

Selenium an Essential Micronutrient.
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In mammals selenium is an essential component of at least twelve enzymes. For both ruminants and non-ruminants various forms of selenium are readily absorbed in the small intestines and vitamin E and selenium often function together.

Selenosis or selenium poisoning occurs in three situations. First, grazing animals may suffer from subacute blind staggers or chronic alkali disease by consumption of selenium accumulator plants. Secondly environmental contamination of agricultural drainage water with sewage sludge or industrial activities such as fly ash from coal plants, oil refineries, and mining of phosphates and metal ores can cause selenium toxicosis in aquatic animals. Thirdly, selenium toxicosis can also be produced high levels of selenium supplementation or poor management.

Although selenium toxicity can be a problem for livestock selenium deficiency is a more widespread problem. There are many clinical and subclinical signs of selenium deficiency in animals and most of these clinical signs are not produced by selenium deficiency alone, but rather in combination with vitamin E deficiency. Nutritional myopathy or white muscle disease is primarily a disease of pigs cattle and sheep with horses and goats moderately susceptible. Historically nutritional myopathy has been considered a disease of young animals with emphasis on the very young. In cattle and sheep myopathy can occur in utero in 7 month old fetuses with muscle lesions observed in lambs and calves at birth. This congenital type of white muscle disease may result in sudden death within 2-3 days of birth with involvement of the heart muscle. In the delayed case of white muscle disease in young animals skeletal or cardiac involvement may be associated with vigorous exercise. Affected animals may move stiffly with an arched back and frequently lie down. If the condition is severe enough to prevent nursing either from dysfunction of the muscles of the legs or tongue death may result from starvation. A deficiency of selenium in gestating cows may cause retained placentas.

Treatment of calves for white muscle disease is commonly performed by giving them an injection either subcutaneously or intramuscularly of an emulsion of vitamin E and selenium providing 1 mg of selenium and 50 mg of vitamin E. Several products are commercially available for designated species Treatment may be repeated every two weeks for a maximum number of 4 treatments.

Soil selenium via the growing of plant feeds and foods serves as the primary source of selenium for the nutrition of grazing animals. However the great lakes area the North East, part of the West Coast and Florida belong to low soil selenium regions which make supplementation of selenium often necessary. Supplementation of selenium containing minerals is the most effective method to meet the selenium requirement of many species in these deficient areas. The most commonly used sources for selenium supplementation are sodium selenite and sodium selenate. Other sources of selenium include calcium selenite, and selenium dioxide. Various selenium enriched yeast preparations are available and appear to have higher bioavailability than sodium selenite in raising tissue, egg, milk, and blood selenium levels. The following approaches can be

used to enhance selenium intakes by grazing animals: free-choice selenium mineral supplement, selenium fertilizations of pasture, injection of selenium, a selenium drench, or selenium ruminal boluses (McDowell). Selenium is regulated by the federal government as a food additive and sources of selenium and levels of supplementation for various species are covered by federal regulation.

References

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