on the hooves, but if biotin supplementation ceased altogether the hooves regressed to their former state. If the dose was decreased below recommended levels, there was deterioration of hoof quality but not complete reversion to the state observed before biotin supplementation began.

Researchers are unsure how biotin helps the hoof, but the actual improvement seen from doses of 20 mg per day has been documented by electron microscope examination. The hoof horn is made up of keratinized cells arranged spirally to form long tubules that run from the coronary band to the end of the toe. As the cells thicken around the tubules, the hoof horn becomes more resilient to damage.

Once biotin has been mixed with other ingredients, particularly oils and other fats, it has a relatively short shelf life, around six months from the time of manufacture. Buying fresh product and using it up within this time frame is the best way to ensure maximum results from a biotin supplement. Since there are no government controls on the manufacture of equine supplements, it is important to buy from a reputable dealer to guarantee that the amount promised on the label is indeed in the product.

Many horsemen that regularly feed hoof supplements may have noticed a significant jump in price during the last year and occasionally some difficulty in obtaining a biotin product. Biotin manufacturers were scrambling to meet an increased demand for the product generated by recent research that indicated improved beef and dairy cattle yields with supplementation. At the same time, one of the largest biotin producers lost its production plant to fire. Prior to these events prices had been so low that many plants had decreased production. Increased demand thus came at a time of low production. Faced with all of these problems, the world market availability was minimal, which resulted in price increases. Biotin is generally an imported product and supplement producers in the United States were hit with incredible trouble in purchasing biotin, obviously victims to market fluctuations. With the addition of new companies in the marketplace and an increase in biotin output by older manufacturers, the price of biotin in the world market is easing. As a result, hoof supplement prices should soon stabilize.

Ker-A-Form More Than Just Biotin

First and foremost, Ker-A-Form contains 20 mg of biotin per serving, the amount proven by researchers to significantly impact hoof quality. What separates Ker-A-Form from other supplements designed to improve hoof quality, however, is the inclusion of other ingredients including methionine and zinc. These ingredients are thought to positively influence the formation and strength of the keratin, the protein that composes most of the hoof wall.

Methionine is an essential amino acid. Horses are unable to synthesize methionine in their bodies, so it must be fed to them in appropriate quantities. Researchers have discovered that methionine is important to body chemistry in countless ways, including the production of hoof horn. Sulfur-bearing amino acids like methionine are largely responsible for the cross-linking of keratin, which accounts for hoof wall sturdiness and resiliency.

Another nutrient included in Ker-A-Form is zinc. Zinc is a trace mineral integral in the health of hair, skin, and hooves. Some equine nutritionists believe that zinc may be deficient in the diets of some horses. While the nutrient is present in hays and grains, levels may be too low to satisfy daily requirements. If zinc deficiency is in fact having a negative impact on hoof quality, the use of Ker-A-Form will boost levels of the trace mineral in the diet.

The recommended daily serving of Ker-A-Form has also an astonishing effect on coat condition. This is due to the inclusion of full-fat soybean meal, a rich source of fatty acids, elements linked to elastic skin and glossy hair coats.

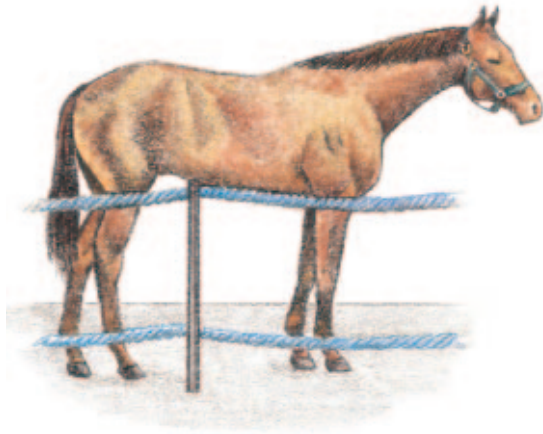
Ker-A-Form offers more than most hoof supplements. In addition to biotin, Ker-A-Form includes methionine and zinc, two ingredients proven to enhance growth and strength of hooves.



In order to achieve maximal improvement in hoof health, a horse should consume 20 mg of biotin per day. If improvement has been seen within eight to 15 months, the horse will need to remain on biotin the rest of its useful life to maintain that improvement. Cutting the dose is not advisable because it may affect the results, and care should be taken not to buy more than what can be used up in six months.

Other nutrients such as zinc, methionine, and iodine can also affect hoof quality. A well-balanced supplement will contain all of these nutrients in addition to the 20 mg per serving of biotin. ○○

Many stressed horses develop ulcers.



Neigh-Lox
is recommended
for all the
stressful times
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