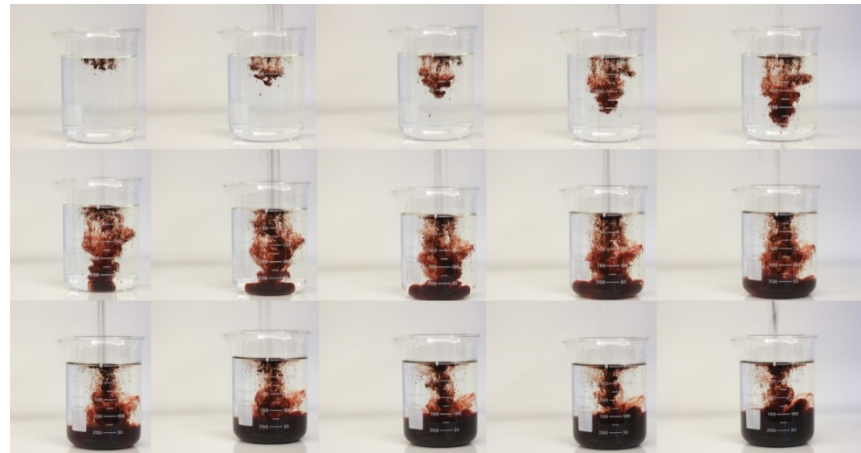
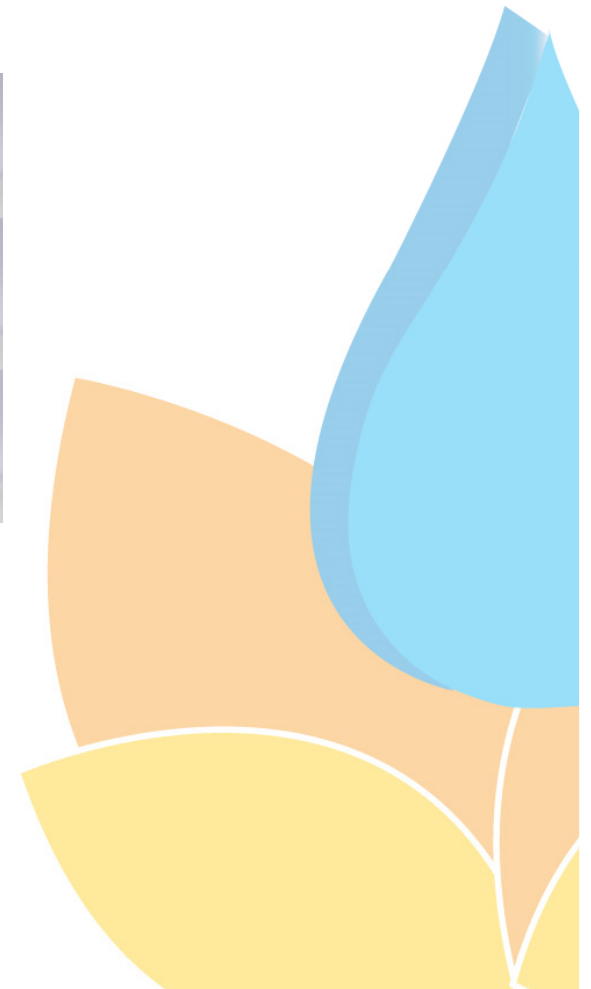




