

URBAN FARMER MACRO SOLUTIONS

MACRO PREMIXES AND MINERALS

An Urban Farmer Macro Solution includes the provision of analytical services, the design and formulation of feeds, the manufacture and supply of customized macro premixes, as well as ongoing monitoring and support of the solution. The solution brings together the knowledge and products of the world's leading animal nutrition and animal health companies and makes them accessible to the farmer.

MACRO PREMIXES AND MINERALS

An Urban Farmer macro premix is a complimentary feed additive, consisting of vitamins, minerals, trace elements, amino acids, enzymes and non-nutritive ingredients on a limestone carrier. Urban Farmer engages the world's leading premix companies to blend its macros premixes and only uses the highest quality ingredients. The minerals employed are included at the correct levels for their intended purpose and are selected based on their stability, bioavailability, mixability and safe handling characteristics.

WHAT ARE MINERALS?

Minerals are inorganic elements that are essential for the physiological functions and metabolic processes in the animal's body. About 4% of an animal's weight is composed of minerals, which are necessary for healthy growth and optimum performance.

The functions of minerals include structural support, enzyme activation, electrolyte balance, oxygen transport, immune function, pH regulation, antioxidant defence, blood clotting, reproduction, muscle contractions, and metabolic processes essential for overall health.

MINERAL REQUIREMENTS

The essential minerals needed by animals can be divided into two categories: macro minerals and trace minerals, based on the amounts needed in the animal's metabolism process and not due to their importance in physiological functions. Macro minerals, such as calcium, phosphorus, and magnesium, are needed in larger amounts and are typically included in feed at levels of anywhere from 1-5% depending on the species of animal. Trace minerals, such as iron, zinc, and copper, are needed in smaller amounts and are typically included in feed at levels of less than 0.01%

Minerals cannot be added to a diet in their elemental forms but need to be added as salts that are combined with other minerals (NaCl, CaCO₃, MnSO₄, etc.). The seven macro minerals and nine trace minerals are listed in Table 1.

Table 1. Macro – and trace minerals

Macro minerals	Trace minerals
Calcium	Iron
Phosphorus	Copper
Potassium	Cobalt
Sodium	Iodine
Chloride	Manganese
Sulphur	Zinc
Magnesium	Molybdenum, Selenium, Fluorine

MINERAL FUNCTIONS AND DEFICIENCIES

MACRO MINERALS

Macro minerals are minerals that are required in higher amounts by animals for optimum growth and health. These minerals include:

- Calcium (Ca): important for bone and teeth development, muscle function, and blood clotting.
- Phosphorus (P): important for bone and teeth development, energy metabolism, and DNA synthesis.
- Potassium (K): important for maintaining proper osmotic balance and muscle function.
- Sodium (Na): important for maintaining proper osmotic balance and muscle function.
- Chloride (Cl): important for maintaining proper osmotic balance, acid-base balance, and nerve function.
- Sulphur (S): important for production of proteins and other important compounds, such as glutathione, which acts as an antioxidant in the body amongst other functions.
- Magnesium (Mg): important for muscle and nerve function, bone development, and protein synthesis.

It's important for animals to obtain the right balance of these minerals through their diet to ensure proper growth, development, and overall health. Imbalances or deficiencies in mineral intake can lead to various health issues and can have an impact on an animal's productivity and well-being.

TRACE MINERALS

Trace minerals, also known as microminerals, are minerals that are required in smaller amounts by animals for proper growth and health. These minerals include:

- Iron (Fe): important for the formation of haemoglobin, which carries oxygen in the respiratory system.
- Copper (Cu): important for the formation of red blood cells, collagen, and the nervous system.
- Cobalt (Co): important for Vitamin B12 synthesis.
- Iodine (I): important for thyroid function and metabolism.
- Manganese (Mn): important for bone development, wound healing, and enzyme function.
- Zinc (Zn): important for growth and development, immune function, and wound healing.
- Molybdenum (Mo): required for the proper functioning of enzymes involved in nitrogen metabolism and detoxification of harmful compounds in the body.
- Selenium (Se): important for antioxidant function and immune function.
- Fluorine (F): important in small amounts for maintaining strong teeth and bones in animals, however excessive in-take can cause toxicity.

Trace minerals are typically included in feed at levels of 0.1-1%. However, the exact requirements per animal can vary depending on factors such as the animal's age, breed, and production stage.

