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FERTILISERS AUSTRALASIA

Valagro

Trace elements in Onions

18 June 2018
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Product Manager Valagro Australia

E.E. Muir & Sons

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Australian Distribution and Branch Network.

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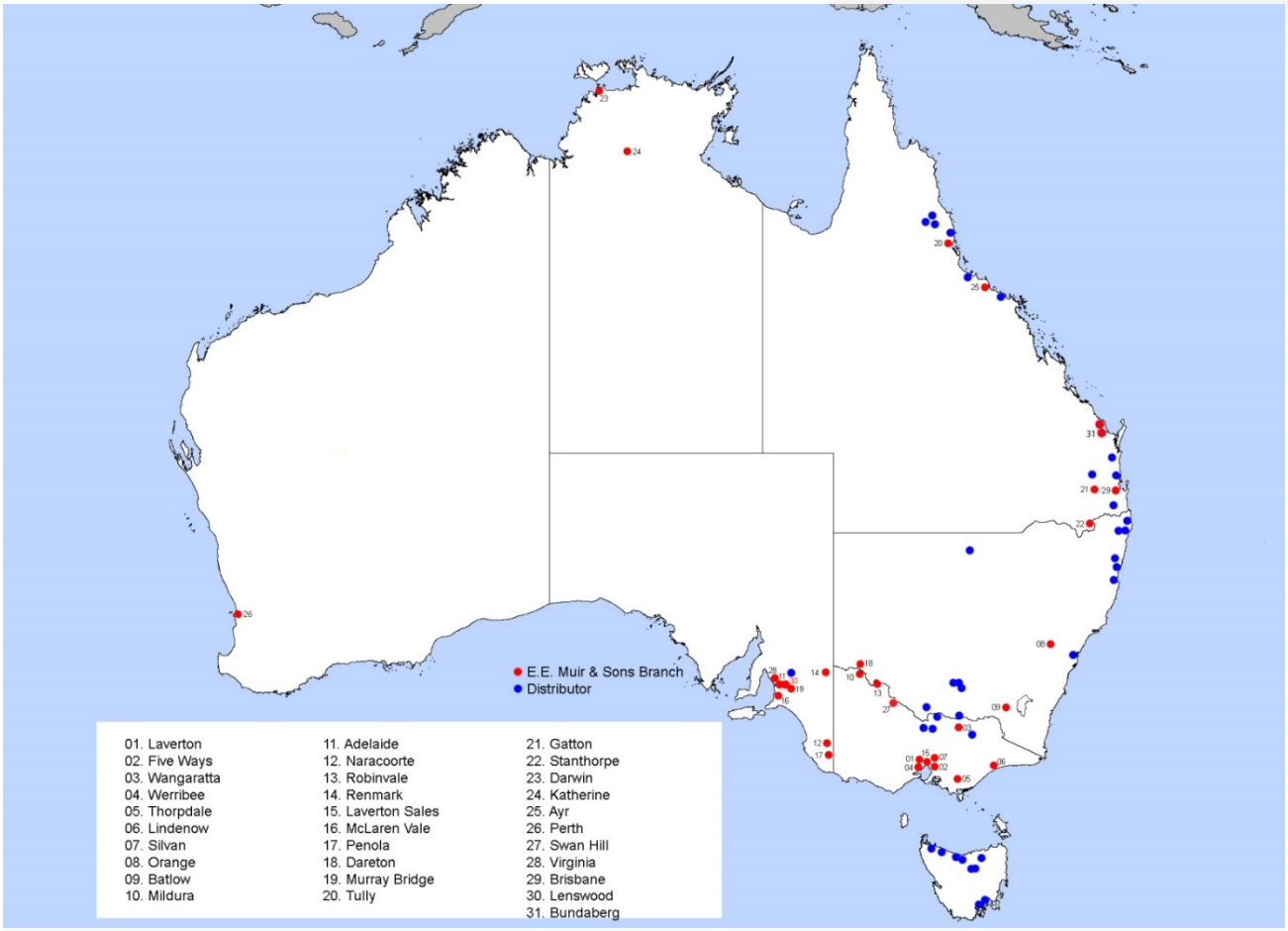

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research and innovation by

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Where science serves nature

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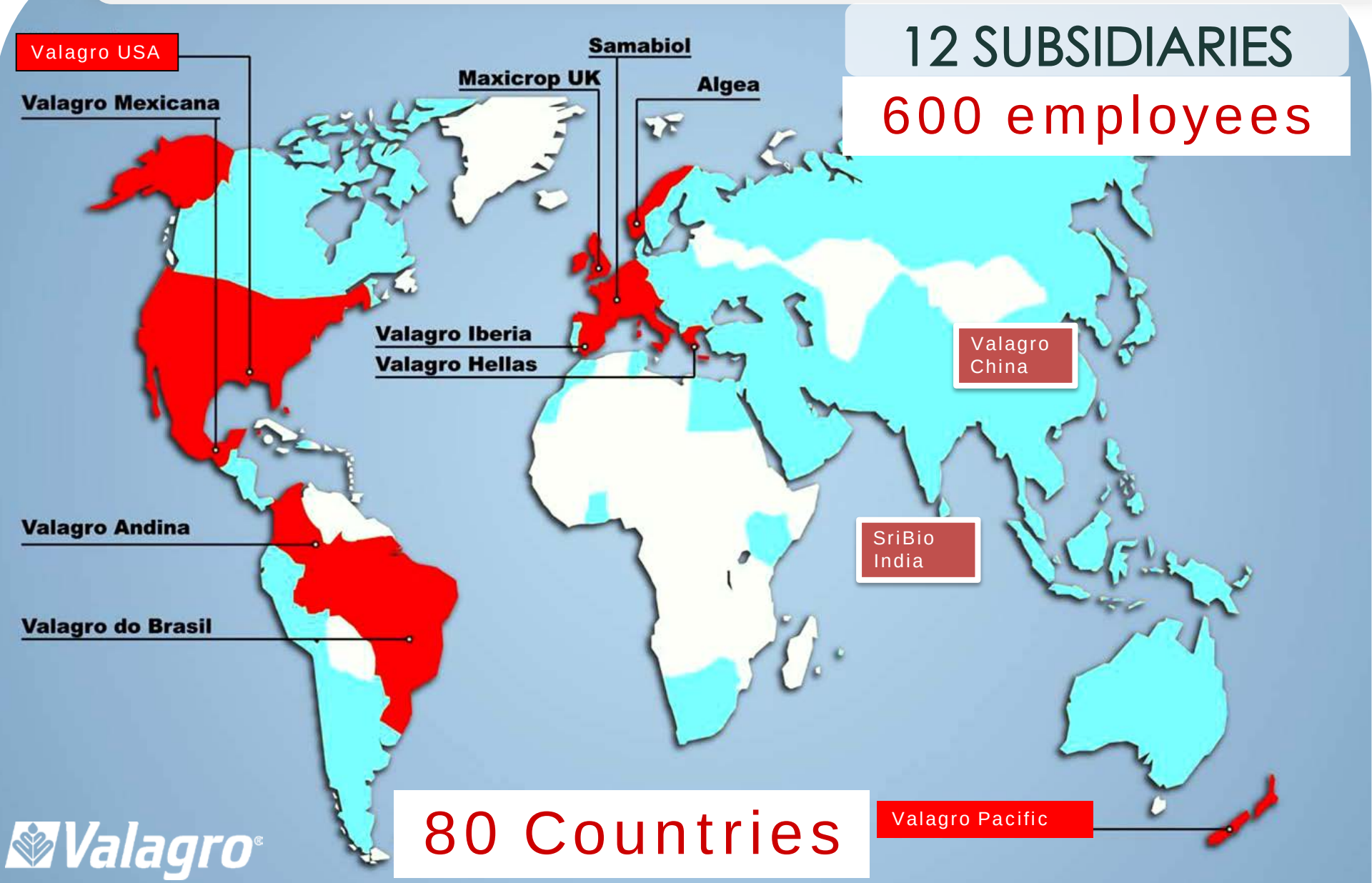


12 SUBSIDIARIES

600 employees

80 Countries

Valagro

KEY MANUFACTURING FACILITIES

ATESSA, ITALY *64.7k m²*

KRISTIANSUND, NORWAY *7.6k m²*

BRØNNØYSUND, NORWAY *8.4k m²*

PASHAMYLARAM, INDIA *5.6k m²*
GUNTUR, INDIA *20.8k m²* ***KARAKAPATLA, INDIA*** *40.4k m²*

INTEGRATED PRODUCTION

- ✔ Harvests and processes *Ascophyllum nodosum* seaweed and seaweed meal
- ✔ Extracts the main active ingredients contained in seaweed
- ✔ Produces biostimulants, micronutrients and water-soluble nutrients

TECHNOLOGICALLY ADVANCED

- ✔ One of the few production facilities in the world capable of synthesizing chelated micronutrients essential for plant nutrition

MULTIFORMULATION CAPABILITIES

- ✔ Able to produce for plant, animal, cosmetics and human nutrition markets
- ✔ Fermentation expertise

KEY MANUFACTURING FACILITIES

NEW PLANT IN BRAZIL

In early 2017 the Group has finished the operational phase for the construction of the new plant in ***Pirassununga, (SaoPaulo),*** Brazil.

