

# Hoof First

## How to feed your horse for strong and healthy hooves



Your horse's diet plays a crucial role in the quality and durability of the horn that makes up his hooves.

**N**utrition impacts everything from performance and temperament to growth and metabolic rate. Hoof quality is no exception. It can take up to a year for a full new hoof to grow, so what your horse eats today could impact his soundness much further down the road. In this article two equine nutritionists—Lynn Taylor, PhD, and Ashley Wagner, PhD—shed light on the do's and don'ts of feeding for optimal hoof health.

### The Recipe for Healthy Hooves

Your horse's diet plays a crucial role in the quality and durability of the horn that makes up his hooves. Horses require certain nutrients in specific amounts and ratios to grow and maintain strong hooves. However, even the perfect diet is not enough by itself to grow good

feet—several other factors come into play. Management, exercise, metabolic rate, hoof care including trimming and shoeing, overall health, genetics, and climate (moisture levels, in particular) can all affect the appearance and strength of horses' feet—and not always for the better. The bottom line is hoof health requires a very holistic (whole horse) approach.

### The Hoof Is a Living, Breathing Organ

You've probably noticed those well-defined horizontal ridges that encircle some horses' feet, but do you know what they are or how they came to be? Growth rings, as they're known, show how the hooves have responded to the horse's diet and health over time. They

can appear following a period of systemic illness or reflect changes in nutrition—for example, when a horse consumes rich grass in the spring or suffers a bout of starvation. Monitoring the appearance of your horses' hooves regularly will help you track progress and identify potential nutrition-related problems.

Keep in mind that the hoof grows slowly (about one-third of an inch per month), from the coronary band down and from the inside out. This slow growth rate means months will pass before your horse's current health and dietary status starts to manifest in his feet. Taylor, a professor of equine science at Centenary University, in Hackettstown, New Jersey, and the owner of a private equine nutrition consulting business, says that in some cases she's had to wait more than 18 months to see real changes. This extended interval is, in her experience as a consultant, the No. 1 issue horse owners face when adjusting diet to improve hoof quality. For example, they might add a new supplement but give up before the product has had time to produce visible results. Patience and persistence are key.

### Feeding the Feet: Ingredients That Build Strong Hooves

**Energy** Starting on a very basic and fundamental level, horses grow strong and healthy hooves by consuming enough energy. Here's why this is so important: A horse that burns more calories than he consumes will save these precious energy-packed calories for vital organs and bodily functions, while external structures such as hooves and hair get the short end of the stick. Balance, however, is key. A horse that consumes an energy-rich diet that is too high in the nonstructural carbohydrates starch and sugar is at an increased risk of developing laminitis (a debilitating hoof disease that occurs when the laminae suspending the coffin

bone within the hoof capsule fail). The same can be said of a severely overweight horse; obesity increases the chance of developing metabolic disturbances similar to diabetes in humans, which can also lead to laminitis.

**Protein** The healthiest horses have balanced diets, meaning they receive all the necessary nutrients in correct amounts and ratios, with no imbalances, excesses, or deficiencies. Certain ingredients affect hoof health specifically, and protein is high on that list. This is primarily because the hoof horn is composed of an insoluble protein called keratin.

“Keratin provides the unique combination of strength, hardness, and flexibility of the hoof capsule,” says Wagner, who also runs an equine nutritional consulting business from her home base in Cheriton, Virginia.

Like all proteins, keratin is made up of amino acids, which the horse digests and uses to build and maintain various body tissues. Specific amino acids exist naturally in the hoof and help ensure its proper structure and function. These include cystine, arginine, leucine, lysine, proline, serine, glycine, and valine, as well as lower amounts of methionine, phenylalanine, and histidine. That’s a lot of ingredients to remember, so a good recommendation is simply to feed a diet containing all 10 essential amino acids, because adding only certain ones to the diet has the potential to throw it off balance. What makes certain amino acids “essential” is the body’s inability to

produce enough of them naturally. The horse must, therefore, ingest them in his diet in the form of protein. While protein is essential for hoof health, beware of excesses. Overfeeding protein is a waste of an expensive ingredient and can be detrimental in hot weather because digesting it generates extra body heat and increases water requirements. This can be problematic for high-performance horses that travel and exercise in hot, humid conditions, because these athletes are already predisposed to dehydration and heat stress.