MENAFERT

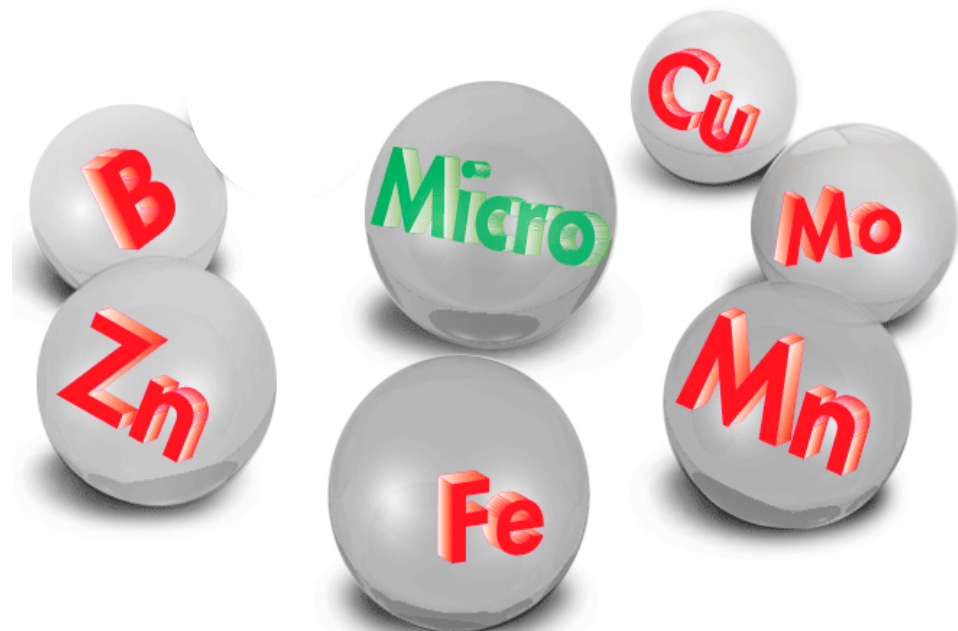


**Introducing Our
Trace Elements**



A. Trace elements

- In addition to the principal elements (N-P-K, Ca-Mg), plants also require regular supplies of Trace elements for their continued balance and growth.
- Micronutrient or trace elements are needed in very small quantities in the plant system.



A. Trace elements

- Even though the amounts required are small, a deficiency of any trace element can cause important production and quality losses.
- Yields are crucially influenced by Trace Elements

Boron
(B)



Manganese
(Mn)



Copper
(Cu)



Molybdenum
(Mo)



Iron
(Fe)



Zinc
(Zn)