There are various sources of trace minerals that can be included in a livestock animal's diet, some examples are:

- Iron: iron sulphate, iron oxide, blood meal
- Zinc: zinc oxide, zinc sulphate, zinc chelate
- Copper: copper sulphate, copper oxide, copper chelate
- Manganese: manganese oxide, manganese sulphate, manganese chelates
- Iodine: potassium iodide, calcium iodate
- Selenium: sodium selenite, selenium yeast, selenium-enriched yeast
- Cobalt: cobalt carbonate, cobalt sulphate

Minerals fulfil physiological, structural, and regulatory functions in physiological metabolism. Mineral supplements take various forms: mineral salts, rumen boluses, 'organic' compounds, and pasture applications.

The roles of individual mineral elements, and the effects of their deficiencies, are summarised below:

Mineral element	Role	Effects and deficiency
Calcium	Bone and teeth, transmission of nerve impulses	Rickets, osteomalacia, thin eggshells, milk fever
Phosphorous	Bone and teeth, energy metabolism	Rickets, osteomalacia, decreased appetite, poor fertility
Potassium	Osmoregulation, acid–base balance, nerve and muscle excitation	Retarded growth, weakness
Sodium	Acid–base balance, osmoregulation	Dehydration, poor growth, poor egg production
Chlorine	Acid–base balance, osmoregulation, gastric secretion	Alkalosis
Sulphur	Structure of amino acids, vitamins and hormones, chondroitin	Equivalent to protein deficiency
Magnesium	Bone, activator of enzymes for carbohydrate and lipid metabolism	Nervous irritability and convulsions, hypomagnesaemia
Iron	Haemoglobin, enzymes of electron transport chain	Anaemia
Copper	Haemoglobin synthesis, enzymesystems, pigments	Anaemia, poor growth, depigmentation of hair and wool, swayback
Cobalt	Component of vitamin B12	Pining (emaciation, anaemia, listlessness)
Iodine	Thyroid hormones	Goitre; hairlessness, weak or dead young
Manganese	Enzyme activation	Retarded growth, skeletal abnormality, ataxia
Zinc	Enzyme component and activator	Parakeratosis, poor growth, depressed appetite
Selenium	Component of glutathione peroxidase, iodine metabolism, immune function	Myopathy, exudative diathesis

ORGANIC VS INORGANIC MINERALS

Minerals can be supplemented in both inorganic and organic forms in a livestock animal's diet. The main difference between the two is their chemical structure and how they are metabolized by the animal, knowing when to use which type is important in optimum nutrition.

Organic minerals are minerals that are bound to an organic compound, such as a protein or amino acid. They are often derived from natural sources, such as plants or animals. Because they are bound to an organic compound, they are more easily absorbed and utilized by the animal's body but are typically more expensive to supplement.

In contrast, inorganic minerals are minerals that are not bound to an organic compound. They are often derived from mineral sources, such as rocks or soil. Because they are not bound to an organic compound, they are not as easily absorbed and utilized by the animal's body but are considered more cost effective.

It is also important to note that inorganic minerals can form compounds with other minerals, like phytates and oxalates, this can reduce their bioavailability to the animal.

In general, organic minerals are considered to be more bioavailable and thus, they are thought to be more efficiently utilized by the animal's body. However, the availability and cost of organic minerals may limit their use. It is important to consult with a nutritionist to determine the best mineral supplement program for the specific needs of the livestock animals.

VITAMIN AND MINERAL PREMIXES

Just like vitamins, minerals also occur naturally in the raw materials that animals consume, certain minerals are not able to be supplemented at high enough levels in raw materials for optimum production and thus need to be supplemented by premixes. The requirements for these essential minerals are therefore addressed through the daily fortification of their feed, using a premix.

Minerals are added to other elements in animal feed premixes through careful blending and formulation of an appropriate premix. The process involves combining mineral sources, such as salts or mineral-rich additives, with other feed components like vitamins and amino acids. This ensures a homogeneous premixture, allowing animals to receive a balanced and uniform distribution of essential nutrients in their feed once the final feed is blended.

MINERAL STABILITY AND BIOAVAILABILITY

It is important to note that the mineral requirements of animals can vary based on factors such as age, breed and production stage.

Urban Farmer's team of qualified nutritionists formulate its macro premixes to meet the specific nutrient requirements of the target animal, its specific phase of production and its anticipated performance. The minerals employed in its premixes are selected based on their stability, bioavailability, mixability and safe handling characteristics.

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It is important to consult with a nutritionist to ensure that the mineral sources being used are appropriate for the specific needs of the livestock animals. Although natural sources of microminerals, such as feed raw materials can in some cases provide microminerals, supplementing with mineral sources is necessary to ensure they are supplemented at correct levels for optimum performance.

Urban Farmer designs and formulates appropriate premixes and then engages the world's leading premix companies to manufacture them. We only indicate validated best-before-dates on our products thus ensuring that what is stated on the label is in the bag, and available to the animal through its feed.