## “Biotin seems to be beneficial specifically for horses with brittleness of the hoof.”

DR. ASHLEY WAGNER

**Fat** This nutrient by itself doesn’t improve hoof quality. However, it contributes greatly to energy intake, indirectly supporting hoof health. Feeding fat also helps maintain a barrier in the hoof, keeping bacteria and fungi out. Fat is a safe and effective energy source for most horses and benefits many structures beyond the hoof.

**Biotin** Nutritionists consider vitamin B7, better known as biotin, to be the single most important vitamin for hoof health. Biotin contains sulfur, an element

that contributes to the strength of the bonds between collagen strands in connective tissues, including in the hoof wall. Several studies going back decades have shown biotin to be effective at restoring the strength and elasticity of a hoof wall with structural defects (Kempson 1987; Wintzer 1986). The good news is biotin exists naturally in grass, concentrates, bran, and yeast, so your horse is probably already getting the recommended dosage of 15-20 milligrams/day (that’s for the average 1,100-pound horse). Because biotin is a water-soluble vitamin (as opposed to a fat-soluble one), the body simply excretes any excess, eliminating the risk of toxicity and making it very safe to feed. Some horses, however, respond better to biotin supplementation than others.

“It is not a silver bullet,” Wagner explains. “Biotin seems to be beneficial specifically for horses with brittleness of the hoof due to deterioration of the stratum externum (the outermost layer of the hoof wall).”

**Gut health** Another ingredient in the healthy hoof recipe that you might not immediately consider is the beneficial bacteria in the digestive tract. “Supporting a healthy gut microbiome is critical because the microbes in the hindgut produce B-complex vitamins, which may assist with blood flow to the hoof,” Taylor says.

Wagner even recommends considering a general gut health supplement. “If there are gastrointestinal issues in digestion and absorption or with microbial dysbiosis (imbalance), then the utilization of the

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nutrients fed is also reduced,” she says.

**Minerals** Of the key minerals, zinc plays an important role in keratinizing and maintaining hoof strength. Research has shown that weak hooves are sometimes associated with low zinc levels in the blood (Harrington et al., 1973). Horses also need calcium to bind cells to each other in the horn. Feeding the correct calcium-to-phosphorus ratio is a tenet in equine nutrition, because excess phosphorus can interfere with calcium absorption and cause an array of health problems. It’s important when considering hoof health, because a lack of calcium can weaken the hooves.

Indeed, just like amino acids, “minerals function in groups,” Taylor says, “and changing the amount fed of one or two can disrupt the absorption and utilization of other minerals.”

Feeding too much zinc, for example, will compromise copper and iron metabolism. Selenium helps build strong hooves, but excessive amounts actually compromise the horn’s quality, as can too much of the amino acid methionine. It’s all about finding an equilibrium in the nutrients.

“Always make sure the horse’s diet is balanced,” Wagner urges. “An unbalanced diet can negatively impact many areas of health and condition, including hoof health.”

Growth rings on a horse’s hoof wall can appear following a period of systemic illness or reflect changes in nutrition.



CARRIE CATHLEEN

### When to Turn to Supplements

Owners, veterinarians, and farriers have reported anecdotally that many nutritional supplements help with brittle feet and hoof cracks, but independent scientific research only supports those containing biotin and methionine. In 1990 a research team from the University of Edinburgh, in Scotland, added a biotin/methionine product (Farrier’s Formula) to the diets of 18 horses with either hoof

cracks or flat, bruised feet. All the study horses had improved hoof horn structure (as assessed on a microscopic level) six weeks after supplementation began. These changes were visible to the naked eye, as well. Once they’d grown quality horn, none of the horses relapsed during the two-year experimental period.

Taylor and other nutritionists usually find that horses with good feet don’t tend to show much improvement with supplements, most likely indicating that their basic diet is already meeting all the hooves’ needs. This suggests that your money is best spent making sure your horses’ diets are complete and balanced and feeding nutritional hoof supplements only to those with weak or cracked hooves. And, as always, consult your veterinarian or equine nutritionist to discuss adding any supplement to your horse’s diet.

### Take-Home Message

“Horses are individuals and, whether they are shod or barefoot, all have individual hoof health needs,” Taylor says. “There is no ‘ideal’ diet that should be applied to every horse, but every owner should look carefully at the hoof in the context of overall health, environment, exercise, and diet.”

And keep in mind that today’s diet is tomorrow’s hoof—so give your horse the best chance at long-lasting health and soundness.



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