

Mineral nutrition of livestock: A balanced approach

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The essential nutrients for life are water, carbohydrates, protein, fat, minerals and vitamins. These nutrients are also critical for growth, reproduction and health. The focus in livestock nutrition is often mostly on energy and protein and, even though minerals and vitamins are required in relatively small amounts, their importance should not be underestimated.

Minerals are critical components for the utilisation of other nutrients and mineral deficiencies adversely affect healthy metabolic function, production and especially reproduction.

Macrominerals vs microminerals

Minerals can be divided into two groups according to daily requirements, namely macrominerals and microminerals, also known as trace minerals. Macrominerals are required in grams per day and the most significant are calcium (Ca), phosphorus (P), magnesium (Mg), sulphur (S), sodium (Na), potassium (K) and chlorine (Cl). Microminerals, however, are required in very small amounts (milligrams per day) and include cobalt (Co), copper (Cu), manganese (Mn), zinc (Zn), selenium (Se), iodine (I) and iron (Fe), among others.

Functions of minerals

The functions of minerals are diverse and complex and can be broadly grouped into the following categories:

- **Structural:** Components of body tissues and organs.
- **Physiological:** Fluids in the body, such as electrolytes.
- **Catalytic:** Activators in enzyme and hormone systems.
- **Regulatory:** Influencing cell replication and differentiation.

Individual minerals are not solely responsible for performing essential functions, but are mostly required in combination with others. Calcium, phosphorus and magnesium are important skeletal components, but calcium in combination with sodium and potassium is also necessary for nerve impulse transmission. Sodium and potassium, on the other hand, in combination with chloride, are responsible for the regulation of pH and osmotic balance.

Magnesium, along with potassium, sodium and calcium, is involved in healthy muscle function. It is also an important co-factor in the functioning of several different enzyme systems. Sulphur, as a component of many proteins, is involved in various functions. Trace minerals are integral components of various hormone and enzyme systems.

Consequently, in combination with especially phosphorus and magnesium, it is responsible for metabolism, growth, efficient production, fertility and health among other functions (*Table 1*).

Economically important functions are thus performed, which directly affect profitability.

Effective mineral supplementation

Although minerals are present in most feedstuffs and natural or irrigated pastures, their levels and bioavailability may vary considerably. Imbalances in soil and water supplies, as well as increased needs due to the ever-improving production levels of modern livestock, necessitate balanced inclusion in feed and supplements to prevent deficiencies and ensure efficient animal production.

Mineral inclusion must, however, be done with extreme caution because of complex interactions, the balance between specific minerals, sensitivity of inclusion levels and differences in the bioavailability of mineral resources. Especially trace minerals should therefore be included as part of scientifically formulated premixes to ensure correct and safe application.

The Feedtek range

Feedtek macro premixes for home mixing of complete feed and lick supplements have been developed for this purpose. The Feedtek range is highly concentrated and contains no carriers or fibre. It is produced by SA Premix, a specialist premix manufacturer, under strict quality assurance standards, including FAMI-QS®. The composition of each bag can therefore be guaranteed for complete peace of mind.

The product range has been used successfully since 2001 by numerous stock farmers. The Feedtek technical team comprises ten professionally registered animal nutritionists with more than 150 years combined experience in the animal feed industry.

For examples of balanced feed and lick formulations, contact your nearest Feedtek representative, visit our website at www.feedtek.co.za, or contact us on 086 111 5362 or info@feedtek.co.za.

Table 1: Important functions of the most common trace minerals.

Important functions	Trace minerals involved
Energy metabolism	Co, Cu, I, Fe, Zn
Rumen function and digestion	Co, Mn
Blood formation and oxygen utilisation	Cu, Fe
Bone and cartilage formation	Cu, Mn
Components or activators of enzymes	Co, Cu, Mn, Se, Zn, Fe
Reproduction and fertility	Co, Cu, Mn, I, Zn, Se, Fe
Growth and efficient production	Co, Cu, Mn, I, Zn, Se, Fe
Wool production and quality	Cu, Zn, Co
Disease resistance and healthy tissue, skin and hair	Zn, Se, Mn, I
Nervous system	I, Cu, Fe, Zn, Mn
Gene expression	Zn