

ROLE OF CHELATED TRACE MINERALS IN ANIMAL PRODUCTION

Trace minerals – zinc, copper, manganese, selenium, cobalt, iron, iodine etc. – are essential nutrients for all animals. They have a wide range of activities and functions within the body, being involved individually or collectively in general metabolism, reproduction, the immune system, growth, development and repair of various tissues and so on.

But, as the name suggests, trace minerals are required in very small amounts in the diet and their uptake from the digestive tract can be impaired by other dietary components or the presence of ‘antagonists’. For example, the availability of copper for absorption is heavily influenced by molybdenum, sulphur and iron.

Natural feedstuffs such as corn, wheat, soybean meal, etc. contain essential trace elements, which are required by animals. However, these trace elements are often in a form which renders them unavailable to the animal. Also, even if the elements were totally available, in many cases, they would not be in adequate concentrations to meet the animal’s requirement.

Therefore, when deficiencies of one or more of the trace mineral elements exist in a diet, they are usually provided to the animal in an inorganic or organic supplemental form. It is advantageous for nutritionists to know the bioavailability of any element in the natural feed ingredient or mineral source used as a dietary supplement. With this knowledge the proper amount of the trace element can be supplied to the animal.

Chelation Process

Chelation, which literally means, “bringing together,” refers to a bonding formed between a metal ion (mineral) and a ligand (protein or amino acid chelating agent) carrier. A mineral complex is a mixture consisting of a mineral and an organic compound carrier, such as a protein or polysaccharide; a chelate is a type of complex. Chelates are generated by reacting a mineral salt with, for example, an enzymatically prepared mixture of amino acids and small peptides, under controlled conditions. The ligand binds the metal at more than one point such that the metal atom becomes part of a ring. Certain amino acids and protein digestion products such as small peptides are ideal ligands because they have at least two functional groups (amino and hydroxyl) that can form a ring structure with the mineral. The resulting mineral-organic complex is a “chelate.”

The primary chelated minerals used in animal feed are the trace elements iron, manganese, cobalt, copper, and zinc. These “Transitional Elements” on the Periodic Table have chemical characteristics intermediate between metal and non-metal elements. Transitional elements prefer to form coordinate covalent bonds, a hybrid form of linkage that gives them their unique ability to form stable complexes-- coordination complexes or chelates.

Specific Uses

Chelates and other complexes are useful in animal nutrition to protect trace minerals during digestion. The goal of forming chelates is to increase the bioavailability of minerals to the animals to support metabolic functions.

Chelated and other complexed minerals are administered especially during times of high nutritional demand, such as pregnancy, weaning, or other reproductive stress, rapid growth, environmental stress (such as moisture, heat, or humidity), or health stress. Chelates have been studied with regard to their effect on improved immunity (less disease or sickness), reproductive performance and herd health.

Action

Solubility is critical for trace mineral absorption. To maximize uptake, chelates and other complexes should be stable in the rumen and digestive tract of animals. Chelates are stable, electrically neutral complexes, which protect trace minerals from chemical reactions during digestion that would render the mineral unavailable to the animal.

When inorganic mineral compounds, typically in oxide or sulfide form, are released and ionized in the stomach's low pH, the electrically charged forms of the minerals are able to react with other products of digestion. Complexes with naturally occurring organic ligands must form if absorption is to occur. However, the formation of insoluble, unavailable substances may also result, especially in the small intestine, when pancreatic bicarbonate restores a higher, more neutral pH. Added minerals pre-complexed with organic ligands thus are used to increase bioavailability and uptake. The chelated mineral reaches the plasma intact and separates at the site of action.

The benefits of feeding **Chelated Trace Minerals** include:

- Improved fertility and reproductive performance
- Reduced somatic cell counts
- Increased hoof strength
- Improved immune status
- Improved performance in growing animals
- Reduced mortality and ill health

How to feed Chelated trace minerals?

Chelated trace minerals are suitable for use in all species. They can replace 25-40% of the supplementary inorganic minerals as a means of providing highly available trace minerals. Soluble **Chelated trace minerals** are specially formulated for drinking water supplies.

Some of the scientifically proven benefits of **Chelated trace minerals** include;

- **Cattle, Sheep and Goat:** Improved performance, reproductive efficiency, hoof health and milk production with lower somatic cell counts.
- **Pigs:** Improved sow productivity, growth rates and feed efficiency with reduced mortality.
- **Equine:** Improved hoof growth and integrity and skeletal development, better reproductive efficiency and enhanced immune function.

For Further information please refer to our Product details of **MicroPower....**