

Why do I need to give my horse extra minerals?

The simple answer is that horses are not native to Australia and Australian soils are lacking in some of the essential minerals and trace elements that were available to the species in their countries of origin. The rich aeolian soils of the Eurasian continent provided a smorgasbord of nutrition and the animals feeding in this area evolved with a high need for nutrition and the ability to use it for speed and endurance. In contrast the majority of Australian native animals evolved more sedentary lifestyles because the highly eroded soils of Australia did not present them with high levels of nutrition needed for a more active lifestyle like which we require from our horses.

If the minerals are not in the soil to start with then the plants grown in the soils are deficient and can't metabolise the organic nutrients that a healthy plant should produce eg: amino acids, vitamins etc. Therefore they are not in the feeds grown in the soil either and supplementation is the only avenue left.

What minerals are typically scarce in Australian soils?

With the exception of iron, nearly all of them. Copper, zinc, manganese, cobalt, selenium, magnesium, calcium, potassium, vanadium, chromium, boron, gallium, sulphur, and about 12 others are all crucially deficient in bioavailable forms. That is, some at least of these minerals may be present but the flora and fauna cannot make use of them in their present forms.

An example of this is the rock Feldspar which is an alumino-silicate rich also in calcium, potassium, magnesium and a number of other biologically useful elements tightly bound up in a mineral structure that can only be broken down in rich organic soils by soil micro-organisms.

The Australian landscape was never rich in these soils to start with and our inappropriate treatment of the land has further depleted these desirable soils thus destroying the fragile ecosystem and micro-organism communities needed to make these minerals bioavailable.

I lied when I said it was **a simple** answer to why we need to supplement.

In the ideal situation a good pasture should provide, in addition to food energy value, an array of micronutrients of both inorganic and organic forms, basically everything an animal needs.

When the pasture can't supply this (as in Australian conditions) supplementation is vital.

What minerals should I supplement and why?

There have been many books written about this and the one we recommended to anyone wanting to finesse in this area is “Nutrient Requirement of Horses” by the National Research Council of the National Academies (USA). Although this book was not written in Australia or specifically for Australian conditions it is however the premier guideline used for horse nutrition anywhere in the world. Now without having to buy the book yourselves I can tell you this:

Calcium – about 99% of the calcium(Ca) in the body is found in the bones and teeth, with calcium constituting about 35% of equine bone. Calcium also plays an important role in various functions within the body such as muscle contraction, the function of cell membranes, blood coagulation and the regulation of many enzymes. Calcium homeostasis within the blood is critical. The skeleton can serve as a readily available storage location for calcium besides serving as structural support. Calcium carbonate, sulphate and oxide are common inorganic forms of calcium. Free choice feeding of calcium supplements is not an effective means of ensuring adequate intake. Calcium supplements should be mixed with grain or other palatable materials to help ensure consumption. The portion of dietary calcium that is absorbed varies in order to maintain normal calcium homeostasis. An absorption efficiency of 50 % is used for all ages of horses. The true absorption efficiency can be as high as 70% with young horses but appears to decline as a horse matures.

Factors affecting calcium absorption include concentrations of calcium, phosphorus, phytate and oxalate in the diet. Increasing the dietary concentration of magnesium increases calcium absorption, while the absorption efficiency of calcium decreases as phosphorus increases in the diet due to the competitive nature of calcium and phosphorus absorption in the small intestine.

Endogenous losses of calcium have been estimated to be 20mg Ca/kg BW/d. Using that estimate and the absorption efficiency of 50% the NRC proposed a 500kg horse would require **20grams** (500kg x 20mg/0.5) **of dietary calcium for maintenance daily**. Using this same estimate growing foals require 27grams of dietary calcium for skeletal growth plus 8.6grams to meet endogenous losses. Quarter horse foals require more thus making the NRC recommendation for growing foals to be – up to 42.7grams.