MICRONUTRIENT & VALAGRO SOLUTION IN ONION NUTRITION

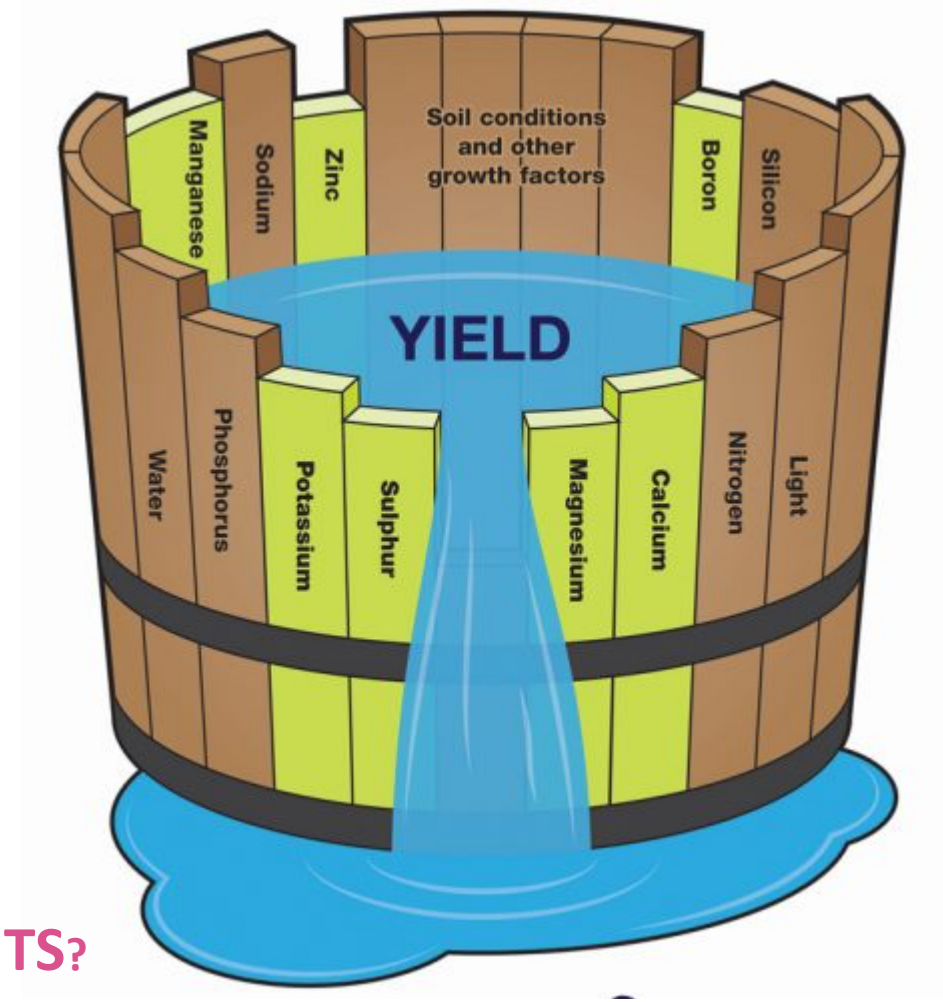
Heinrich van der Westhuizen – Products Manager Australia

Liebig minimum law

It states that growth is controlled not by the total amount of resources available, but by the scarcest resource (limiting factor).

To optimize the yield we have to consider limiting factors:

1. Usually NPK are supplied….
2. Plant protection program is applied….
3. And what about **MICRONUTRIENTS?**



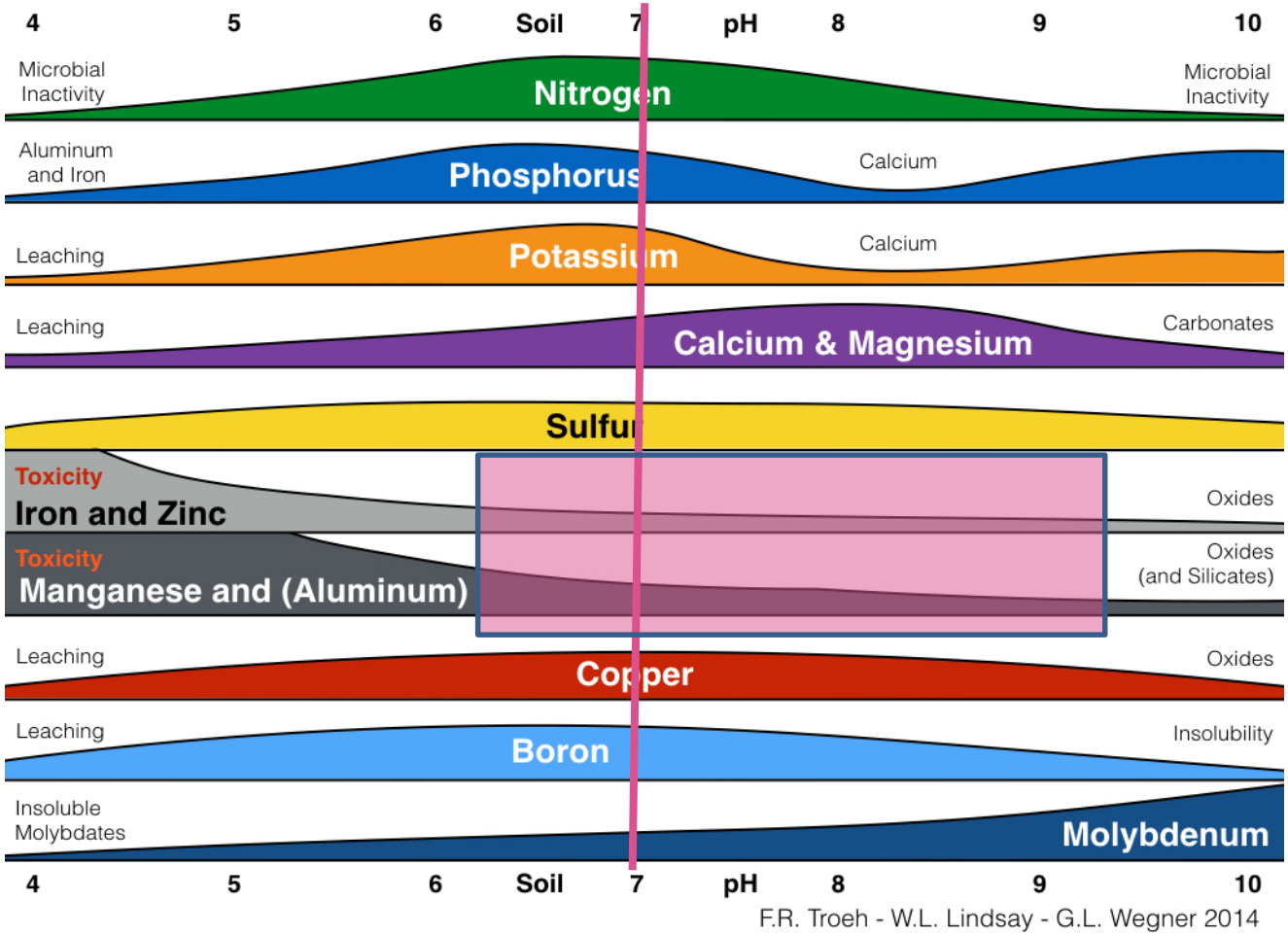
The micro & meso elements

Iron (Fe), Manganese (Mn), Zinc (Zn), Copper (Cu), Boron (B), Molybdenum (Mo),

+

Calcium (Ca), Magnesium (Mg), Sulphur (S).

