



# SICOCHEL

## **Organic Trace elements : Mineral Amino Acid Chelates for Animal & Poultry Nutrition.**

The modern genetic breeds have increased productivity levels, improving growth speed, profits and animal quality. As a result, nutritional requirements have been increasing too. Even with high supplementation levels, it is common that minerals supplied in inorganic forms are not absorbed at the levels and speed required by more productive animals. The most important thing is the stability of the connection between the amino acids and the salt of the trace element. The covalent binding between SICOCHEL products causes an unusual molecular stability. Careful reaction of soy proteins guarantee for all amino acids to be available for a chemical connection. SICOCHEL Mineral Amino Acid Chelates for animal & poultry nutrition are free flowing produced in completely liquid environment in order to produce Real Metal Chelates. That is why SICOCHEL products offer higher efficiency. SICOCHEL products are competitive in cost & widely used in animal nutrition. The value of an organic mineral product lies in the degree and integrity of the bond between the metal and the organic material. If the degree of bonding is high, more of the actual mineral content of the supplement is utilized by the animal, and less is excreted in waste product. This does not only save money on the feed end, but also protects the environment from high concentrations of minerals in animal waste. Organic Trace Minerals have been utilized as a safe nutritional supplement for all animal species by overcoming mineral imbalances caused by :

- Mineral interaction
- Stress (environmental, management, reproduction, transportation, etc)
- Feed variability and uneven forage quality.

### **SICOCHEL : Benefits for healthy animals ...**

#### POULTRY

Improved Performance  
Better Immune response  
Better reproductive efficiency  
Improved bone strength  
Enhanced bone development  
Less skin damages & lesions  
Improved Shell quality  
Improved Feed Conversion  
Higher transfer of minerals in egg

#### PIGLETS

Better gain in weight  
Improved feed conversion  
Reduced mortality rates

#### SWINE

Sows : Fewer delays to oestrus  
More pigs born alive  
Less non productive days  
Higher feed intake & More transfer through placenta  
Better hoof integrity

#### DAIRY COWS

Better reproductive efficiency  
Higher milk production & less open days  
Fewer days to oestrus  
Improved fertility  
Better hoof integrity  
Reduced levels of somatic cells  
Higher mineral transfer through placenta & to milk

### **SICOCHEL : - for balanced feeding...**

Little aggressive to vitamins  
Other parts of the feed additives will be stabilized  
No interaction with other minerals

### **SICOCHEL : - for a clean environment...**

Less secretion in slurry and soil, consequently security of location  
Increased efficiency of the trace elements

## **Organic Trace elements : Metal Amino Acid Chelates for Animal Nutrition.**

### *Essential Mineral Role in Animal Nutrition.*

To participate as essential cofactors in enzymatic reactions.  
To help in hard and soft target tissues growth and maintenance.  
To assist in the animal physiologic and biologic processes regulation.  
To participate in the structure of hormones and enzymes.

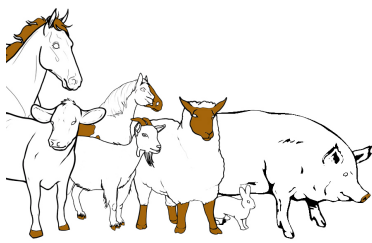
### *Factors Affecting Intestinal Absorption.*

- Mineral reactions producing insoluble precipitates.  
- When a mineral salt is ingested by an animal and arrives to the stomach, low pH usually ionize it. However, once it enters a

Any information in this publication is believed to be accurate and is given in good faith, but is for the customer to satisfy himself of the suitability for his own particular purpose. No representation, warranty or guarantee is made to its accuracy, reliability or completeness.

**SAP INTERNATIONAL CORPORATION bvba Krekelenberg 69, B-2980 Zoersel, Belgium**  
Tel. +32-3-309.06.51 Fax. +32-3-309.19.31 Email : [info@sico.be](mailto:info@sico.be) Website : [www.sico.be](http://www.sico.be)

**SICO FEEDS**  
EVERY TIME THE *right* SOLUTION



**PRODUCT INFO  
& DATASHEET**

higher intestine pH, the metal is bonded by anions trapping the metal and making it insoluble.

