

Common Nutrient Deficiencies in Horses

Find out if your horse could be at risk of suffering subtle but serious vitamin and mineral imbalances.

By [Sharon Biggs Waller](#) | May 18, 2015 | [Metabolism](#), [Muscle and Joint Problems](#), [Musculoskeletal System](#), [Nutrition Deficiencies](#), [Vitamins & Minerals](#)
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Depending on his lifestyle and location, your horse might be at risk for suffering subtle but serious vitamin and mineral imbalances



Photo: Anne M. Eberhardt/The Horse

For the most part, horse owners have little to fear when it comes to nutrient deficiencies in their horses' diets. Nowadays many horses consume commercially prepared feed balanced for their energy, protein, vitamin, and mineral needs.

Kathleen Crandell, PhD, equine nutritionist at Kentucky Equine Research, explains that most horse owners in the United States have access to good-quality forages, and North American horses live fairly healthy lives. However, we shouldn't take these things for granted. "Nutrient deficiencies in the U.S. tend to be subclinical rather than clinical," she says. "Clinical means there are obvious signs. Subclinical means symptoms are vague. If the horse is not taking in enough nutrients, the problems may show in subtle ways. For example, a front-end lameness could be the result of an imbalance of calcium and

phosphorus in the diet. We might put the blame on exercise or an accident, and not relate it to nutrient deficiencies.”

At-Risk Horses and Common Deficiencies

Kristen M. Janicki, MS, PAS, performance horse nutritionist for Mars Horse-care US Inc. and Buckeye Nutrition, says horses at risk for developing nutrient deficiencies include high-level performance horses, pregnant and lactating mares, growing horses up to 2 years of age, and horses that are stalled 24/7 on an all-hay diet with no pasture access.

“Also at risk are horses living in a state deficient in certain nutrients,” she says. “A lot of minerals vary depending on location, soil content, and the species of plants growing. Drought conditions can affect minerals, too. But we do know that areas with soil deficient in selenium (for example) include the Midwest, East Coast, and some parts of the West Coast.” Selenium supports horses’ immune function, so a lack of it can impede a horse’s ability to fight off infection.

Crandell says horses on hay-only diets can become vitamin E deficient over time. This potent antioxidant enhances immune function, facilitates cellular respiration, aids DNA synthesis, and improves the absorption and storage of vitamin A, among other roles. Fresh grass contains high levels, but these drop once the grass is cut for hay and stored. There are two diseases associated with a vitamin E deficiency: equine motor neuron disease, a rare oxidative disorder that impacts motor neurons in the spinal cord, and equine degenerative myoencephalopathy, a disease characterized by brain stem and spinal cord deterioration. Testing is the only way to know for sure if a forage is deficient in E; horses on hay-only diets might need vitamin E supplementation.

Researchers have shown that horses’ bodies absorb and utilize natural vitamin E better than they do the synthetic, says Crandell. So if you choose to supplement, she suggests checking the product’s label to see what type of vitamin E (tocopherol) it contains: Natural vitamin E is d- α tocopherol, and synthetic vitamin E is dl- α tocopherol.

Vitamin A is important for vision, bone and muscle growth of young horses, reproduction, healthy skin, and immune response to infection. Crandell says horses get their vitamin A from forage but, similar to vitamin E, levels begin to decrease once the grass is cut for hay. “When green, grass has plenty of

carotene, which is the source of vitamin A,” she explains. “But when you start feeding only hay, sometimes horses don’t get enough A. Usually A isn’t a vitamin of concern because it is added into almost all commercial horse feeds, and if a horse gets enough green grass it’s not an issue at all.”

Vitamin C is an antioxidant that helps boost the immune system, notes Crandell. Horses’ bodies produce vitamin C naturally, but when stressed they might not make enough. “We’re talking long-term stress,” she adds. “Weaning a foal would be an example. In a study looking at blood levels of vitamin C in foals being weaned, the levels dropped during that stressful time.”

Horses off their feed due to illness and/or stress can develop B vitamin deficiencies. The equine hindgut (the large intestine, which consists of the cecum and the colon) contains billions of microbes that digest forage and produce B vitamins, which have a variety of functions such as maintaining healthy skin and muscle, promoting cell growth and division, and enhancing the immune and nervous systems.

“If a horse isn’t eating enough or if their hindgut is too acidic (due to too much grain and not enough forage) or if the horse has a fever or colic, the hindgut can become out of balance, which compromises production of B vitamins,” Crandell explains. “But again, good-quality feeds have B vitamins included in the mix.”

