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Nutritional Minute



More Mighty Minerals

Minerals are inorganic compounds that serve both as components in body tissue and as catalysts for various body processes. They play a critical role in a horse's health and well-being.

Minerals are broken down into two categories: macrominerals and microminerals.

Macrominerals are those required by the horse in larger quantities. They are measured in the diet in grams per kilogram (g/kg). Microminerals are required in smaller quantities and are measured in parts per million (ppm) or milligrams per kilogram (mg/kg).

In a previous Nutritional Minute, "Mighty Minerals," we reviewed the macrominerals calcium and phosphorus. We learned that mineral levels can influence the absorption, metabolism, and excretion of other nutrients; therefore, not only is the quantity of mineral itself important but also the ratio of one mineral to another.

There are five additional macrominerals that the National Research Council (NRC) lists as required for horses. Each plays a supporting role in different areas of your horse's body.

Magnesium (Mg)

- 60% of Mg is found in the skeleton
- 30% is found in muscle
- It is a critical ion in the blood that activates enzymes and participates in muscle contraction

Potassium (K)

- 75% of K is found in skeletal muscle
- Maintains acid-base balance and osmotic pressure
- Plays an important role in neuromuscular function

Sodium (Na)

- 51% of Na is found in the skeleton
- 10.8% is found in blood and muscles
- As a major electrolyte, Na is involved in maintaining acid-base balance and osmotic regulation (fluid regulation)
- Critical for normal function of the nervous system
- Transports glucose across cell membranes

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Chlorine (Cl)

- Accompanies sodium in the diet as a chloride anion
- Critical for acid-base balance and osmotic regulation
- Is an essential component of bile
- Plays a role in the formation of hydrochloric acid, a component of gastric secretions that digest foodstuffs in the stomach

Sulfur (S)

Sulfur is found in certain amino acids, B vitamins (thiamin and biotin), heparin, insulin, and chondroitin sulfate.

- Chondroitin sulfate contributes to joint health
- Heparin is an anticoagulant (a blood thinner that protects against the formation of blood clots)
- Insulin helps regulate carbohydrate metabolism
- Cysteine and methionine (sulfur-containing amino acids) provide the building blocks for proteins and enzymes
- Thiamin and biotin are involved in metabolism

Getting the balance right

Deficiencies, excesses, and imbalances of these macrominerals can cause a variety of problems in the horse. To avoid these problems follow these simple steps:

- Always choose research-proven, nutritionally sound supplements that follow NRC recommendations and feed them at the suggested levels
- Pick reputable commercial concentrates that are properly formulated to provide adequate levels of macrominerals
- Test your hay and pasture frequently so you know what it is contributing to your horse's diet
- When feeding straight grains or low levels of commercial feeds, consult your veterinarian about adding a well-balanced mineral supplement to your feeding program

How to avoid over-supplementation

- Always consult your veterinarian or equine nutritionist when developing your horse's diet
- Choose supplements that have been formulated to work together
- Don't feed several supplements from the same category at the same time (for example, multiple mineral and vitamin supplements, or several all-in-one products)
- Feed only research-backed supplements that are formulated to complement, not compete with, fortified feeds

Know the recommended levels for your horse

- The recommended feeding levels for minerals vary according to a horse's age, workload, and reproductive status; visit <http://nrc88.nas.edu/nrh> to view NRC's tables outlining current requirements
- Work with a qualified equine nutritionist or veterinarian when balancing your horse's diet



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