

THE SOLUTION FOR THE TREATMENT OF MACRO- & MICRO- NUTRIENT DEFICIENCIES

WATER SOLUBLE CHELATED NUTRIENTS ELEM & FERRUM



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IRON



Iron is essential for the chlorophyll formation, for that reason iron deficiency causes chlorosis. The symptoms of iron deficiency start as an interveinal chlorosis of the youngest leaves that evolves in an overall chlorosis. Finally young leaves end up totally bleached. Brown necrotic spots may appear on the leaf margins. Fruits are of low quality and their quantity is reduced. The tips of the shoots become extremely chlorotic. Plants susceptible to iron deficiency are vineyard, pears, azaleas, gardenias and camellias. Iron deficiency appears usually in compacted soils or in soils of high pH.



Ferrum and **Elem-Fe** are two products of chelated iron in the form of water soluble powder. Ferrum contains 6% chelated with EDDHA iron while Elem-Fe contains 13.2% iron chelated with EDTA. The different chelating agent differentiates the way of application and the mode of action of the two iron fertilizers.



Ferrum is applied only in the soil by fertigation or by scattering and immediate incorporation into the soil since it is photodegradable. The main advantage of Ferrum is that iron in the chelated with EDDHA form is easily uptaken by the plants in all types of soil (acid, neutral, alkaline). While iron of **Elem-Fe** (chelated with EDTA) is easily absorbed by the plants only in acid to neutral soils. However, **Elem-Fe** has the advantage that it can be applied in almost all crops through fertigation and also foliarly. Both products can ensure the required amount of iron to the crops that not only prevents but also corrects the iron deficiencies very quickly.

CALCIUM

Calcium regulates the permeability of the cell membranes of plants. Calcium deficiency causes initially tissue necrosis leading to necrotic leaf margins in the young plants and stunted growth of the plants. In apples it causes bitter pit, that is pits and brown spots on fruits and the taste of those areas is bitter.



In tomatoes and peppers it causes blossom end rot that appears as sunken and dry necrotic areas on the fruits.



Elem-Ca contains 9.5% chelated calcium (chelating agent EDTA) which is readily absorbed by the plants. For this reason it is very effective in the prevention and correction of calcium deficiencies without creating problems of antagonism with other soil nutrients.

MANGANESE

Manganese has an important role in enzyme systems necessary for respiration and photosynthesis. Symptoms of manganese deficiency begin with a slight chlorotic maculation of the young leaves that later extends in the whole plant. Leaf yellowing, poor growth of shoots, reduced flowering and small fruiting are also observed.



Onions, wheats, apples, pears and cherries are susceptible to manganese deficiency. Manganese deficiency is very common in poorly drained fields as well as in alkaline soils.



Elem-Mn contains 13% chelated manganese (chelating agent EDTA) that makes manganese immediately assimilated by the plants. The application of **Elem-Mn** prevents manganese deficiencies and treats the already existing ones. It is recommended to apply by foliar spraying and fertigation.

COPPER

Amino acid formation, protein synthesis and respiration are important plant functions that require copper. Copper deficiency can induce early senescence or lowered levels of chlorophyll that lead to crop yield reduction. Copper deficiency appears as light chlorosis along with permanent loss of vigour in the young leaves. Young leaves become chlorotic while the leaf



centers are yellow and in the same time the leaf margins and veins remain green. In tree crops it causes necrosis of the terminal shoots and also a rosette-type growth in cases of long lasting copper deficiency. In grains it induces necrosis of the leaf tips. **Elem-Cu** is used efficiently for the prevention and cure of copper deficiencies since it contains 14% chelated with EDTA copper in a water soluble powder form. In this form copper is immediately absorbed when applied foliarly or by fertigation.



Boron deficiency appears initially at the growing points and results in a stunted growth. Specifically:

In apples it causes vitrescence with the inner of the fruit to look like frozen.

In sugar beets it causes internal brown rot of the root.

In cabbage it induces leaf deformation.

In pears the new shoots die back in spring.

In strawberries stunted growth is observed. Also the foliage is small, yellow and puckered at tips. Fruits are small and pale colored.

Boron deficiency is very common in olives, apples and sugar beets cultivated in regions of high rainfall.

Elem-B contains 21% boron in the form of disodium octabate which is totally water soluble and as a result it is immediately absorbed. Its effectiveness prevents the appearance of boron deficiencies and corrects the already established ones as well. It is applied with soil applications and foliar sprays.



BORON



Magnesium deficiency creates chlorotic spots on the lower leaves while the periphery of the laminae remains green at the beginning. Later it expands on the younger leaves as well. Small brown necrotic spots and drying of the leaves are symptoms of extreme magnesium deficiency. In cotton it causes reddening, while in citrus the green area of the leaves forms an inverted "V". Susceptible to magnesium deficiency crops are potatoes, tomatoes, apples and chrysanthemums. Magnesium deficiency is favored in acid and sandy soils.

