

# Winter Feeding Horses: What About Vitamins & Minerals?

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Feeding horses in the winter “up north” tends to create times when you’re fighting snow, wind, bitter cold, and frozen water lines. Often, we just hope to get sufficient feed to our animals. When balancing a diet for horses, we strive to make sure they have sufficient protein and energy, but sometimes overlook if the forage and feeds provide adequate levels of vitamins and minerals.

**Vitamins** are organic compounds needed to regulate many bodily functions. Fat soluble (absorbed with fat) and water soluble (absorbed with water) are the two general classes of vitamins. Vitamins A, D, E, and K are absorbed with fat while vitamins B and C are absorbed with water.

Vitamins are essential for normal metabolism of all animals. Newly harvested green forages are high in vitamin A and E. Grazing horses on green pasture or feeding green hay will meet their vitamin A and E demands. However, if you’re experiencing drought conditions, grazing dormant pasture in which grass is brown, or feeding hay older than one year can lead to a vitamin A and E deficiency.

Vitamin D is provided from sunlight and sun-cured forages. Horses should be provided 4-6 hours of sunlight or sun-cured forages to meet their vitamin D requirements.

Vitamins K, C, and B-complex are usually met through common feedstuffs and microbes in the gut. Thus, these vitamins are usually not supplemented to horses.

- **Supplementing Vitamins.** During the winter months when green pasture isn’t available, feeding a grass and/or legume hay that is green will provide sufficient levels of vitamins A and E. Vitamins do degrade in concentration as stored hay ages, so supplementing A and E may still be needed.

There are many commercial vitamin-mineral supplements and commercial grain mixes available, with both options containing the necessary vitamins. Overfeeding vitamins doesn’t present any health issues to horses, so feeding a vitamin supplement to horses whose vitamin A and E needs are met is safe.

**Minerals** are inorganic nutrients required in relatively small amounts. Minerals are typically categorized as essential and trace. Minerals are needed, as they are components of the body tissue and facilitators of various body processes. Mineral requirements vary based on bodyweight, age, production stages (e.g., pregnancy stage, lactating, breeding), and activity level (e.g., working, exercising, maintenance).

- **Calcium to Phosphorus Ratio.** The two minerals of largest requirements are calcium (Ca) and phosphorus (P). Thus, relatively large Ca and P amounts are required in the diet with the total dietary supply of minerals containing more Ca than P. Diets are recommended to contain ~1.5-2.5 times more Ca than P.

A ratio <1:1, where P content exceeds Ca, can lead to bone disorders; especially in young, growing horses. This tends to happen when animals graze lush pasture in spring or fresh regrowth pastures, and can even happen when total Ca and P amounts are adequate.

Phosphorus is highest in immature forages, while Ca actually increases with plant maturity. Calcium deficiency is usually not an issue, but the imbalance of Ca:P ratio can become a dietary issue when pastures are green and lush (<1:1 Ca:P ratio). Phosphorus becomes deficient when forages are harvested when mature or pasture conditions become poor (brown or mature plants). Legumes are usually high in Ca and grains higher in P but lower in Ca. Harvested grasses (unless immature) are usually high in Ca, low in P.

- **Other Minerals.** High-quality forages and green, actively growing pastures are high in magnesium (Mg), potassium (K), and sulfur (S). Forages harvested at the mature phase and not green can become deficient in Mg and K.



Stallion eating a winter forage ration plus complete mineral supplements (Photo Kevin Sedivec).

Most forages fed to horses will be low in sodium (Na) and chloride (Cl). Always provide salt, either in a block or loose form.

- **Trace Minerals.** These are essential to the horse. Most trace mineral content in forages and feeds will vary by location, environment, and plant maturity. The level of trace mineral content in a forage is directly related to mineral concentrations in the soils from which they are harvested. This is especially true for copper (Cu) and zinc (Zn). Copper and Zn tend to be low in Northern Plains soils, with Cu rarely achieving the minimum levels. Zinc tends to be marginal or adequate in good moisture conditions, unless it is low in the soil profile, and deficient in dry years.

Trace minerals also interact with other minerals and can hinder their uptake by the horse. High levels of Na in their drinking water will tie-up Cu absorption. In my experience, both available Cu and Zn are low in grazing pastures and forages in the Northern Plains states.

Iodine is rarely found in forages and feedstuffs. Horses require 1-6 mg/day. Feeding iodized salt will provide the necessary levels of iodine for your horse.

Cobalt (Co) and selenium (Se) are found naturally in forages grown in the Northern Plains. Cobalt is required within the horse's hindgut to synthesize vitamin cobalamin, or vitamin B12. Selenium is an important antioxidant, but can be toxic.

Selenium is intricately linked to vitamin E. If both Se and vitamin E are deficient, an increase in oxidation will occur, resulting in a lower immune system. If Se levels are low in the feed, increasing vitamin E will prevent peroxide formation. Toxic levels of Se start at 2 mg/kg of diet for the horse (minimal requirements at 1 mg/day for the average horse). Toxic levels of Se occur in regions where soils are high in Se. These areas tend to occur where marine shale is exposed in the Northern Plains (e.g., western South Dakota).

Trace mineral salt can either be in block or loose form and should contain Na, Cl, and trace minerals but not Ca or P. Target intake per horse should be 1.5-2 oz daily. If your horse doesn't eat enough supplement, try moving the mineral mix holder or using additives to encourage intake. Loose form of trace mineral mixes increase intake by 15%. If you provide trace mineral salt, don't provide other sources of salt.

- **Commercial Complete Mineral Supplement.** These contain essential and trace minerals. Choose the supplement that compliments your hay and concentrate (grain) ration. Feed the complete mineral supplement daily at the recommended rate to each individual horse to assure each horse gets the proper amount of mineral. You will still need to provide a white salt block that doesn't contain trace minerals.