- Ion competition for small proteins involved in the active transport between lumen and cytoplasm of intestinal cells.
- Heavy metal interactions in protein generation, which are responsible for bonding metals in active transport.
- Obstruction or decrease of enzymatic actions due to presence or replacement of some metals.
- Active transport process interference and devolution of few metals to the lumen without being used.
- High levels of fat and oil form insoluble salts with calcium affecting optimal absorption.
- High levels of non-digestible fibers in diets affecting mineral absorption process.
- Any factor that inactivates transport proteins or that modifies chemical capacity of bonding the mineral, affects its absorption by the organism.
- Chain reaction of all the interactions mentioned above.

### **Organic Trace Elements for Animals & Poultry Nutrition**

#### Inorganic Mineral Disadvantages

Poor availability and slow metabolization.

Demand a mineral balance in order to avoid antagonisms. Have negative interrelations with other diet compounds as phosphates, fibers, folic acid, fat and vitamins. Inorganic compositions, such as sulphates and oxides used to cover animal nutrition requirements don't only put strain on the animals organism, but further form chemical connections with other minerals within the digestive system. Since a large proportion of the minerals is excreted into the soil and drinking water, these become contaminated. This is why organic minerals have been winning a key space in demanding diets.

Today chelates are organic trace elements which are bound into proteins. Chelates are stable, easily absorbed products, in between of amino acids, derived from hydrolyzed vegetable proteins and trace elements. Consequently the dosage can be reduced by up to 75% and because of this increased absorption there are reduced excretions with reduced environmental harm. But there are further tremendous differences within organic trace elements.

#### What is a Metal Amino Acid Chelate ?

**The definition according to the American Association of Feed Control Officials (AAFCO) for Metal Amino Acid Chelates is as follows :**

A metal amino acid chelate is a product resulting from the reaction of a metal from a soluble metal salt with amino acids with a mole ratio of one mole of metal to one to three (preferably two) mole of amino acids to form coordinated covalent bonds. The average weight of hydrolyzed amino acids must be approximately 150 and the resulting molecular weight must not exceed 800. The minimum metal content must be declared. When used as a commercial feed ingredient it must be declared as a specific metal amino acid chelate such as Zinc amino acid chelate, Manganese amino acid chelate etc.

#### Why use a Chelated Mineral Supplement ?

The word chelate (pronounced key-late) comes from the Greek word *chela* meaning "claw". In metal chelates, an organic molecule called a ligand binds to a central metal atom through two or more different atoms, thus forming a heterocyclic ring. Picture a crab holding something with both its claws. The concept is the same. This form of binding gives the system more stability than simple metal complexes. This type of bonding between a mineral and an organic molecule creates a stable compound. The organic material facilitates absorption while protecting the mineral from antagonists (or anti-metabolites) in early digestive stages. The mineral can then be absorbed more readily at the proper stage of digestion and utilized more efficiently by the animal.

#### Nutritionally effective chelates

The chelate must possess following characteristics to guarantee its nutritional effectiveness:

- Chelating agent must be easily metabolizable.

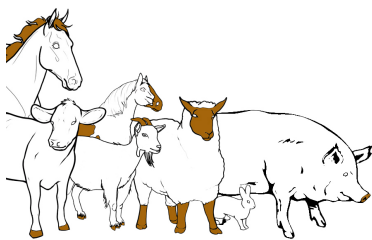
All chelates resulting from non-metabolizable chelating agent do not offer Metal amino acid chelate bioavailability advantages.

- The chelate must have a molecular weight smaller than 800 Daltons

It is known that only these molecular low weight chelates are able to pass through intestinal walls without any modification or intact conditions. This characteristic allows the chelate to be absorbed without expensive and inefficient ionization process that must occur in the intestine for inorganic sources absorption. In contrast, it takes advantage of amino acids absorption mechanism.

