



## Essential Elements

With so much emphasis on energy, protein and fibre in dairy production, often mineral nutrition tends to take a back seat. Yet, minerals are as important as traditional feed, and can hinder milk production just as much. Minerals are directly involved in milk production, but usually influence productivity through reduced feed intake and animal health issues.

Minerals or elements fall into two categories by virtue of their required volumes. Macro elements are expressed in grams/cow/day and micro as milligrams/cow/day. It is necessary to include vitamins and rumen modifiers under this heading also as they are usually fed in pelleted form with micros through the grain mix, and play a similarly critical role in cow health and productivity.

Macro elements are calcium, magnesium, phosphorous, sulphur, potassium, sodium and chlorine. Phosphorous is rarely a limiting factor in grazing/grain fed dairy cows in southern Australia. Potassium is more often a problem due to excess in pasture, and although I have supplemented sulphur, it is usually to address high DCAD rations (high cation – sulphur is an anion) when symptoms of magnesium deficiency appear in cow behaviour and there is adequate magnesium in the grain mix. It can also have application during times of high nitrogen content in pasture eg July/August.

Sodium and chlorine are combined nicely in common salt in their right proportions. Like salt, calcium is also very cheap to supplement as lime. Magnesium requirement we usually supply as MagOx.

Calcium can have a major effect on rumen metabolism, production, skeletal growth and reproduction. Calcium is most likely deficient in grass based rations. Calcium plays a major role in muscle function (milk fever) and has a close relationship with phosphorous in many body functions. Generally I run 100-120 gms of lime/cow/day to meet these needs for calcium.

Magnesium is an enzyme activator; also found in large quantities in skeletal tissue and bones. It has a role in rumen pH management too. Deficiency is most commonly seen in cow behaviour – irritability; tetany and increased excitability. Magnesium is very easily supplemented via MagOx in the grain mix at around 40-50gms/cow/day unless symptoms suggest otherwise. We also get some magnesium from magnesium sulphate when supplementing sulphur as required.

Sodium and chlorine are too easy in just adding salt to the grain mix. Despite salt's abundance in our world, low salt intake is one of the most common causes, after accessibility, in feed intake and production. Low salt impairs acid-base balance also. Salt must be force fed through the grain mix, and available free choice for all animal groups. 40-50 gms/cow/day of salt in the grain mix is advisable.

Micro or trace elements play an important role in the diet of dairy cattle. Although they constitute a small fraction of the diet, a lack of them may adversely affect production and especially health to an equal extent to the deficiency of energy or protein. Equally, excesses may also adversely affect production and health. Low intakes of trace elements are widespread in young stock and dry cows.

Copper and zinc are traditionally low in our pasture. Induced deficiency also occurs due to antagonists like sulphate, molybdenum, iron and manganese in water and crops. Similarly selenium is often deficient in our feeds and increases susceptibility to infections including udder, uterus and feet.

A lack of cobalt results in vitamin B12 deficiency which is essential to animal health and metabolism, especially fibre digestion, and also appetite. Iodine deficiency hampers thyroid function and hormonal relationships.

Vitamins A, D and E are regularly supplemented. Vitamins A and E are commonly deficient in preserved feeds eg silage; any feed lacking green colour. Selenium and vitamin E are necessary for immune function. Vitamin D deficiency can manifest itself in silent or weak heats, especially in young stock.

As both the cost of feed (particularly grain, but also pasture due to land values and fertilizer costs) and milk price increase, rumen modifiers have an increasing role in terms of feed utilization and rumen pH management, and have a proportionate return on investment to these two commodities price-hikes.

Common rumen modifiers are Rumensin and Tylan. Rumensin is an ionophore and increases energy utilization by favouring propionic producing bacteria in the rumen which in turn delivers more energy to the cow from the same amount of feed. Tylan limits lactic acid producing bacteria to the goal of controlling rumen pH. Rumen pH has a very major impact on both cow health and production, without even considering the devastating effects and cost of clinical acidosis.

In summary, for minimal cost, and especially in light of both feed cost and milk price, supplementing cows with adequate macro elements, rumen modifiers and trace elements is essential for both cow health and productivity. All my client's grain mixes have Rumensin/Tylan and trace elements added as a pellet, and macro elements through salt, lime and MagOx added as powders at the grain mill as this is the cheapest way to meet these vital requirements.