Visual example of deficiencies
– Micro nutrients

A. Trace elements can be

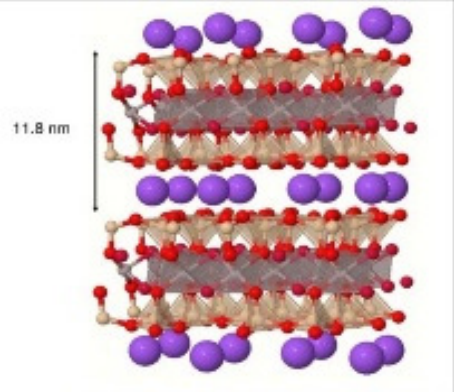

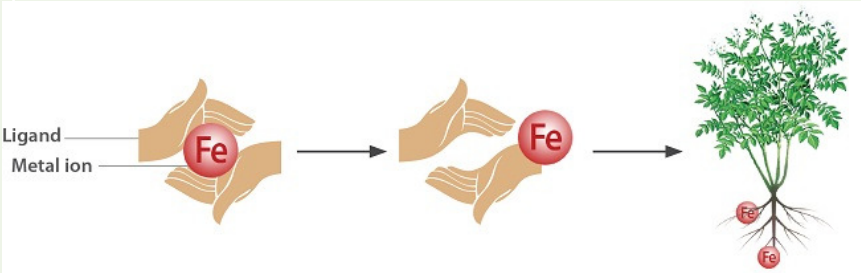
Salts of Metals



Chelated Metals

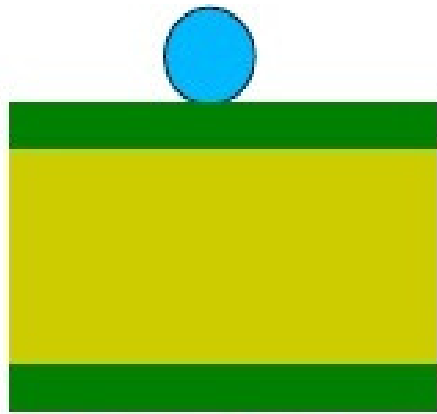


A. Trace elements can be

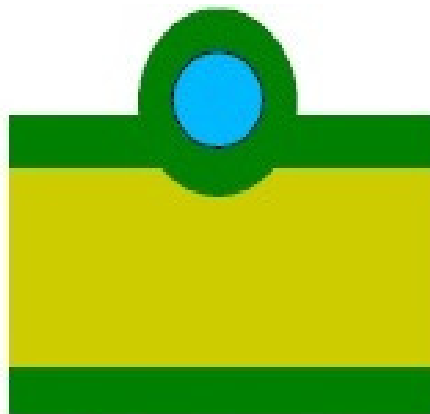
Salts of Metals	Chelated Metals
Manganese Sulfate, Iron Sulfate...	Cu-EDTA, Fe-EDDHA, Zn-IDHA
<p>Clays with soil Precipitation</p> <p>+</p>  	<p>Chelation <u>protects</u> the ion in the soil</p> 

Trace Elements become available can be used by the plant

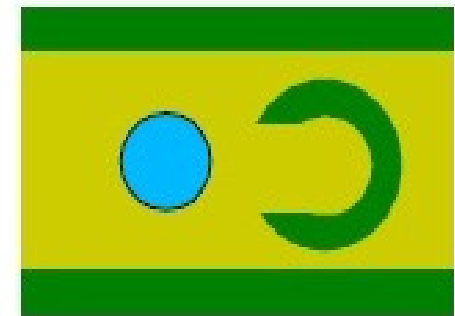
A. Chelates Metals Foliar Applications



Plant leaves have a waxy coating that prevents the chelated nutrients to penetrate



The organic coating around the chelated nutrient allow it to penetrate through the wax into the leaf.



Once in the leaf, the chelated agent releases the nutrient, thus it can be used by the plant



B. Available type of chelation

15.3.2012

EN

Official Journal of the European Union

L 75/19

(3) Section E.3.1 is replaced by the following:

E.3.1. Chelating agents ⁽¹⁾

Acids, or sodium, potassium or ammonium sales of:

No	Designation	Alternative designation	Chemical formula	CAS number of the acid ⁽¹⁾
1	Ethylenediaminetetraacetic acid	EDTA	$C_{10}H_{16}O_8N_2$	60-00-4
2	2-hydroxyethylethylenediaminetriacetic acid	HEEDTA	$C_{10}H_{18}O_7N_2$	150-39-0
3	diethylenetriaminepentaacetic acid	DTPA	$C_{14}H_{23}O_{10}N_3$	67-43-6
4	ethylenediamine- N,N'-di[(ortho-hydroxyphenyl)acetic acid]	[o,o] EDDHA	$C_{18}H_{20}O_6N_2$	1170-02-1
5	ethylenediamine- N-[(ortho-hydroxyphenyl)acetic acid]- N'-[(para-hydroxyphenyl)acetic acid]	[o,p] EDDHA	$C_{18}H_{20}O_6N_2$	475475-49-1
6	ethylenediamine- N,N'-di[(ortho-hydroxy-methylphenyl)acetic acid]	[o,o] EDDHMA	$C_{20}H_{24}O_6N_2$	641632-90-8
7	ethylenediamine- N-[(ortho-hydroxy-methylphenyl)acetic acid]- N'-[(para-hydroxy-methylphenyl)acetic acid]	[o,p] EDDHMA	$C_{20}H_{24}O_6N_2$	641633-41-2
8	ethylenediamine- N,N'-di[(5-carboxy-2-hydroxyphenyl)acetic acid]	EDDCHA	$C_{20}H_{20}O_{10}N_2$	85120-53-2
9	ethylenediamine- N,N'-di[(2-hydroxy-5-sulfophenyl)acetic acid] and its condensation products	EDDHSa	$C_{18}H_{20}O_{12}N_2S_2 + n^*(C_{12}H_{14}O_8N_2S)$	57368-07-7 and 642045-40-7
10	Iminodisuccinic acid	IDHA	$C_8H_{11}O_8N$	131669-35-7
11	N,N'-di(2-hydroxybenzyl)ethylenediamine-N,N'-diacetic acid	HBED	$C_{20}H_{24}N_2O_8$	35998-29-9

⁽¹⁾ For information only.

