

MAX RANGE



Fruit Crops • Vegetables • Turf • Grain Crops • Ornamentals • Nut Crops



CALCIMAX® • K-MAX® • ZINCMAX® • MAGMAX® • CU-MAX® • MANMAX™ • FERRO-MAX®



NULANDIS®
unlocking nature's potential

INTRODUCTION

Nulandis's **MAX Range**, first developed by Plaaskem in 1991, represents a new concept in micronutrient technology. **MAX Range** nutrients are organic chelates, derived from natural sources which work harmoniously with the metabolism of the plant and ensure maximum uptake and translocation. Unlike synthetic chelates, the **MAX Range** is stable and effective, even under varying water and soil pH conditions.

The formulation of the **MAX Range** approaches the chelation process differently, by using carbohydrate derivatives to neutralise the electrical charge of the cation. Carbohydrates are used in the general biochemical functioning of a plant, and hence, carbohydrate-based chelates are more readily accepted by the plant.

MODE OF ACTION

The charge on the surface of a leaf is negative. Due to the neutral charge of the MAX formulation, the product is not bound by the charge on the surface of the leaf and the MAX product moves through the leaf cuticle by diffusion. As a result of the unique formulation of the MAX products, the built-in humectant activity ensures that the droplet evaporates slowly from the leaf surface, thereby resulting in longer exposure to the foliar surface. This renders greater cuticular uptake, penetration, absorption and improved translocation.

The phloem sap consists of a solution of minerals, proteins and carbohydrates which flows in all directions in the plant. The MAX product, a carbohydrate chelate, enters the phloem and is transported to the relevant site of activity. This complex process is highly compatible with the normal physiological processes within the phloem, as the MAX complex is not alien to the plant due to its organic nature.

MAX PRODUCT RANGE

PRODUCT	MASS/MASS	MASS/VOLUME
CalciMax®	Ca: 78.5 g/kg, B: 5.08 g/kg	Ca: 100 g/ℓ, B: 6.5 g/ℓ
Cu-MAX®	Cu: 40 g/kg	Cu: 50 g/ℓ
Ferro-Max®	Fe: 40 g/kg	Fe: 50 g/ℓ
K-Max®	K: 91 g/kg, K ₂ O: 110 g/kg	K: 115 g/ℓ, K ₂ O: 139 g/ℓ
DoubleMax	Ca: 63 g/kg, Mg: 11.6 g/kg, B: 5 g/kg	Ca: 80 g/ℓ, Mg: 15 g/ℓ, B: 6.3 g/ℓ
MagMax®	Mg: 58 g/kg, B: 5 g/kg	Mg: 75 g/ℓ, B: 6.5 g/ℓ
ManMax™	Mn: 60 g/kg, B: 5 g/kg	Mn: 75 g/ℓ, B: 6.5 g/ℓ
ZincMax®	Zn: 100 g/kg , B: 5 g/kg	Zn: 130 g/ℓ, B: 6.5 g/ℓ

FEATURES	ADVANTAGES
Organically chelated complexes derived from natural plant material	Hence, not ALIEN to the plant. Therefore rapid uptake and translocation within the plant.
Carbohydrate based ligand	Compatible with the normal biological processes within the plant.
Non-phytotoxic	Product can therefore be applied during the flowering stage of plants - no phytotoxicity or fruit abnormality. In the event of accidental overdosage, to date, no phytotoxicity has been reported. Product may be applied during high temperature weather conditions with no risk of leaf scorching.
Built-in humectant activity	Ensures the slow evaporation of the droplet from the leaf surface, thereby resulting in optimum uptake.
Suitable for prevention or correction of nutritional imbalances caused by adverse soil or climatic conditions	May be used as a foliar spray or via fertigation.
Safe formulation	Free from harmful residues such as chlorides, sulphates and sodium. Non-carcinogenic.
Includes boron	Assists in the mobilization of various cations, e.g. calcium, within the plant. Post-harvest requirements of the tree with respect to boron can be decreased or eliminated depending on the number of MAX sprays applied.
Stable product with a neutral pH	Available to the plant over a broad pH spectrum of soil and water conditions. Due to the neutrality of the product, it is compatible with most pesticides, water-soluble fertilizers and other cations in the MAX Range .
Proven track record	Research has been conducted both locally and internationally and results are available on request.
Individual formulations available	Single, as well as multiple deficiencies in crops can be overcome as the products can be used individually or in the required combinations.
Non-corrosive	No damage to expensive spray equipment.
Price competitive	Nutrient uptake, on a comparative basis, reflects in terms of foliar analysis that one litre of MAX product is equivalent to the active of one kilogram of crystalline inorganic product. This is due to the efficient uptake of the MAXES by the plant.