- Chelate must be electrically neutral

The reason is plain as in the intestinal walls and other diets compounds exist positive and negative charges that can affect chelates free flow and absorption if these were electrically charged.



## **SICOCHEL Zn10 : Zinc Amino Acid Chelate for Animal & Poultry Feeds**

### What is SICOCHEL Zn10 ?

SICOCHEL ZINC 10% is a nutritional mineral feed ingredient in the form of Organic form of Zinc that results from the chelation of soluble salts with amino acids and/or partially hydrolyzed protein. This organic source of zinc is intended for use in livestock, poultry, aquaculture and pet food as feed ingredient.

### Why Organic Zinc ?

Inorganic supplementation of Zinc as its salts has been in vogue for several years. As the salts of Zinc have unreliable solubility and poor bio availability of mineral, the need for a precise and reliable source was felt which resulted in evolution of organic forms of Zinc. Of various forms available in the market, Zinc chelates and complexes with amino acids have been proven useful tools in Zinc supplementation. Organic forms stable in various pH levels of the gut have been proven to offer highest bioavailability.

### **MODE OF ACTION**

SICOCHEL Zn10 Chelation of zinc with hydrolyzed protein provides for a maximum effect of zinc as a nutritional feed ingredient as it is protected from degradation by the chelation complexation.

### **RATE OF APPLICATION**

SICOCHEL Zinc is recommended for use in Premixes only.

Swine, Layers, Broilers and Turkeys	: 250 grams per mton of feed
Dairy, Beef Cattle & Horses	: 2-3 gr/head daily or 1 kg/500 heads daily
Sheep & Goats	: 2.5 grams/400 heads daily

### **ADVANTAGES**

SICOCHEL Zinc prevents mineral – mineral interactions  
SICOCHEL Zinc prevents mineral interactions with non-mineral compounds  
SICOCHEL Zinc achieves constant superior bio-availability in varying rations  
SICOCHEL Zinc aids rapid correction of Zinc deficiency (primary and secondary)  
SICOCHEL Zinc supplies amino acids Post Rumen  
SICOCHEL Zinc is unsusceptible to micro-flora degradation  
SICOCHEL Zinc helps strengthen body immune mechanisms  
SICOCHEL Zinc retains to a greater degree than its inorganic form  
SICOCHEL Zinc elicit beneficial production response  
Characterized feed or production/management situations when chelates would induce a positive response. SICOCHEL Zinc is stable in presence of other chelating agents and bio inhibitors in feed. SICOCHEL Zinc helps strengthen body immune mechanisms. SICOCHEL Zinc improves reproductive performance (heat detection, semen quality, conception rate). SICOCHEL Zinc minimizes calving problems, retained placenta, lameness conditions. SICOCHEL Zinc helps prevention of mastitis and laminitis in ruminants. SICOCHEL Zinc reduces somatic cell count of milk in lactating animals. SICOCHEL Zinc reduces incidence of thin shelled eggs, leathery eggs and shell breakage in eggs SICOCHEL Zinc helps improve stress. SICOCHEL Zinc improves response to medication. SICOCHEL Zinc improves livestock & poultry performance (hatchability, feed conversion, livability, meat, milk, eggs).

### **SPECIFICATIONS**

SICOCHEL Zn10 is a dark brown free flowing powder.  
Solubility : partially soluble in water. Zinc-10% min. Crude Protein-30%, Moisture-10% max.  
Color of the product may vary from batch to batch & performance of the product does not depend on the variation in color.

### **PACKAGING AND STORAGE**

25 kg laminated paper bags. Store in dry area, under roof at ambient temperature. Shelf-life 3 years approx. Store inside in dry place and away from sunlight. No incompatibilities with feed ingredients.

## **SICOCHEL Cu10 : Copper Amino Acid Chelate for Animal & Poultry Feeds**

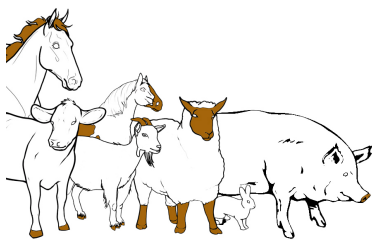
### What is SICOCHEL Cu10 ?