C. Our Trace Elements range

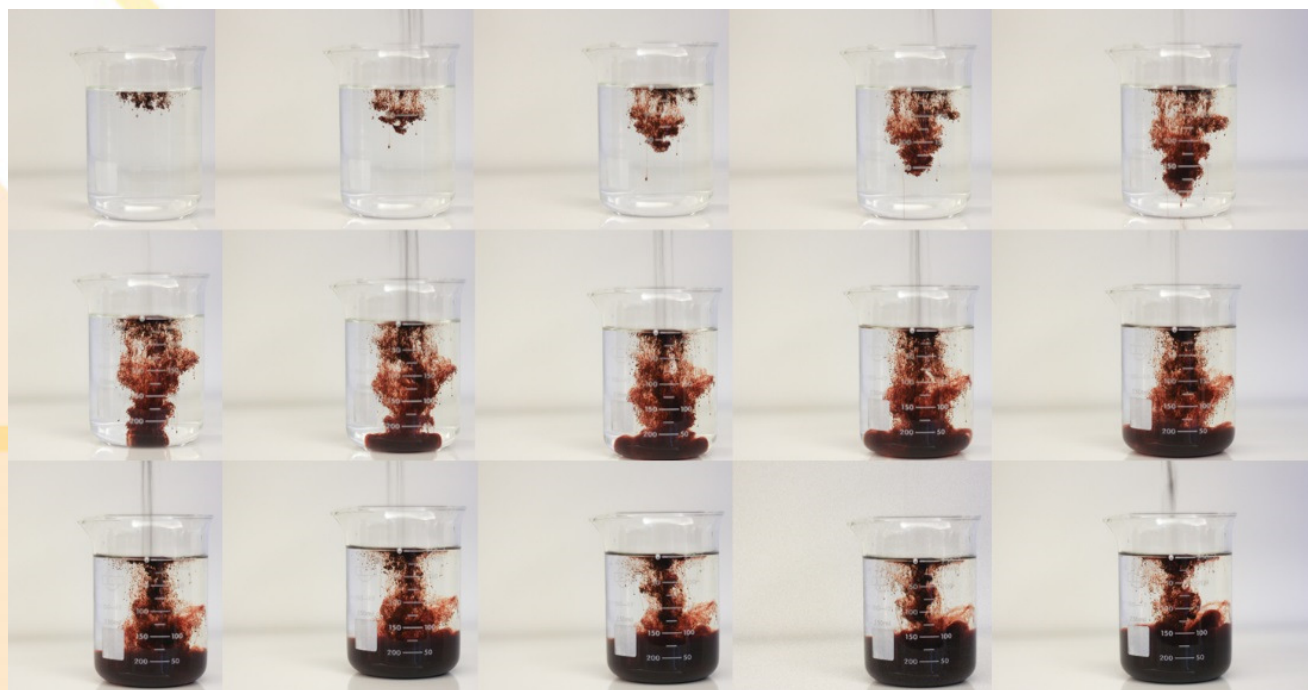
- 1. MENAFERT IRONPRO EDDHA**
2. MENAFERT SELECT EDTA
3. MENACOMBI MIX
4. MENAFERT IRONFEED DTPA



C. Our Trace Elements range

1. MENAFERT IRONPRO EDDHA

The Menaferf EDDHA chelate powder is a fully chelated, water soluble product. It complex metallic ion Fe^{2+} and protect it from oxidation and precipitation → **Fe^{2+} available to the plant**