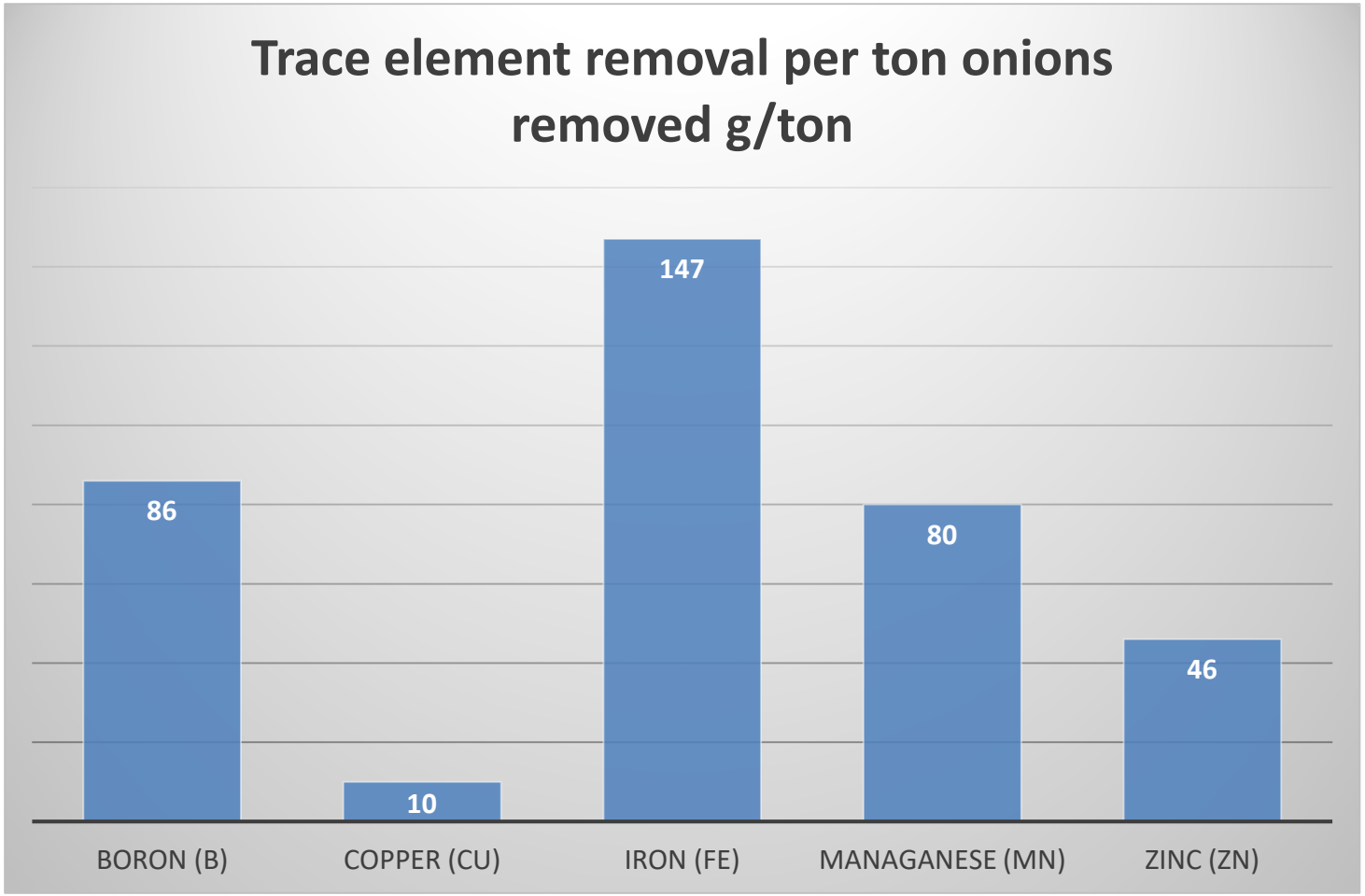
pH activity on the different Microelements availability



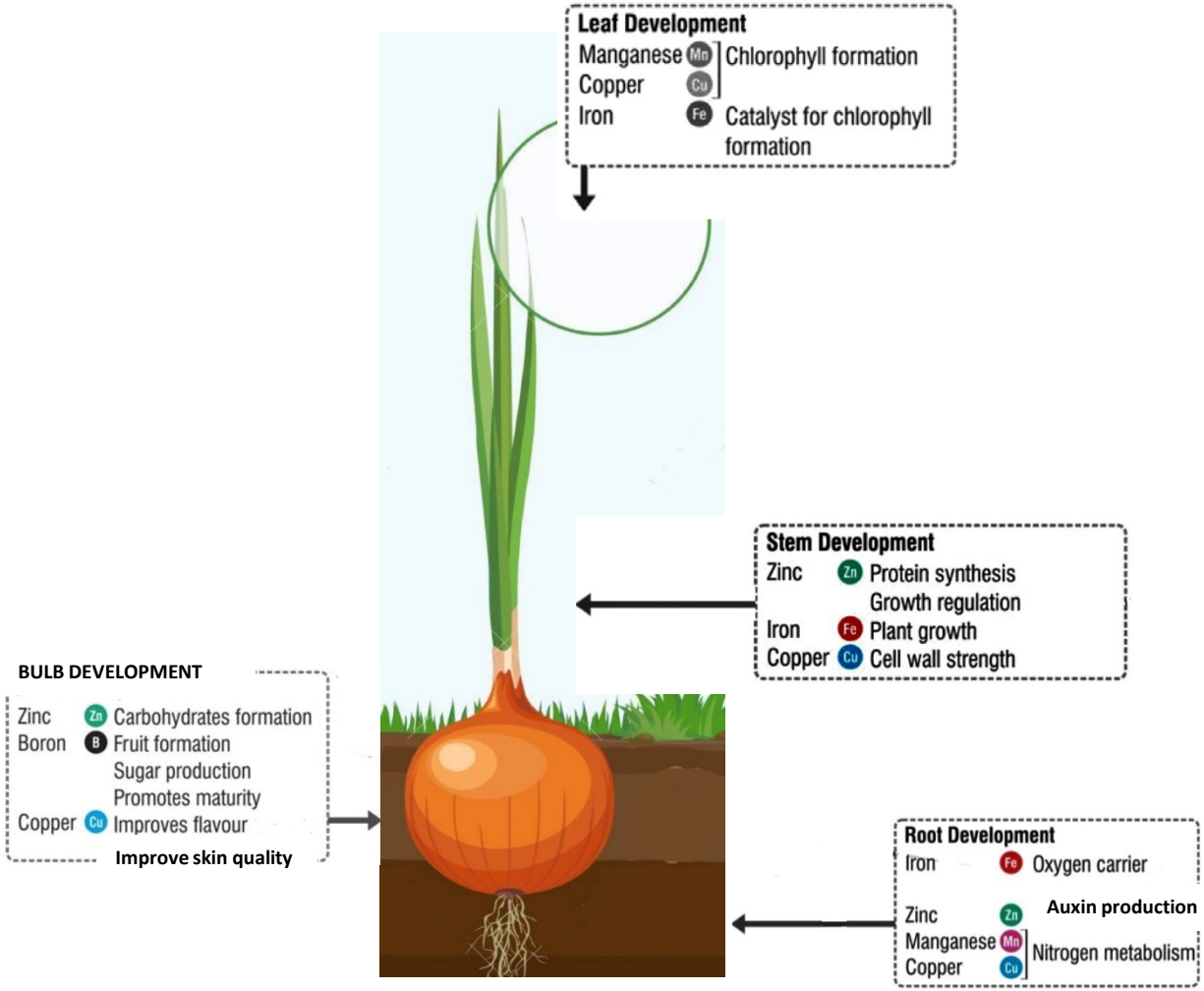
Macro Nutrition

Trace Elements Zn, B, Mo, Mn & Cu

Total Trace element removal in Onions



Trace elements requirements in Allium Plants



Zinc:

Role in plant

- Plays important role in nitrogen metabolism.
- Very important in production of growth hormones

Deficiency symptoms

- Young leaves show chlorosis and tipburn.
- The leaf blades are small, narrow and cupped upwards.
- Plants are stunted.