SICOCHEL Copper 10% is a nutritional mineral feed ingredient in the form of Organic form of Copper that results from the chelation of soluble salts with amino acids and/or partially hydrolyzed protein. This Organic source of Copper is intended for use in livestock, poultry, aquaculture and pet food as feed ingredient.

Any information in this publication is believed to be accurate and is given in good faith, but is for the customer to satisfy himself of the suitability for his own particular purpose. No representation, warranty or guarantee is made to its accuracy, reliability or completeness.

**SAP INTERNATIONAL CORPORATION bvba Krekelenberg 69, B-2980 Zoersel, Belgium**  
Tel. +32-3-309.06.51 Fax. +32-3-309.19.31 Email : [info@sico.be](mailto:info@sico.be) Website : [www.sico.be](http://www.sico.be)

**SICO FEEDS**  
EVERY TIME THE *right* SOLUTION



### Why Organic Copper ?

Inorganic supplementation of Copper in the form of its salts has been in vogue for several years. As the salts of Copper have unreliable solubility and poor bio availability of the mineral, the need for a precise and reliable source was felt which resulted in evolution of organic forms of Copper. Of various forms available in the market, Copper chelates and complexes with amino acids have been proven useful tools in Copper supplementation. Organic forms stable in various pH levels of the gut have been proven to offer highest bio availability.

### **MODE OF ACTION**

SICOHEL Cu10 Chelation of Copper with hydrolyzed protein provides for a maximum effect of zinc as a nutritional feed ingredient as it is protected from degradation by the chelation complexation.

### **RATE OF APPLICATION**

SICOHEL Copper is recommended for use in Premixes only.

Swine, Layers, Broilers and Turkeys : 225 grams per mton of feed

Dairy, Beef Cattle & Horses

: 1.5 to 2 gr/head daily or 1 kg/500-700 heads daily

Sheep & Goats

: 2.5 grams/400 heads daily

### **ADVANTAGES**

SICOHEL Copper prevents mineral – mineral interactions

SICOHEL Copper prevents mineral interactions with non-mineral compounds

SICOHEL Copper achieves constant superior bio-availability in varying rations

SICOHEL Copper aids rapid correction of copper deficiency (primary and secondary)

SICOHEL Copper supplies amino acids Post Rumen

SICOHEL Copper is unsusceptible to micro-flora degradation

SICOHEL Copper helps strengthen body immune mechanisms

SICOHEL Copper retains to a greater degree than its inorganic form

SICOHEL Copper elicits beneficial production response

SICOHEL Copper is stable in presence of other chelating agents and bio inhibitors in feed. SICOHEL Copper helps strengthen body immune mechanisms. SICOHEL Copper improves reproductive performance (heat detection, semen quality, conception rate).

SICOHEL Copper minimizes calving problems, retained placenta, lameness conditions. SICOHEL Copper helps prevention of mastitis and laminitis in ruminants. SICOHEL Copper reduces somatic cell count of milk in lactating animals.

SICOHEL Copper reduces incidence of thin shelled eggs, leathery eggs and shell breakage in eggs. SICOHEL Copper helps improve stress. SICOHEL Copper improves response to medication SICOHEL Copper improves livestock performance

(hatchability, feed conversion, livability, meat, milk, eggs)

### **SPECIFICATIONS**

SICOHEL Cu10 is a dark bluish green flowing powder.

Solubility : partially soluble in water. Copper-10% min. Crud Protein-30% Moisture-10% max.

Color of the product may vary from batch to batch & performance of the product does not depend on the variation in color.

### **PACKAGING AND STORAGE**

25 kg laminated paper bags. Store in dry area, under roof at ambient temperature. Shelf-life 3 years approx. Store inside in dry place and away from sunlight. No incompatibilities with feed ingredients.