C. Our Trace Elements range

1. MENAFERT IRONPRO EDDHA

- MENAFERT IRON-PRO 3.0 - acts fast for short cycles
 - Lettuce (cycle < 2 months)
 - MENAFERT IRON-PRO 3.5
 - MENAFERT IRON-PRO 4.0
 - MENAFERT IRON-PRO 4.8
 - Tomato (cycle 5 – 6 months)
- ✓ play an important role to Supplement
 - ✓ Fe for the plants
 - ✓ pH 4 to 9
 - ✓ Stable product




C. Our Trace Elements range

1. MENAFERT IRONPRO EDDHA
- 2. MENAFERT SELECT EDTA**
3. MENACOMBI MIX
4. MENAFERT IRONFEED DTPA



C. Our Trace Elements range

2. MENAFERT SELECT EDTA

MENAFERT PRODUCT NAME	CHARACTERISTICS	pH	
MENAFERT SELECT 13.2	EDTA Chelate of Min 13.2% Fe	5 - 6	EDTA will not injure leaf tissue  Safe for foliar
MENAFERT SELECT Mn	EDTA Chelate of 13.0% +/- 0.4% Mn	6.0 +/- 0.5	
MENAFERT SELECT Cu	EDTA Chelate of 15.0% +/- 0.4% Cu	6 - 7	
MENAFERT SELECT Zn	MENAFERT SELECT Zn	6 - 7	

C. Our Trace Elements range

1. MENAFERT IRONPRO EDDHA
2. MENAFERT SELECT EDTA
- 3. MENAFERT IRONFEED DTPA**
4. MENACOMBI MIX



C. Our Trace Elements range

3. MENAFERT SELECT DTPA

MENAFERT PRODUCT NAME	CHARACTERISTICS	pH	
MENAFERT IRONFEED 3.1% AQUA	DTPA Chelate of 3.1 +/- 0.2% - 3.9 +/- 0.2% Fe	6 - 7	For hydroponic systems Safe for foliar
MENAFERT IRONFEED 7%	9% Fe ³⁺	5 - 7	
MENAFERT IRONFEED 11%	11% Fe ³⁺	pH 3.0 +/- 0.5	
MENAFERT IRONFEED 6% AQUA	DTPA Chelate of 6 +/- 0.05% - 7.6 +/- 0.05% Fe	6 - 8	