Boron:

Role and deficiency symptoms

- Boron plays big role in Ca transport and cell elasticity.
- Has huge effect on yield and quality.
- Applications should be regular at small rates. Too big rates could stunt growth.
- Deficient plants are stunted with blue-green colour. Older leaves chlorotic with tip die back and transverse yelow lines.

Iron:

Role and deficiency symptoms

- Iron is important for chlorophyl formation and photosynthesis.
- Iron is the trace element that plant requires largest quantity.
- Plant struggle with uptake early season when soil temp is low.
- Symptoms- Chlorosis on young leaves

Manganese:

Role and deficiency symptoms

- Plays major role photosynthesis.
- Deficiency could delay maturity.
- Severe deficiency could also cause thick necks at harvesting. This is due to too slow early devekopment.
- Onions are highly sensitive to Mn deficiency.

Copper:

Copper (Cu) deficiency

- Cu deficiency causes permanent wilting of plants. Particularly young leaves will curl
- Responsible for lignification.
- Important for healthy green foliage. Improved yield.
- Made worse by – Organic soils, Chalky soils, Sandy soils and high nitrogen applications

What's best soil or foliar applications?

Best way of applications in Onions

Element	Root applications	Leaf Applications
Iron	★★★	★★
Manganese	★	★★★
Zinc		★★★
Copper		★★★
Boron	★	★★★
Molybdenum		★★★
Magnesium	★★★	★★
Calcium	★★★	★

BREXIL

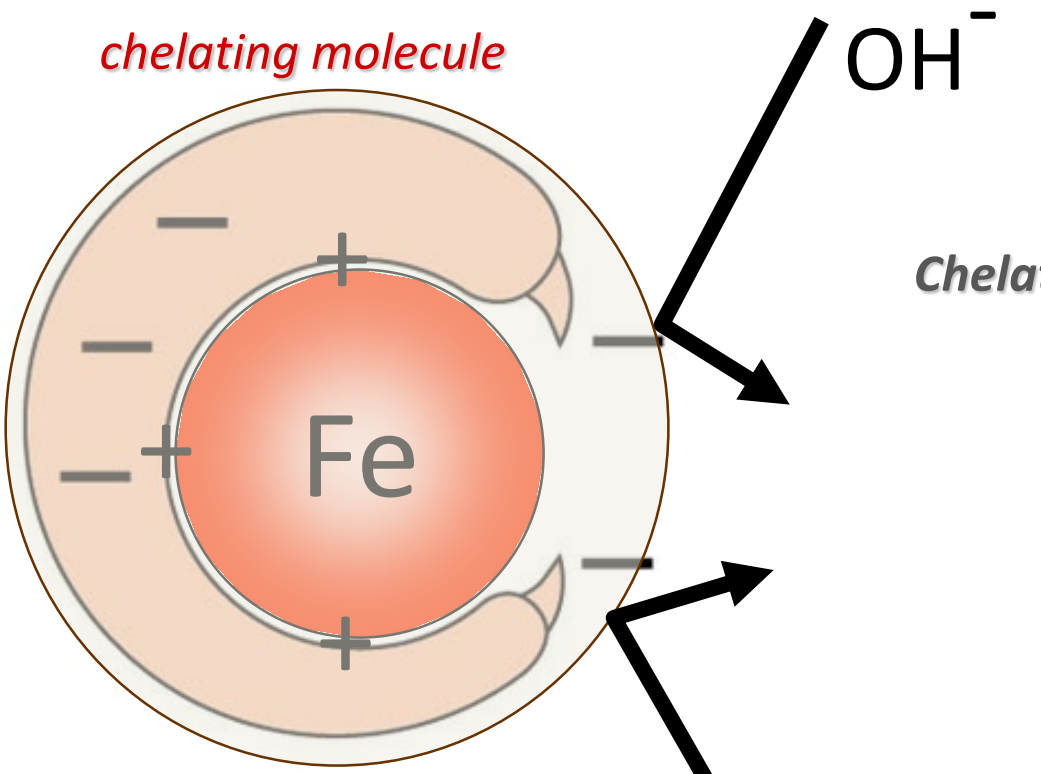
To treat micro deficiencies you need a **champion**

BREXIL line

FOLIAR APPLICATION

- BREXIL is a range of products that contain a **microelement complex with LSA** (ligninsulfonate). LSA is characteristic for its notable ability to **penetrate plant tissues, without the risk of phytotoxicity**;
- The granules are **completely soluble** and do not cause the accumulation of unstable suspensions in the irrigation tanks;
- Today, the BREXIL range is even more efficient than ever before, thanks to the combined action of a **specific carrier** that facilitates the passage of nutrients through the cuticles and increases cell absorption.

What is a chelating molecule?