In late gestation, calcium requirements for the mare are increased to meet the needs of fetal growth and tissue development. Approx. 11.4mg of Ca/kg of mare body weight are deposited daily in the fetus and membranes of mares in months 9 – 11. It is also commonly recognized that there is additional demand for calcium during lactation.

Phosphorus. Like calcium, phosphorus is a major constituent of bone, making up to 17% of the skeleton. In addition it is required for many energy transfer reactions and for the synthesis of phospholipids, nucleic acids and phosphoproteins. True phosphorus absorption is quite variable and typically ranges from 30 – 55 %. The absolute intakes of calcium and phosphorus by horses must be adequate, but secondarily, it is important to evaluate the calcium:phosphorus ratio. Even if the diet contains adequate calcium, excessive phosphorus intake may cause skeletal abnormalities. This condition can occur if horses are fed large amounts of grain-based

feedstuffs such as wheat bran or oats or grains not supplemented with calcium and are receiving forage relatively low in calcium or that contain substantial amounts of oxalates (kikuyu & setaria).

Magnesium Sixty percent of magnesium in the body is found in the skeleton and about 30% is in the muscle. It is an important ion in the blood playing a role as an activator of enzymes and participating in muscle contractions. Magnesium is absorbed from both the small and large intestine and absorption rates from common feedstuffs appear to be 40-60 percent. Excess phosphorus decreases magnesium absorption as does high potassium concentrations. Clinical signs of magnesium deficiency include nervousness, muscle tremors and ataxia with the potential for collapse and death.

As you can see from the above, its not as simple as throwing a handful of dolomite or lime into their feed and you could in fact be doing more harm than good. You need to give your horse a balanced mineral supplement.

Sodium. Sodium is critical for normal function of the central nervous system, transport of substances such as glucose across cell membranes and the major electrolyte involved in maintenance of acid-base balance and osmotic regulation of body fluids. During chronic sodium completion the greatest loss is from the ingesta with the next greatest loss coming from the skeleton. Signs of sodium deficiency include a tendency for horses to lick objects that may be sweaty, a slowed rate of eating, decreased water intake and eventually a cessation of eating. Chronic

Sodium excess is not usually a problem as long as sufficient water is available as excess sodium will typically be excreted in the urine. Supplementation of sodium is recommended for exercising horses to meet losses associated with sweating.

Iodine Most of the body's iodine is found in the thyroid gland and is necessary for the synthesis of thyroid hormones that regulate basal metabolism. Iodine deficiency prevents the body from producing sufficient thyroid hormones and similarly excess iodine can directly inhibit the synthesis and release of thyroid hormones. A high iodine intake when selenium is deficient may permit thyroid tissue damage.

So once again it is not just as simple as throwing a handful of salt and seaweed meal into their feed either.

Cobalt Cecal and colonic microflora of horses use dietary cobalt in the synthesis of vitamin B₁₂, and cobalt in the form of vitamin B₁₂ is inter-related with iron and copper in hematopoiesis or blood cell formation.

Selenium plays an important role in the control of thyroid hormone metabolism and aids in detoxification of Lipo- and hydrogen peroxides that are toxic to cell membranes.

Zinc is present in the body as a component of more than 100 enzymes with the highest concentrations of zinc occurring in the choroid and iris of the eye and in the prostate gland. Intermediate concentrations of zinc are present in the skin, liver bone and muscle and low concentration are found in blood, milk, lungs and brain.

Chromium plays a role in carbohydrate and lipid metabolism, acts as a co-factor of insulin and is considered an essential nutrient.

All of the above information points to the use of a balanced mineral supplement that has been well researched and developed specifically for horses.

Enduromin made by the local company Cedar Party Minerals is one such product. It contains all of the above mentioned minerals and Silica Gel and Colloidal Silver, manganese, iron, sulphur, boron, copper, molybdenum, tungsten, nickel, folic acid, germanium and other Nano nutrients.

When you give your horse Enduromin there is no need to feed any other supplements.

Contact us by phoning 02 6550 5655 or emailing fjhoberg@bigpond.com or visit www.enduromin.com or go onto **Ebay under horse minerals** and find us there.