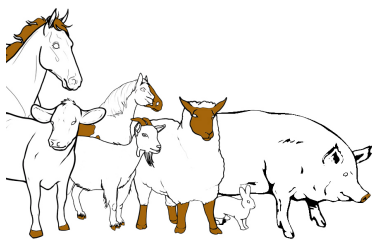
## **SICOHEL Mn10 : Manganese Amino Acid Chelate for Animal Feeds**

### What is SICOHEL Mn10 ?

SICOHEL Manganese 10% is a nutritional mineral feed ingredient in the form of Organic form of Manganese that results from the chelation of soluble salts with amino acids and/or partially hydrolyzed protein. This Organic source of Manganese is intended for use in livestock, poultry, aquaculture and pet food as feed ingredient.

### Why Organic Manganese ?

Inorganic supplementation of Manganese as its salts has been in vogue for several years. As the salts of Manganese have unreliable solubility and poor bio availability of mineral, the need for a precise and reliable source was felt which resulted in evolution of organic forms of Manganese. Of various forms available in the market, Manganese chelates and complexes with amino acids have been proven useful tools in Manganese supplementation. Organic forms stable in various pH levels of the gut have been proven to offer highest bio availability.



### **MODE OF ACTION**

SICOCHEL Mn10 Chelation of Manganese with hydrolyzed protein provides for a maximum effect of Manganese as a nutritional feed ingredient as it is protected from degradation by the chelation complexation.

### **RATE OF APPLICATION**

SICOCHEL Manganese is recommended for use in Premixes only.

Swine, Layers, Broilers and Turkeys : 350-450 grams per mton of feed

Dairy, Beef Cattle & Horses : 1.5 gr/head daily or 1 kg/600 heads daily

Sheep & Goats : 150 grams/400 heads daily

### **ADVANTAGES**

SICOCHEL Manganese prevents mineral – mineral interactions

SICOCHEL Manganese prevents mineral interactions with non-mineral compounds

SICOCHEL Manganese achieves constant superior bio-availability in varying rations

SICOCHEL Manganese aids rapid correction of manganese deficiency (primary and secondary)

SICOCHEL Manganese supplies amino acids Post Rumen

SICOCHEL Manganese is unsusceptible to micro-flora degradation

SICOCHEL Manganese helps strengthen body immune mechanisms

SICOCHEL Manganese promotes bone development and growth in young animals. SICOCHEL Manganese retains to a greater degree than its inorganic form. SICOCHEL Manganese elicits beneficial production response. SICOCHEL Manganese is stable in presence of other chelating agents and bio inhibitors in feed. SICOCHEL Manganese helps strengthen body immune mechanisms. SICOCHEL Manganese improves reproductive performance (heat detection, semen quality, conception rate).

SICOCHEL Manganese minimizes calving problems, retained placenta, lameness conditions. SICOCHEL Manganese helps prevention of mastitis and laminitis in ruminants. SICOCHEL Manganese reduces somatic cell count of milk in lactating animals.

SICOCHEL Manganese reduces incidence of thin shelled eggs, leathery eggs and shell breakage in eggs. SICOCHEL Manganese helps improve stress. SICOCHEL Manganese improves response to medication. SICOCHEL Manganese improves livestock performance (hatchability, feed conversion, livability, meat, milk, eggs).

### **SPECIFICATIONS**

SICOCHEL Mn10 is a light brown free flowing powder.

Solubility : partially soluble in water. Manganese-10% min. Crud Protein-30% Moisture-10% max.

Color of the product may vary from batch to batch & performance of the product does not depend on the variation in color.

### **PACKAGING AND STORAGE**

25 kg laminated paper bags. Store in dry area, under roof at ambient temperature. Shelf-life 3 years approx. Store inside in dry place and away from sunlight. No incompatibilities with feed ingredients.

## **SICOCHEL Fe10 : Iron Amino Acid Chelate for Animal Feeds**

### What is SICOCHEL Fe10 ?

SICOCHEL Iron 10% is a nutritional mineral feed ingredient in the form of Organic form of Iron that results from the chelation of soluble salts with amino acids and/or partially hydrolyzed protein. This Organic source of Iron is intended for use in livestock, poultry, aquaculture and pet food as feed ingredient.