OH^-

Chelating agent protect the TE from the immobilization

chelated microelement

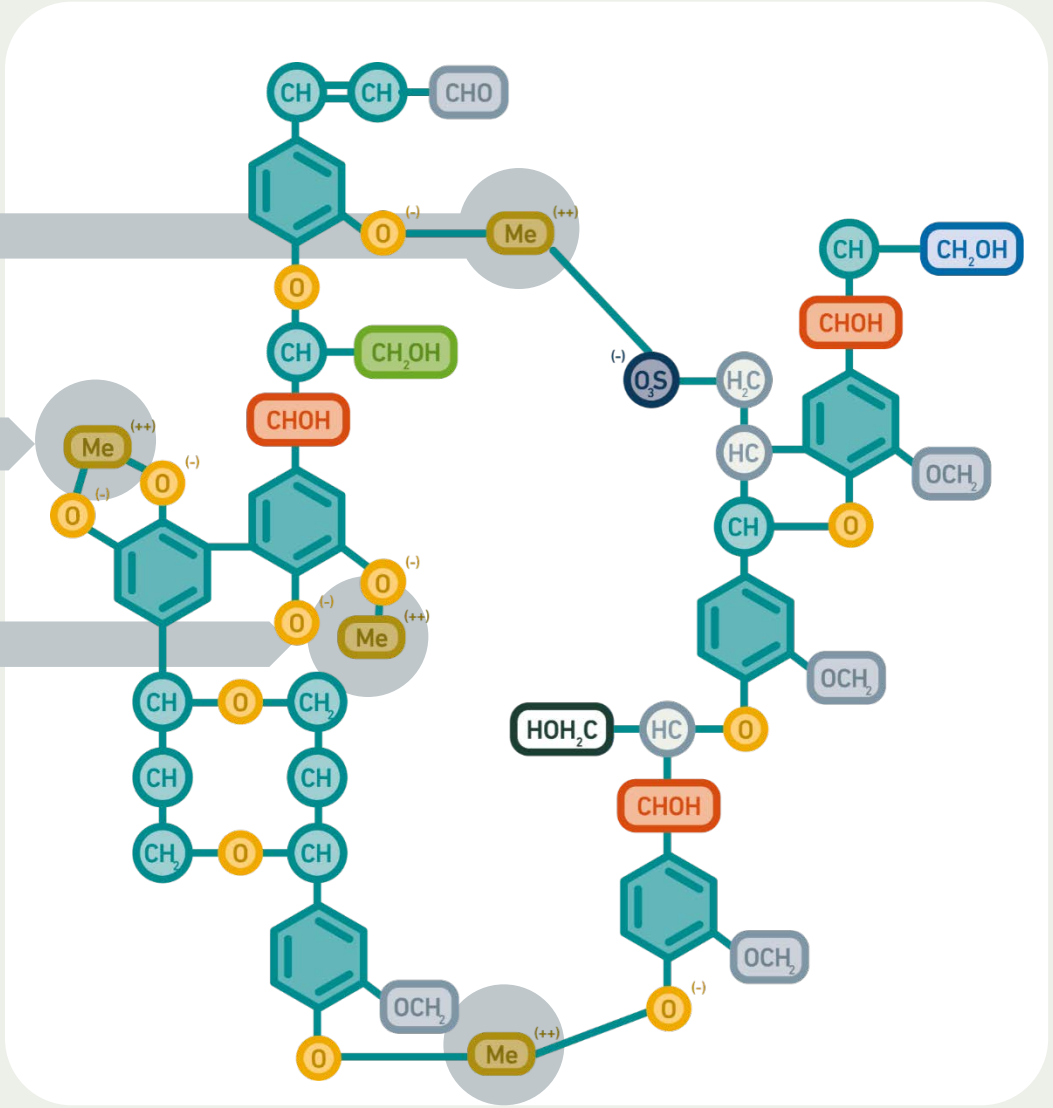
PO_4^{3-}

LSA PATTERN

The metal can be complexed in one or more points by ionic interactions

BREXIL

Stable Complex

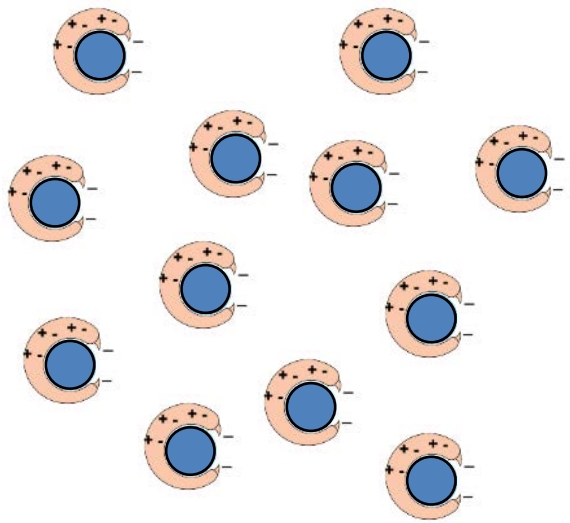


Benchmark microelement based products

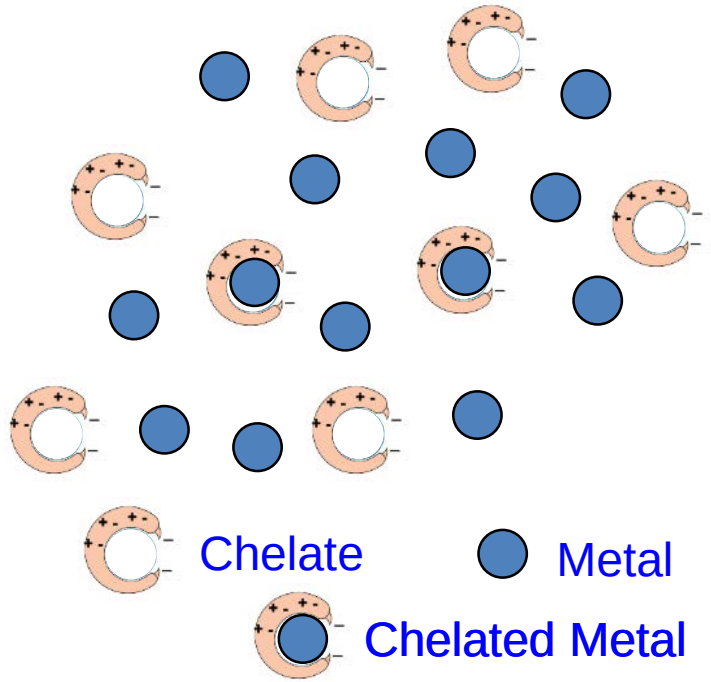
SALTS (ZnSO4, CaCl2, etc...)			• Medium penetration the leaves; • Easly leached; • Risk of phytotoxicity
SALT + AMINO ACIDS	PHYSICAL MIXTURE		• It is only Mixture,it is not a true chelated micronutrients!
SALT + LSA	CONTROLLED CHEMICAL REACTION	STABLE COMPLEX BREXIL	• Excellent penetration; • Quick absorption; • No phytotoxicity; • Mixable with most common pesticides.

What Makes BREXIL Unique?

Chemically Reacted (Brexil)



Simple Mix or Blend (Most Liquid Chelates)



- **Chemically-reacted chelates have stronger, more stable bonds.**
- **Chelate or metal molecules that are NOT combined will either tie up or be tied up in tank mixtures and can also cause plant phytotoxicity**

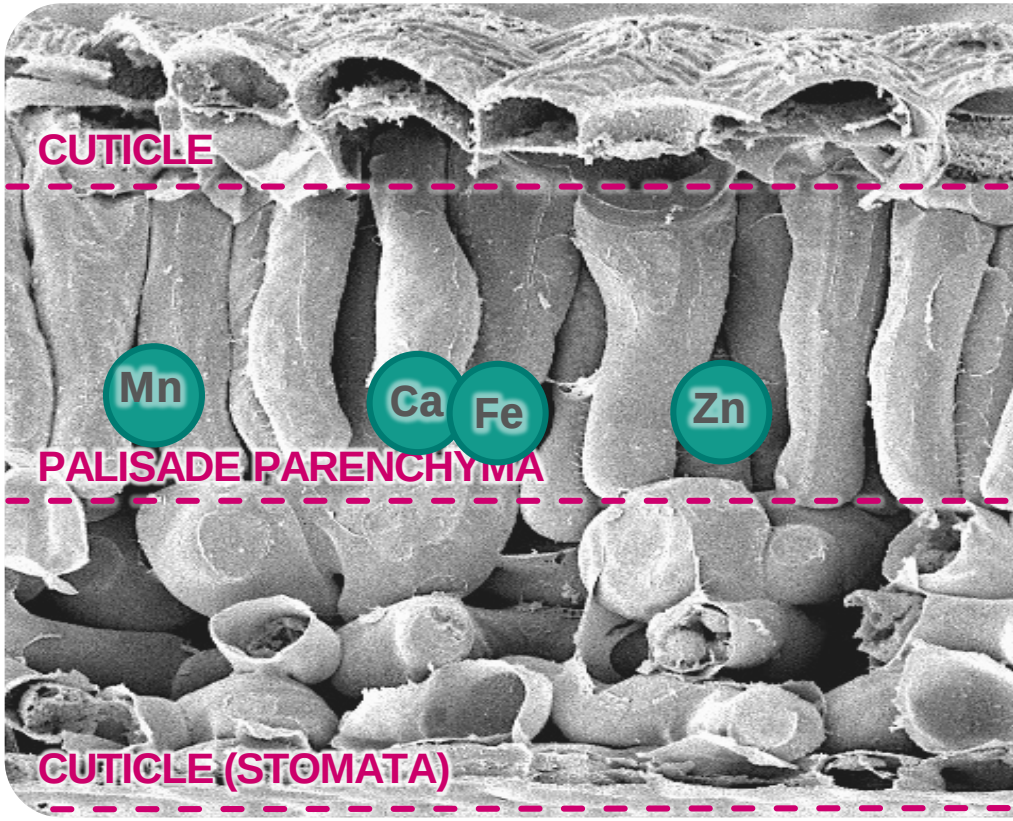
Product Uptake

1. The BREXIL solution is **rapidly absorbed** through the leaf's cùticle and **does not leave metal residues on the surface.**

2. LSA's complexing action not only favours the penetration of metal but also, once the metal has entered the vegetable tissue, **exercises its protective action** and therefore, **its bio-availability.**

3. The plant recognises LSA as a **source of energy or food**; therefore, the microelements that bind to the LSA are **released in the plant**, preventing and curing microelement deficiencies.