FUNCTIONS OF COPPER

Copper is essential in the production of iron compounds needed for chlorophyll synthesis. It is also necessary as an enzyme activator. Copper has a main regulatory function in the biochemical life processes, being essential for enzyme systems and plant growth.

DEFICIENCY SYMPTOMS

Copper deficiency symptoms are not as straightforward as for most of the other trace elements. Slight deficiency may only cause reduced growth and yield with no visible symptoms. Common symptoms of severe deficiency include stunted growth, chlorosis and die-back.



CAUSES OF COPPER DEFICIENCY

Copper deficiency can be induced by the over application of nitrogen and/or phosphate fertilizers, over-liming and drought. Alkaline soils, as well as sandy or leached acid soils give rise to copper deficiency.

BEANS

The efficacy of **Cu-MAX®** was tested on beans, as a foliar application versus copper EDTA powder.

LEAF ANALYSES WITH RESPECT TO COPPER CONTENT

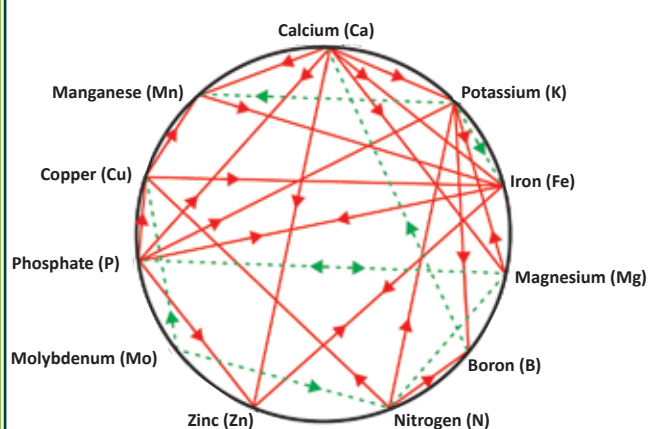
TREATMENT	Cu (mg/kg)
Control	18
Copper EDTA 0.5 kg/ha	90
Cu-MAX® 0.375 l/ha	70
Cu-MAX® 0.5 l/ha	100

Relative to the control, these results indicate that both types of chelates are effective. However, **Cu-MAX®** at 500 ml/ha results in the highest uptake of copper.



EXPLANATION

MULDER'S CHART



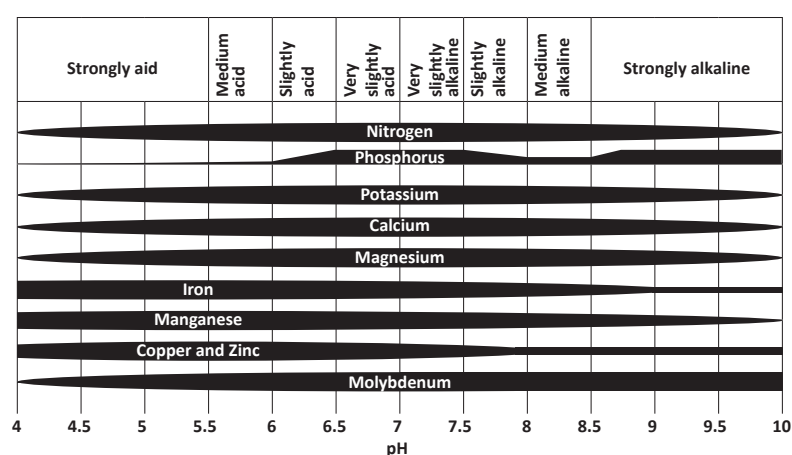
ANTAGONISM

Decreased availability to the plant of a nutrient, due to the action of another nutrient.

SYNERGISM

Increased availability of a nutrient to the plant due to the increase in the level of another nutrient.

TRUOGS DIAGRAM



How Soil pH Affects Availability of Plant Nutrients

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Active Ingredients:	CalciMax®:	Calcium (Ca)	100 g/l
		Boron (B)	6.5 g/l
	K-Max®:	Potassium (K)	115 g/l
		K ₂ O	139 g/l
	ManMax™:	Manganese (Mn)	75 g/l
		Boron (B)	6.5 g/l
	Cu-MAX®:	Copper (Cu)	50 g/l

Ferro-Max®:	Iron (Fe)	50 g/l
MagMax®:	Magnesium (Mg)	75 g/l
	Boron (B)	6.5 g/l
ZincMax®:	Zinc (Zn)	100 g/kg (130 g/l)
	Boron (B)	5 g/kg (6.5 g/l)

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