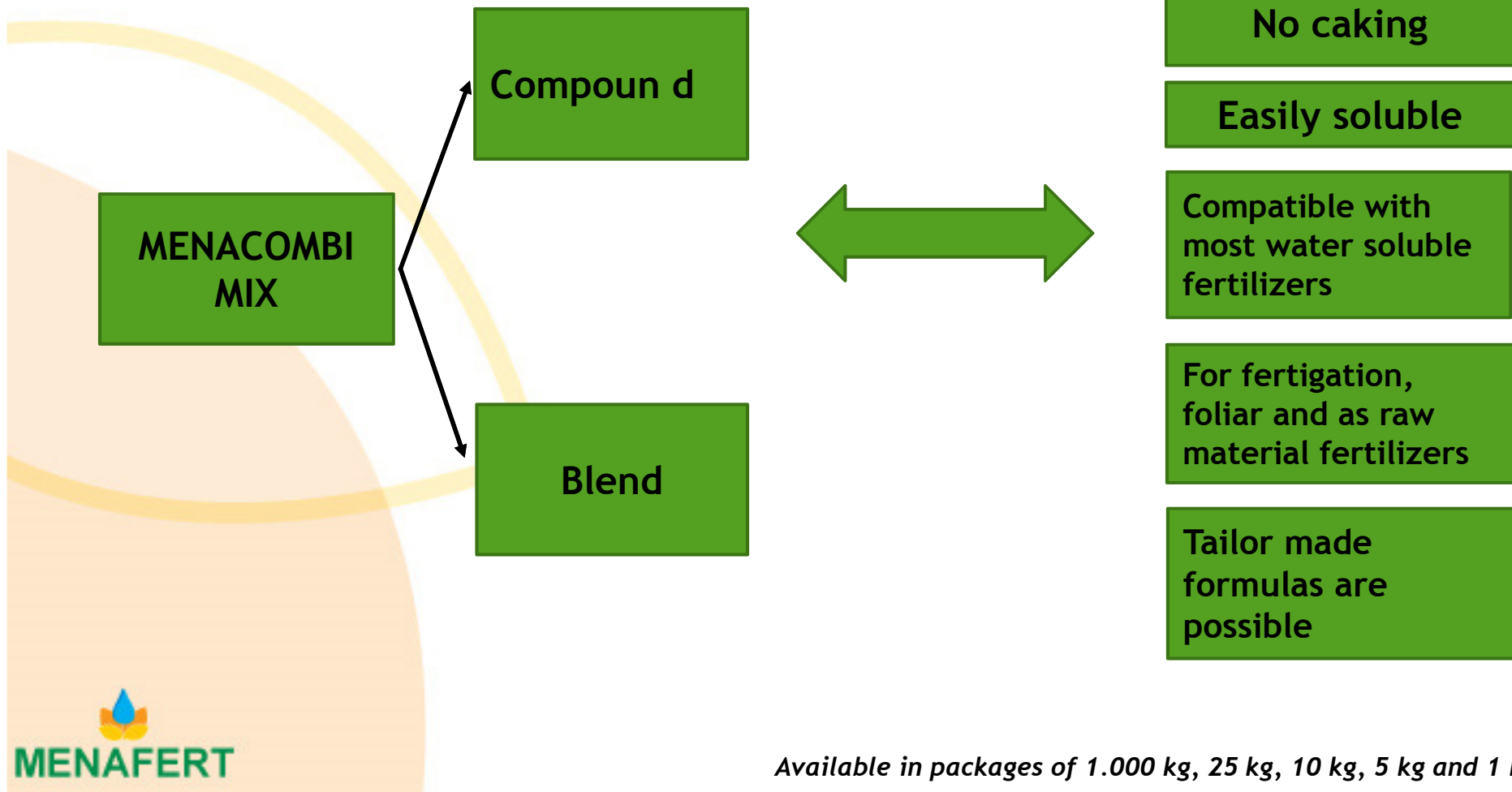
C. Our Trace Elements range

1. MENAFERT IRONPRO EDDHA
2. MENAFERT SELECT EDTA
3. MENAFERT IRONFEED DTPA
- 4. MENACOMBI MIX**



C. Our Trace Elements range

4. MENACOMBI MIX



Available in packages of 1.000 kg, 25 kg, 10 kg, 5 kg and 1 kg

C. Our Trace Elements range

4. Better results with MENACOMBI MIX

- ✓ Prevents physiological disorders
- ✓ Increases yield
- ✓ Induces better performance



- ✓ Achieves healthier crops
- ✓ Provide adequate specific solutions

Country of Origin NETHERLANDS



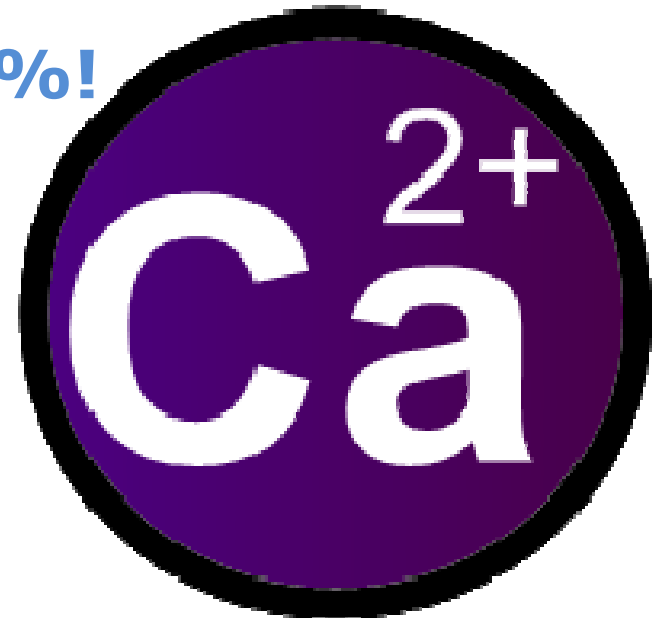
C. Our Meso Chelates

1. Calcium availability

Availability - Why Calcium - Isn't our soil rich enough with it?