LSA-Metal = penetration and release of elements

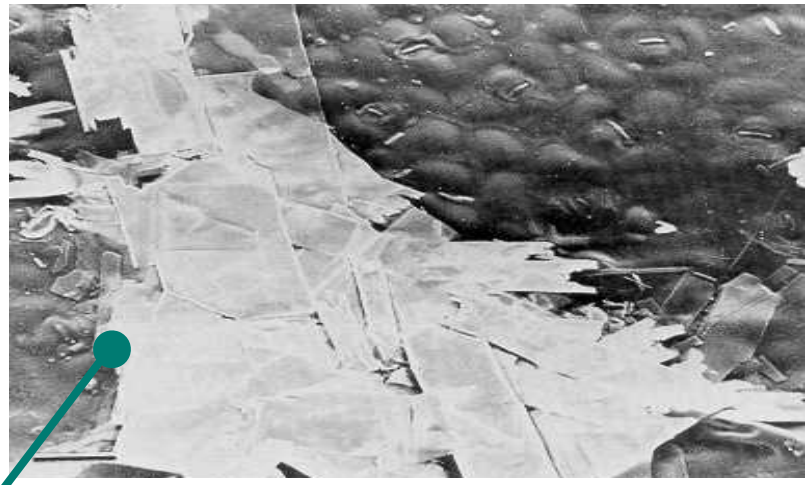


Leaf cross section (Dicotyledon)

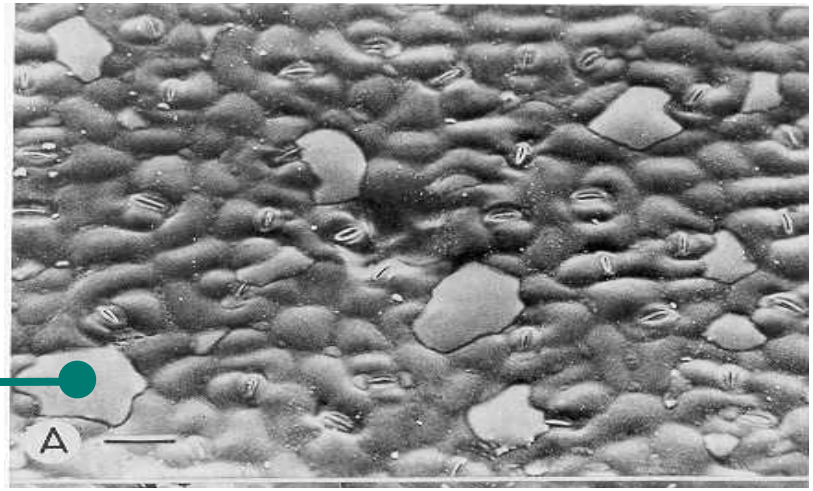
Insoluble salts = cannot penetrate the cuticle.

Oxides are insoluble elements and can only be absorbed through the stomatal openings. This means that they are only available to the plant in some cases and after lengthy periods of application. Following their application, abundant insoluble residues can be seen on the leaf's surface under a microscope.

Metallic residues remain on the outer surface (clusters the size of a few microns).



Strong amount of metal residues caused by oxides applications.



With Brexil the solution is rapidly adsorbed and does not leave residues on leaves

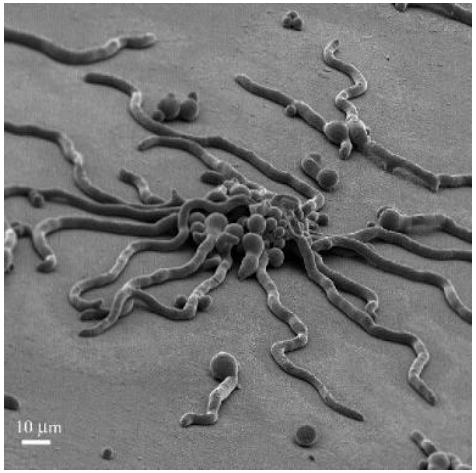
Brexil Zn Trial published In *Scientia Horticulturae* Journal January 2018

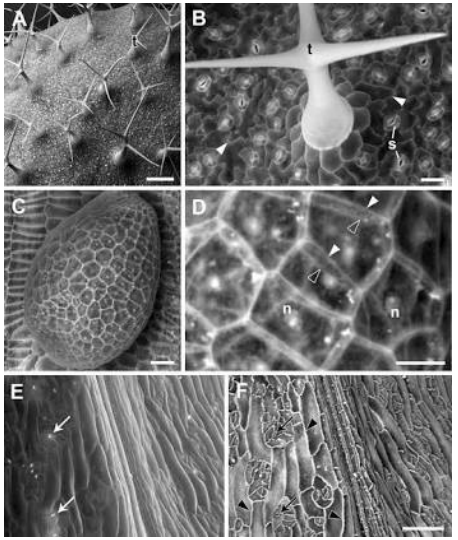
Zn localization and anatomical changes in Leaf tissue of green beans (*Phaseolis vulgaris*) following foliar appilications of Zn- lignosulphonate (Brexil Zn) and ZnEDTA

Methods of measuring

Tissue and single cells concentrations

- **Cryo-scanning electron microscopy (Cryo-SEM)**

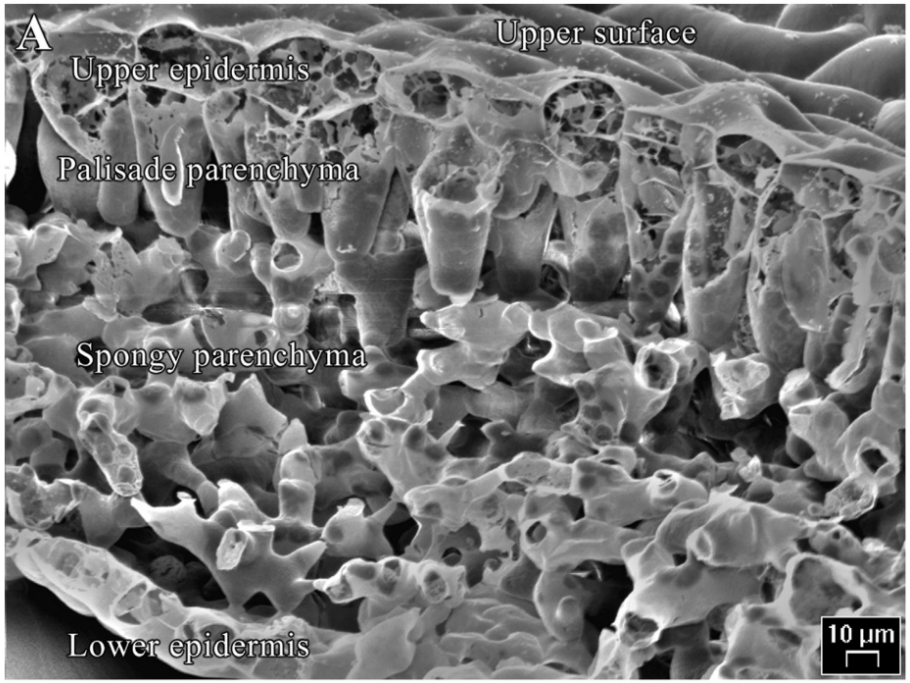


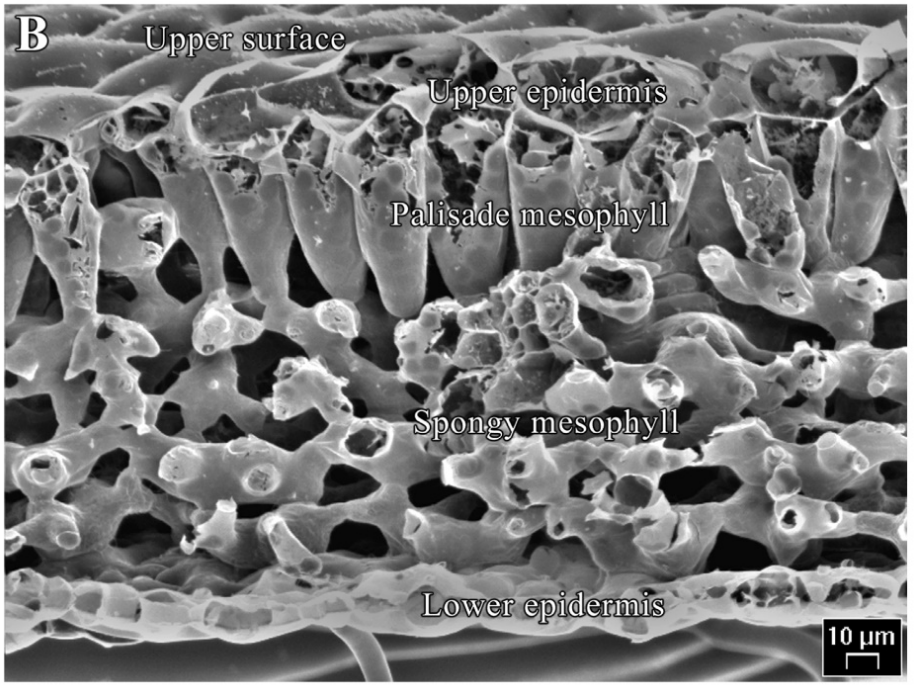


Results

Cryo-scanning electron microscopy (Cryo-SEM)