Elem-Mg contains 6.0% chelated magnesium (chelating agent EDTA) which is rapidly absorbed by the leaves, preventing the appearance of magnesium deficiencies or

correcting rapidly the already established deficiencies. **Elem-Mg** does not contain other elements apart from magnesium. As a result its application does not affect the balance of the rest soil nutrients.



MAGNESIUM



Zinc is a primary element for the energy production, protein synthesis and growth regulation. Zinc is not a mobile element, so deficiencies appear more often in the new growth. The most visible symptoms of zinc deficiency are the short internodes (internode shortening) that get rosette form, the decrease of the leaf size and the delayed maturing. Young leaves turn yellow and develop spots on the upper surface. Zinc deficiency is common in sandy soils of low organic matter. The uptake of Zinc is reduced when the soil pH is increased. Zinc deficiency is a very often problem in citrus trees.

The application of **Elem-Zn** prevents and corrects problems caused by zinc deficiencies since it contains 14% chelated zinc (chelating agent EDTA) which is dissolved fully in the water and is absorbed immediately. Elem-Zn is applied foliarly as well as by fertigation (watering the roots).



ZINC



The major role of molybdenum is its involvement in the synthesis of Nitrate Reductase. Nitrate Reductase is the enzyme that contributes to the assimilation of nitric ions (namely nitrogen) inside the plants. So under molybdenum deficiency, this enzyme is not produced resulting in reduced assimilation of nitrates. As a consequence, the symptoms of molybdenum deficiency look like those of nitrogen deficiency. Molybdenum deficiency causes chlorosis of the foliage and bends the lamina up. Also it causes marginal leaf drying. Another main symptom is leaf yellowing which appears initially in the basal leaves of every shoot. Symptoms are more intense in the older leaves.

Elem-Mo contains 38.2% molybdenum in the form of the sodium molybdate, which is totally water soluble and so it is immediately absorbed by the plants preventing the occurrence of molybdenum deficiencies. Due to the high concentration of molybdenum of the product, the application of a small quantity is enough for the quick recovery of the plants that have suffered from molybdenum deficiency.



MOLYBDENUM

Foliar application kg/ha	FERRUM	ELEM-FE	ELEM-ZN	ELEM-MN	ELEM-CU	ELEM-B	ELEM-MG	ELEM-CA	ELEM-MO
Open field fruiting vegetables	2.5-5.5	1-2	1-2	1	0.25-0.5	5	1-2	1-2	0.08-0.15
Greenhouse fruiting vegetables		50	1-5	3-4	0.8-2.5	5	1-2	1-2	0.1-0.2
Leafy vegetables	2.5-5.5	1	1-2	1-2	0.2-0.5	5	1-2	1-2	0.1-0.2
Bulbous vegetables	2.5-5.5	1-2	0.5-2	1-2	0.25-0.5	5	1-2	1-2	0.1-0.2
Crucifers	2.5-5.5	1-2	0.5-2	1-2	0.25-0.5	5	1-2	1-2	0.12-0.25
Root vegetables	2.5-5.5	1-2	0.5-2	1-2	0.25-0.5	5	1-2	1-2	0.05-0.25
Tuberous vegetables	2.5-5.5	1-2	0.5-2	1-2	0.25-0.5	5	1-2	1-2	0.1-0.2
Cucurbits	2.5-5.5	1-2	0.5-2	1-2	0.25-0.5	5	1-2	1-2	0.1-0.2
Pome fruits	25-125 g/tree	1-2	1-2	1-2	0.3-0.7	2	1-2	1-2	0.1-0.2
Stone fruits	25-125 g/tree	1-2	1-2	1-2	0.3-0.7	5-12	1-2	1-2	0.1-0.2
Citrus	0.2-0.5 /tree	1-2	1-2	1-2	0.3-0.7	1-2	1-2	1-2	0.08-0.15
Nut trees				3-4			1-2	1-2	0.1-0.2
Vineyard	10-50 g/vine		8-25	3-4		5-12	1-2	1-2	0.1-0.2
Olive				3-4		5	1-2	1-2	0.1-0.2
Cereals				3-4	0.3-0.5		1-2	1-2	0.1-0.2
Corn				3-4		1-2		1-2	0.1-0.2
Ornamentals	10-50 g/plant	0.1	7-30 g/tree	3-4	7-30 g/tree			1-2	0.1-0.2
Fodders		0.5		3-4		5-12		1-2	0.15-0.2
Energy crops	150-200 /1,000 l of water			3-4		5		1-2	0.05-0.08
Bushes	5-25 /bush		1-7 g/bush	3-4	1-7 g/bush		1-2	1-2	0.1-0.2
Dilution rate g/l		1:2-20	1:1	1:1	1:1	1:1			1:10