1. What we are looking for here is not the TOTAL calcium % in soils

2. It is the Active Calcium %!



C. Our Meso Chelates

1. Calcium availability

Availability Problems

Why Calcium - Isn't our soil rich enough with it?

Calcium – Phosphor

precipitation in high pH makes both nutrients, despite being highly present, unavailable



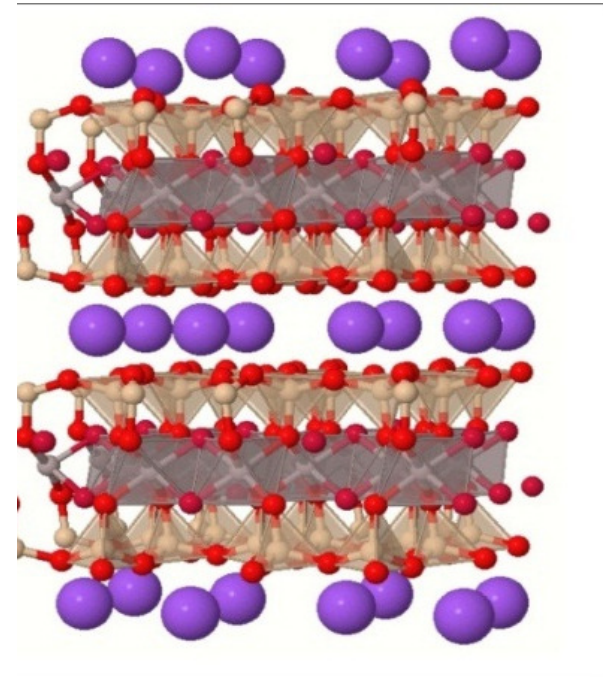
C. Our Meso Chelates

1. Calcium availability

Availability Problems

Why Calcium - Isn't our soil rich enough with it?

- ✓ Sodium and other positively charged ions, compete with Calcium and make it less available
- ✓ Sodium damages the soil structure – Calcium helps maintaining it

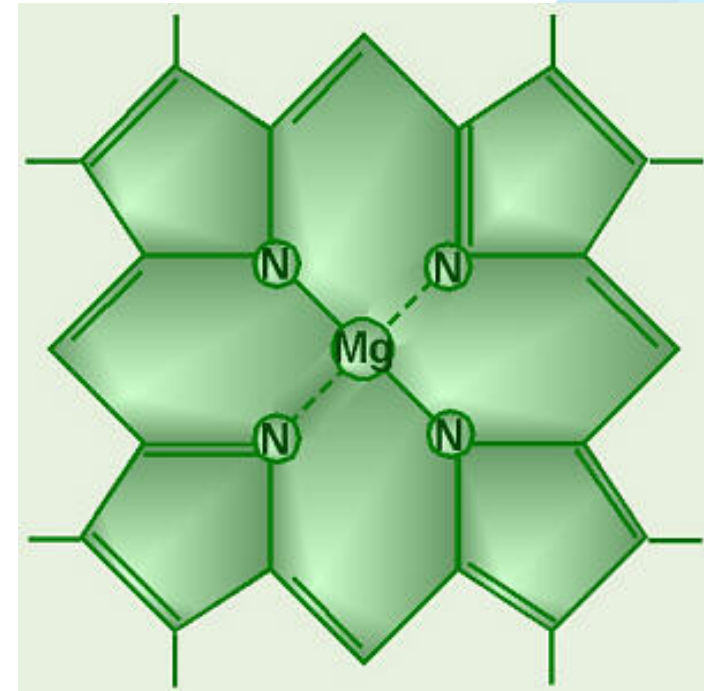


C. Our Meso Chelates

2. Magnesium

Importance of Mg

- ✓ Magnesium is the backbone of Chlorophyll
- ✓ Magnesium deficiency
 - ✓ = less photosynthesis
 - ✓ = less performance and yield
- ✓ Magnesium carries **P** in plant
- ✓ Magnesium helps sugars translocate in plants