A. Minnocci et al.





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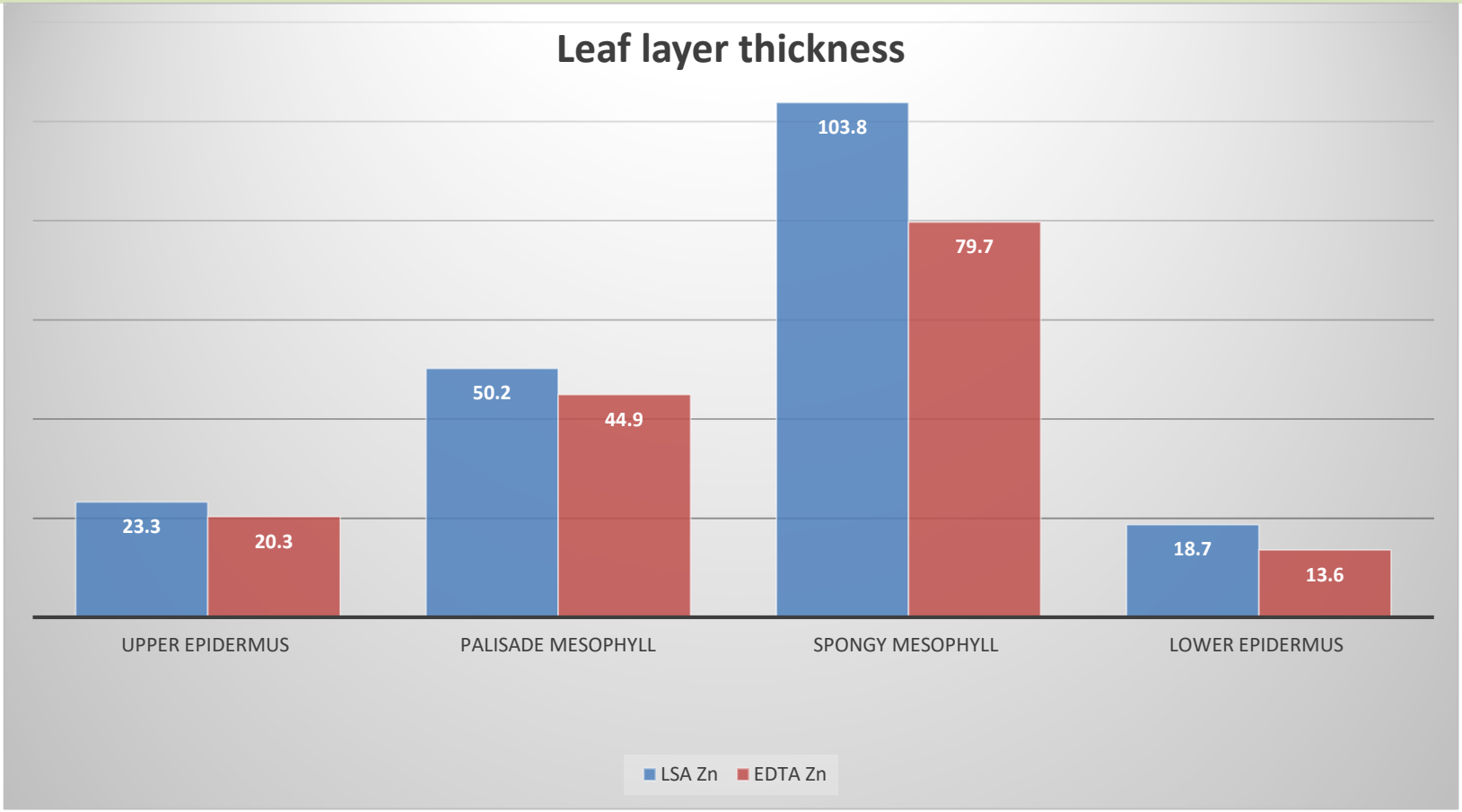
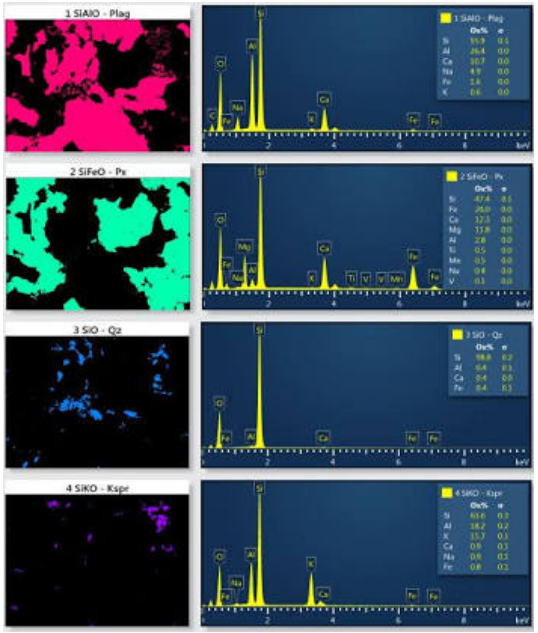


Methods of measuring

Tissue and single cells concentrations

Energy dispersive X-ray microanalyses (CEDX)



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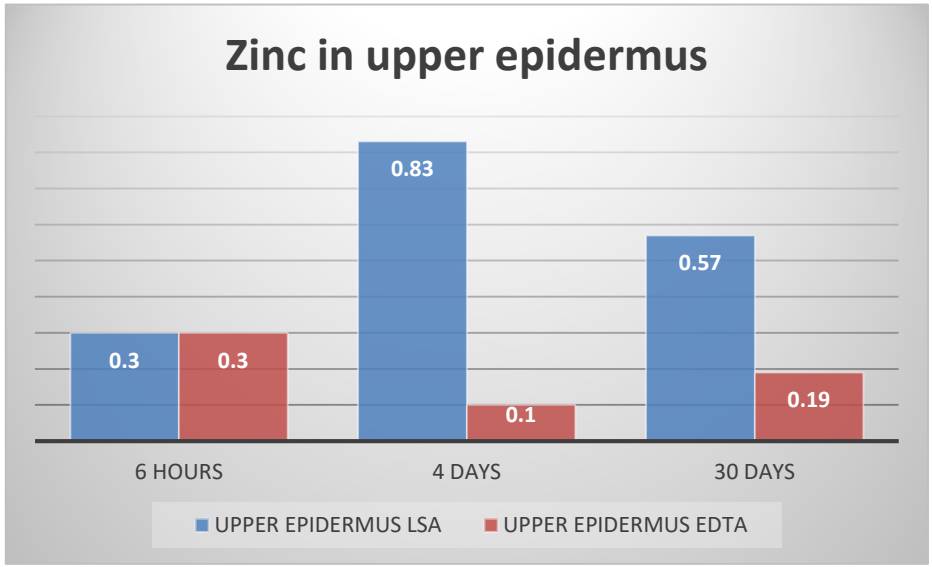

