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Selenium

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Why is selenium important?

Selenium is a trace mineral requirement of horses and its major purpose is to act as an antioxidant agent. It works synergistically with Vitamin E to protect cell membranes from the by-products of energy metabolism. Selenium is also needed to activate thyroid hormones and it is also required for normal muscle integrity. It is also important for the normal function of the immune system.

What is its relationship with Vitamin E?

The functions of both Vitamin E and selenium are intrinsically linked – if there is a deficiency of one adequate amounts of the other can compensate. However, for optimal health and well being both selenium and Vitamin E should be present at the correct level in the body.

Selenium levels in soil.

Many soils are deficient in selenium – especially those where horses and livestock are grazed- and the resulting pastures are usually selenium deficient. Crop growing soils generally have higher selenium levels and grains from these areas can have reasonable amounts of selenium.

What are the signs of selenium deficiency?

Horses that are able to graze pastures and horses fed lucerne (alfalfa) hay get an abundant amount of Vitamin E in their diet. Green grass is an excellent source of Vitamin E so horses on selenium deficient soils often show no signs of selenium deficiency. Mild deficiency of selenium could show as poor hair quality, a depressed immune system and decreased fertility in mares. More pronounced deficiencies would show as white muscle disease which is degenerating muscle tissue – poor work tolerance, impaired movement, difficulty swallowing, respiratory difficulties and impaired heart function are all a consequence of degenerating muscle tissue.

What are the signs of toxicity with selenium?

Mild toxic effects would be loss of hair from mane and tail, hoof sloughing, joint erosion and lameness. Acute selenium poisoning will produce staggers, colic, diarrhoea, increased heart and respiratory rates and death.

What are the recommended levels of selenium in the diet?

The minimum required as determined by the NRC is 0.1mg /kg of food ingested per day. For a 500 kg horse that is not in any work this equals 1mg per day. Toxicity starts at around 2mg/kg of food ingested. Sulphur, copper, arsenic, mercury and silver will decrease the toxicity of selenium ingested in the diet as they inhibit absorption or promote excretion from the body.

Selenium is present either as organic selenium in plants or inorganic selenium added to supplements. The absorption of organic selenium is slightly higher, selenium has an absorption of at least 50%.

A 500kg horse in work would require approximately 2.5-3.5 mg /day but a range of 1 to 10 mg per day is generally considered safe and adequate. Toxic effects start to show at 20mg selenium ingested per day.

How do I test for my horse's selenium levels?

Selenium levels are measured by whole blood and/or plasma and serum samples. Serum or plasma levels can go up and down with changing selenium intake while whole blood levels are more constant. The age of the horse will also affect what is regarded as a normal level with younger horses having less selenium than older horses. Normal values for whole blood are also higher than those for plasma or serum. For a thorough evaluation both whole blood and plasma samples should be taken and repeat sampling done over a period of time.

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