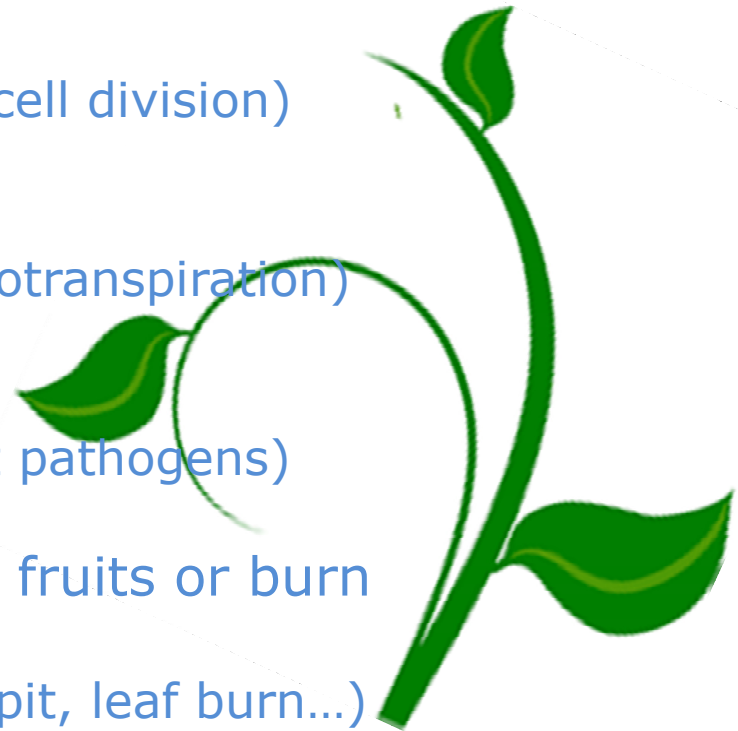


C. Our Meso Chelates

Foliar sprayings of Calcium and Magnesium

Foliar application of Meso nutrients help plants

- ✓ Recover from temporary stress
(Reactivation of photosynthesis and cell division)
- ✓ Resist drought
(Regulation of stomata activity and evapotranspiration)
- ✓ Recover from pests or disease
(Strengthen cell wall membrane to resist pathogens)
- ✓ Prevent physiological disorders on fruits or burn on leaves
(Direct effect on blossom end rot, bitter pit, leaf burn...)



C. Our Meso Chelates

Why Foliar? - Foliar application of Meso nutrients

- ✓ Faster reaction
- ✓ Easy application
- ✓ Ideal in case of soil blockage (often the case with Ca, Mg)
- ✓ Ideal in case of decreasing root activity (cold, stress, disease...)
- ✓ Environment friendly crop nutrition solution
- ✓ Better availability (no adsorption, no precipitation, no leaching)



C. Our Meso Chelates Translocation

- ✓ Translocation is vital to resolve localized deficiencies
- ✓ Calcium movement, when not chelated, is relatively slow when transpiration is affected, which results in leaf burn, blossom end rot or internal browning of fruits and plants!
- ✓ Chelates give **Ca** and **Mg** Translocation power to move inside the plant



C. Our Meso Chelates

Choose the solution that fits your needs from our Advanced range of high quality EDTA:

- ✓ Ca-EDTA 14%
- ✓ Mg-EDTA 9.9%

EDTA will not injure leaf tissue = safe for foliar

Available in packages of 1.000 kg, 25 kg, 10 kg, 5 kg and 1 kg