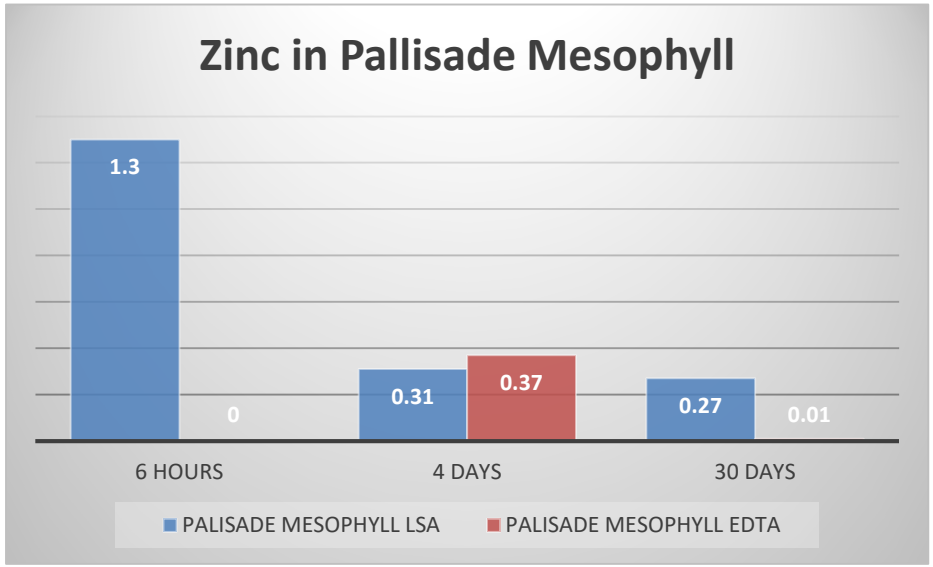

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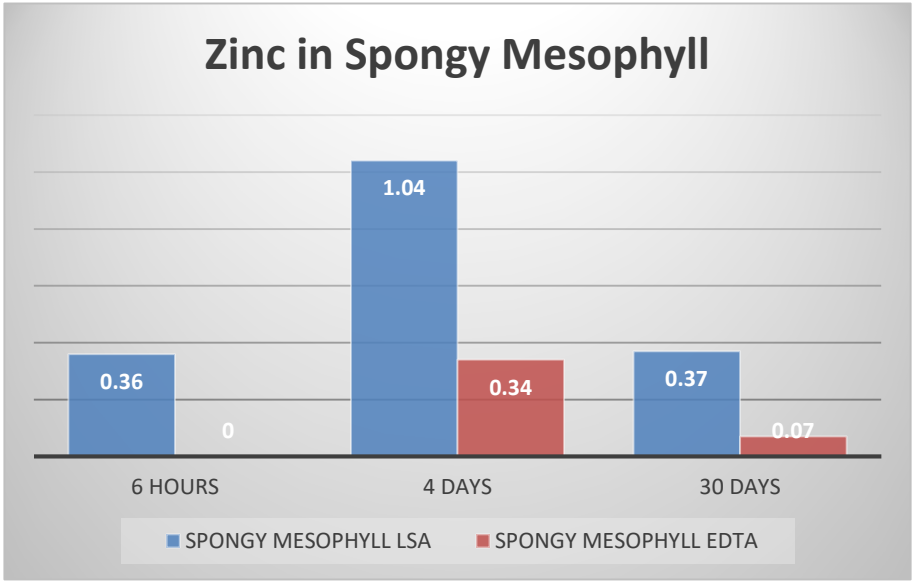

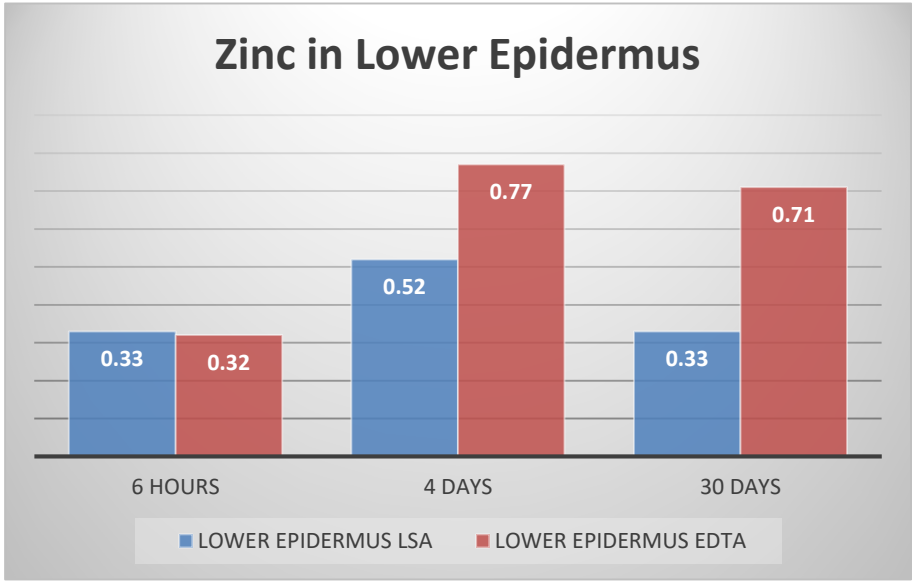

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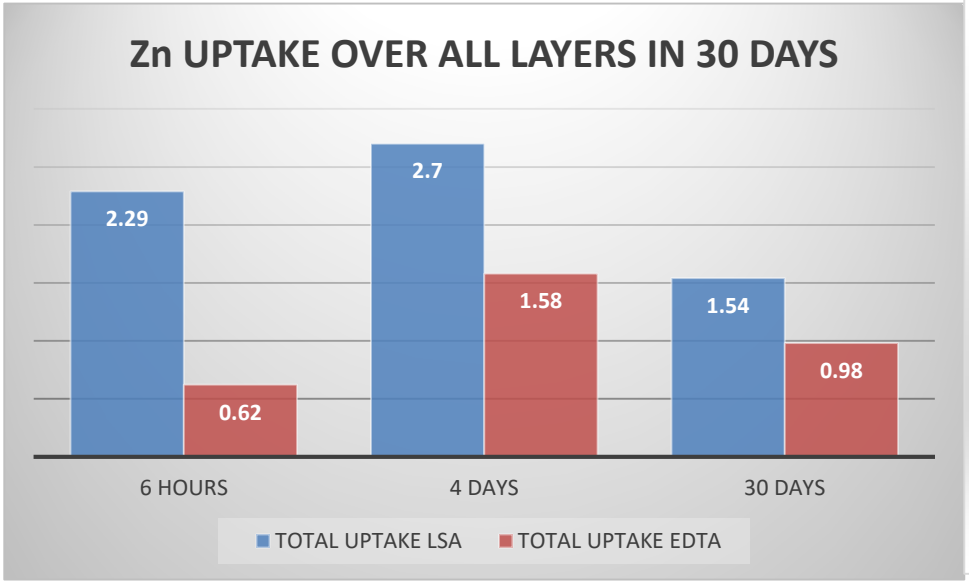

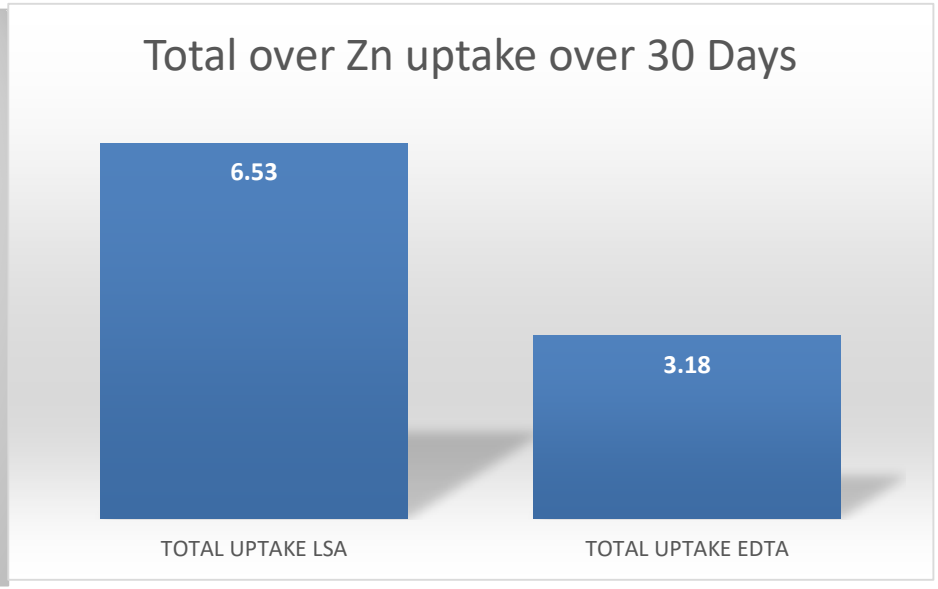

The Formulations Available

PRODUCTS (Composition%)	CaO	MgO	B	Cu	Fe	Mo	Mn	Zn
Brexil Ca	20,0	-	0,5	-	-	-	-	-
Brexil Combi	-	-	0,9	0,3	6,8	0,2	2,6	1,1
Brexil Fe	-	-	-	-	10,0	-	-	-
Brexil Mg	-	8,0	-	-	-	-	-	-
Brexil Mn	-	-	-	-	-	-	10,0	-
Brexil Zn	-	-	-	-	-	-	-	10,0
Brexil Mix	-	6,0	1,2	0,8	0,6	1,0	0,7	5,0
Brexil Multi	-	8,5	0,5	-	4,0	-	4,0	1,5
Brexil Duo	20,0	4,0	0,5	0,5	-	-	0,5	1
Brexil Nutre	-	-	-	-	2	-	6	6
Brexil Top	-	-	2	-	-	-	5	6

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THANK YOU FOR YOUR ATTENTION

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