Some trainers and owners believe low magnesium causes nervousness and insulin resistance in certain horses, although Crandell says she rarely sees a diet that is low or deficient in magnesium. “People are feeding magnesium in therapeutic doses to calm a horse, and some say it reduces the thick, cresty neck and the risk of foundering in insulin resistant horses,” she says. “So far, there are no scientific studies supporting this claim, and results are largely anecdotal.”

A diet can be salt-deficient, causing metabolic issues, if a horse does not have access to salt. “Forages are low in sodium and chloride (together they make salt), and commercial feeds usually only add less than 0.5% salt to the feed,” Crandell explains. “Deficiency signs in the idle horse are not obvious but are much worse if the horse is exercising and sweating.”

Sometimes it’s not a deficiency that causes a problem but, rather, an imbalance. The mineral calcium is important for muscle contraction, cell membrane function, and blood coagulation, and phosphorus is

important for energy transfer. Deficiencies in these minerals are rare, says Crandell, but ratio imbalances can mean detrimental effects.

“Calcium and phosphorus need to be balanced in a 1-1 ratio for adult horses; growing horses need 2-1 (ratio, calcium to phosphorus),” Janicki explains. “If that ratio is inverted you’ll have definite bone problems, such as osteochondritis dissecans—a cartilage disorder characterized by the presence of large flaps of cartilage or loose cartilaginous bodies within a joint—and epiphysitis (inflammation of the ends of the long bones), in your young horse.”

Is My Horse Deficient?

Our sources say there’s no easy answer to this question, and to complicate matters further, Crandell says blood tests aren’t conclusive. Veterinarians can measure certain vitamins and minerals reliably, such as selenium and vitamins B, D, and E, using blood tests, but they can’t accurately measure vitamin A (which is stored in the liver) and the minerals calcium, phosphorus, and magnesium. “The reason for this is because of homeostatic regulation in the blood, which means that the body tries to keep the same level in the bloodstream,” she says. “So, when needed, (these vitamins and minerals) will be released from the stores in the body, such as in the bones and liver, and put into the blood. So a blood test can appear normal, even if the horse is deficient.”

However, horses can exhibit clinical signs specific to each vitamin and mineral deficiency. Janicki says that abnormal behaviors, premature fatigue and other performance problems, or issues with grazing and consuming feed (and no outward signs of any other disorder) can indicate nutrient deficiency.

Correcting an Imbalance

Our sources agree that you must be cautious when correcting an imbalance so as not to overcorrect and provide too many minerals and vitamins. “You have to be careful and look at the amount the horse is receiving in his concentrate already,” says Janicki.

Both sources recommend contacting an equine nutritionist for advice on correcting imbalances. Many feed companies offer consultations free of charge. “Talk to a nutritionist and see if there’s an issue that can be explained,” says Janicki. “Most nutrient deficiencies can be reversed. The severe ones are iodine,

in which case the horse will have a goiter (an enlarged thyroid gland, visible as swelling behind the jaw); and the calcium and phosphorus ratio imbalance, which can cause skeletal issues.”

Janicki warns that the last thing you want to do is start feeding vitamins and minerals indiscriminately when you think your horse is deficient in a nutrient. “More than likely the problem can be more than one thing,” she says.

Simple Solutions

There are three ways to tailor your horse’s diet so he receives the nutrients he needs. First, if he doesn’t need the calories grain supplies, simply provide a mineral block or loose minerals plus good-quality forage. If you live in a selenium-deficient area, look for a product that contains this mineral. If you do offer a commercial feed, also provide a salt lick because, as mentioned, the amount in these feeds does not usually meet horses’ requirements.

“They’ve done studies on whether horses have enough nutritional wisdom to eat the nutrient they are lacking, but apart from an appetite for salt, they don’t appear to,” says Crandell. “Nowadays nutrients are mixed with salt to get the horse to eat them. Horses aren’t looking for selenium, but they will get some when they come over for salt.”

The second choice is offering a ration or hay balancer. Janicki says this is a good choice for a horse that doesn’t need a significant source of calories.

The third choice is providing concentrated feed, to which manufacturers have added vitamins and minerals. But just any concentrate won’t do, says Crandell—it’s important to choose the product formulated for your horse’s circumstances. “For instance, if you have a broodmare, you want the product for broodmares,” she says. “But you must make sure you feed at least the minimum of the recommended daily amount or else the horse won’t get all the nutrients he or she needs. If the minimum recommended amount is too much for the horse, then look for a lower intake feed or ration balancer or add a vitamin and mineral supplement.”

Take-Home Message

Don't hesitate to seek advice from a nutritionist, says Janicki. "The majority of the horse's diet is forage, so have your hay tested by your feed company or cooperative service extension," she says, to get a baseline for your horse's nutrient intake. "Also remember that indiscriminately adding supplements to your horse's diet has the possibility of throwing off the balance. In short, consider the entire diet from forage to concentrate."