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Mg
Magnesium

Magnesium

Always remember that minerals and vitamins interact in many different ways. Supplementing with just one or two minerals and not with others is highly likely to cause problems with imbalances in the other vital nutrients. Very rarely is a horse's diet deficient in just one mineral and rarely does a nutritional medical problem respond to the addition of just one or two minerals. Whilst the action of individual minerals can be described in the functioning of the normal horse's body never forget that it needs other cofactors to enable it to work.

An informed, astute and observant owner is the best judge of how a horse is performing on the diet it is on and can correct it appropriately as required.

Magnesium is vital for correct nervous system and muscle function, energy metabolism and production, and is directly required for hundreds of chemical reactions in the body daily. An absolute or relative deficiency of magnesium manifests as horses with nervous, wary or excited behaviours and muscle tremors. There is poor work tolerance with tying up likely. Excess magnesium is excreted in the urine and there is very little magnesium stored in the body. Major overdoses of magnesium can lead to renal and cardiac problems.

Most magnesium needs are acquired through forage – they absorb 40 to 60% of the magnesium in pasture plants and acquire 60% to 100% of daily needs through this source.

Magnesium deficiency is likely when there is strong grass growth as in spring or when winter pastures are fertilised and grass grows well – grasses under these conditions of rapid growth are likely to be low in magnesium, sodium and soluble carbohydrates and relatively high in nitrogen and potassium. High potassium slows magnesium uptake while high sodium helps magnesium uptake. A relative magnesium deficiency is likely when dietary potassium is too high. Calcium, phosphorus and fats in the diet also influence the ability of the horse to utilise and store magnesium.

Magnesium can be supplemented in the diet with magnesium oxide, magnesium carbonate, magnesium sulphate and magnesium-L-aspartate. It has been estimated that maintenance needs of magnesium for horses is 13-15 mg/kg/day – this is increased 1.5 to 2 times for growing horses, lactating mares and horses in medium to heavy work due to losses in sweat.

Studies have shown magnesium oxide is absorbed at a rate of 70%. Magnesium oxide has the chemical composition of MgO, where one magnesium atom (Mg) is bound to one oxygen atom (O). By weight, magnesium oxide is 60.3% magnesium. This means that for a horse to absorb 15mg it would require 35mg of magnesium oxide. Chelated magnesium is magnesium bound to an amino acid which makes it more easily absorbed. For example, chelated magnesium (magnesium-l-aspartate) achieves close to 100% absorption. The issue is that the concentration of magnesium in magnesium-l-aspartate is low at just 15.6%. This means 96mg of magnesium-l-aspartate would need to be supplemented for a horse to absorb 15mg. Due to the expensive nature of chelated magnesium products the inorganic form of magnesium oxide provides excellent value due to the high levels of concentration and high absorption rate. There is vigorous debate about chelated magnesium vs. inorganic forms of magnesium particularly in regard to absorption. What is of particular interest is that magnesium naturally found in plants is absorbed at a rate of between 40 - 60%. Comparing this to the absorption of inorganic forms (magnesium oxide, magnesium carbonate, magnesium sulphate) it shows that both the inorganic and chelated forms of magnesium can achieve absorption superior to that of magnesium naturally found in pasture.

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