### Why Organic Iron ?

Inorganic supplementation of Iron as its salts has been in vogue for several years. As the salts of Iron have unreliable solubility and poor bio availability of mineral, the need for a precise and reliable source was felt which resulted in evolution of organic forms of Iron. Of various forms available in the market, Iron chelates and complexes with amino acids have been proven as useful tools in Iron supplementation. Organic forms stable in various pH levels of the gut have been proven to offer highest bio availability.

### **MODE OF ACTION**

SICOCHEL Fe10 Chelation of Iron with hydrolyzed protein provides for a maximum effect of iron as a nutritional feed ingredient as it is protected from degradation by the chelation complexation.

### **RATE OF APPLICATION**

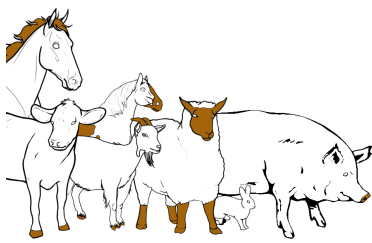
SICOCHEL Iron is recommended for use in Premixes only.

Swine, Layers, Broilers and Turkeys : 500-800 grams per mton of feed

Any information in this publication is believed to be accurate and is given in good faith, but is for the customer to satisfy himself of the suitability for his own particular purpose. No representation, warranty or guarantee is made to its accuracy, reliability or completeness.

**SAP INTERNATIONAL CORPORATION bvba Krekelenberg 69, B-2980 Zoersel, Belgium**  
Tel. +32-3-309.06.51 Fax. +32-3-309.19.31 Email : [info@sico.be](mailto:info@sico.be) Website : [www.sico.be](http://www.sico.be)

**SICO FEEDS**  
EVERY TIME THE *right* SOLUTION



**PRODUCT INFO  
& DATASHEET**



Dairy, Beef Cattle & Horses  
Sheep & Goats

: 4 to 5 gr/head daily or 1 kg/200-250 heads daily  
: 100 grams/200 heads daily

### **ADVANTAGES**

SICOCHEL Iron prevents mineral – mineral interactions  
SICOCHEL Iron prevents mineral interactions with non-mineral compounds  
SICOCHEL Iron achieves constant superior bio-availability of elemental ferrous iron in varying rations  
SICOCHEL Iron aids rapid correction of Iron deficiency (primary and secondary)  
SICOCHEL Iron supplies amino acids Post Rumen  
SICOCHEL Iron supplementation on a regular basis prevents anemia SICOCHEL Iron improves general thriftiness and improves growth and weight gain  
SICOCHEL Iron is unsusceptible to micro-flora degradation  
SICOCHEL Iron helps strengthen body immune mechanisms  
SICOCHEL Iron retains to a greater degree than its inorganic form.  
SICOCHEL Iron elicits beneficial production response  
SICOCHEL Iron is stable in presence of other chelating agents and bio inhibitors in feed. SICOCHEL Iron helps strengthen body immune mechanisms. SICOCHEL Iron helps prevention of mastitis and laminitis in ruminants. SICOCHEL Iron reduces incidence of thin shelled eggs, leathery eggs and shell breakage in eggs. SICOCHEL Iron helps ameliorate stress. SICOCHEL Iron improves response to medication. SICOCHEL Iron improves livestock performance (hatchability, feed conversion, livability, meat, milk, eggs).

### **SPECIFICATIONS**

SICOCHEL Fe10 is a brown colored free flowing powder.  
Solubility : partially soluble in water. Iron-10% min. Crud Protein-30% Moisture-10% max.  
Color of the product may vary from batch to batch & performance of the product does not depend on the variation in color.

### **PACKAGING AND STORAGE**

25 kg laminated paper bags. Store in dry area, under roof at ambient temperature. Shelf-life 3 years approx. Store inside in dry place and away from sunlight. No incompatibilities with feed ingredients.