

Micro Granule EDTA Chelates




wilchem
solutions for agriculture

Wilchem Sentinel Wettable Micro Granule



In 2020 Wilchem released a range of wettable micro granule EDTA's.

At Wilchem we are always looking to improve the range of nutritional products available to meet the changing needs in the market, not only new products but improved versions.

Wilchem's new range of EDTA's are Sodium Free, utilising potassium through a new formulation that will provide a significant plant benefit. The Potassium in the new range is plant available, giving not only a plant benefit but also a commercial advantage.

A comparison of product analysis can be seen below.

Example of Zinc EDTA comparison –

Analysis	Wilchem	Standard
Zinc	14.5 %	15 %
Sodium	-	10.5 %
Potassium	17.3 %	-
Formula	$C_{10}H_{12}N_2O_8K_2Zn$	$C_{10}H_{12}N_2O_8Na_2Zn$

- Sentinel Zinc - 10.5% Sodium has been replaced by 17.3% plant available Potassium.
- Sentinel Manganese - 10.9% Sodium has been replaced with 17.7% plant available Potassium.
- Sentinel Copper - 10.1% Sodium has been replaced with 6.8% Nitrogen.

Wilchem Sentinel

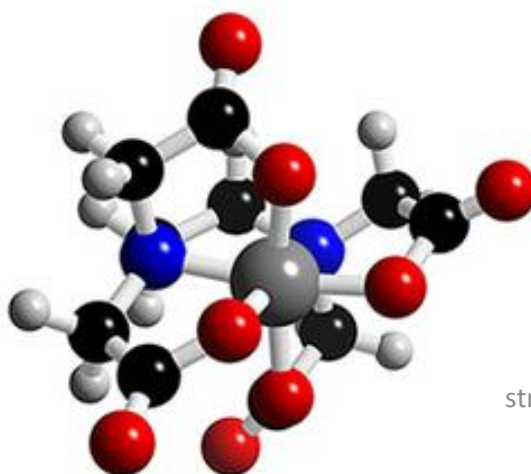
Wilchem Sentinel is a range of Ethylenediaminetetraacetic acid (EDTA) chelates. EDTA forms sexadentate chelates – they form six bonds to the nutrient to form a “chelate ring”. As can be seen in the diagram below showing the octahedral structure of EDTA chelating a metal ion. The chelate ring is stronger than a single ionic bond and protects the nutrient and maintains it in solution. EDTA chelates protect the nutrient from interaction with other crop protection products making it the most compatible product on the market.



Metal Chelates Definition

IUPAC (International Union of Pure and Applied Chemistry)

“Chelation is the formation of bonds between two or more binding sites within the same molecule and a single central metal atom.”



EDTA Structure
Diagram of the octahedral structure of zinc EDTA forming a hexadentate chelate.

Nutrient range

Wilchem Sentinel range covers the three most commonly used micronutrients for broad acre agricultural use. They are –

Zinc

Manganese

Copper

Blends

A full list of products can be found on the product information page.

Compatibility Function

Increased compatibility

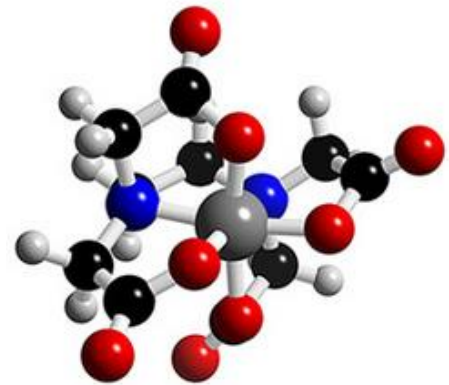
The EDTA molecule (ethylenediaminetetraacetic acid) is the strongest chelation agent currently available. The benefit of strong chelate bonds is that it makes this range of products the most compatible micronutrient products for tank mixing and for soil applications. This is very important for furrow injection in alkaline soils and tank mixes that contain soluble phosphates.

The synthetic EDTA molecule does not provide any additional nutritional benefit, it purely acts as a stable transporter of the micronutrients in solution.

Uptake mechanism

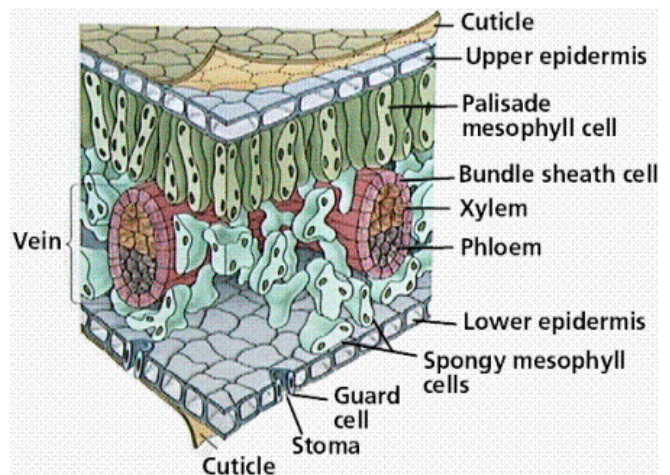
Foliar micronutrient applications can enter the plant two ways. Via the stoma which is used by the plant for respiration or by direct absorption through the leaf cuticle. The leaf cuticle is highly negatively charged making it difficult for positively charged ions to be absorbed. Chelating the positive ions to a highly negatively charged EDTA molecule creates a molecule that remains negatively charged that can pass through with no interaction. The nanopores that allow passage through the cuticle are very small. EDTA chelates have a low molecular weight and can pass through these pores.

EDTA chelates cannot be absorbed directly through the cell membrane. The micronutrient must first be uncoupled from the EDTA molecule either in the rhizosphere (soil applications) or epidermis or palisade cells (foliar applications). It can then be absorbed through the cell exchange process as pictured to the right.

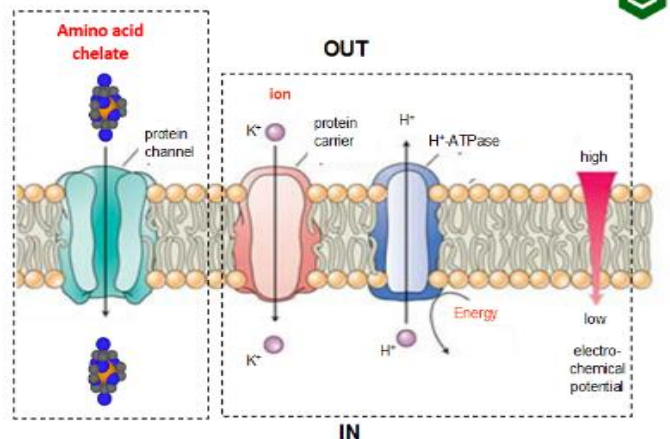


EDTA chelate structure

Leaf structure



ION UPTAKE THROUGH CELL PLASMA MEMBRANE

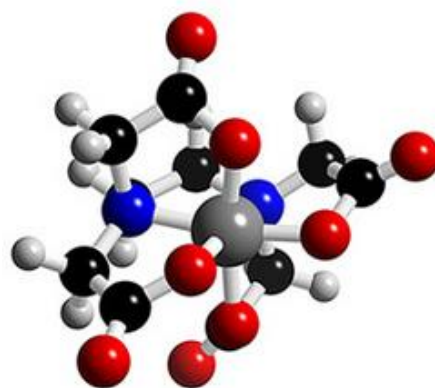


SENTINEL EDTA CHELATES PHYSICAL COMPATIBILITY



Wilchem's Sentinel Range of EDTA chelates is the most compatible of our offering of liquid micronutrient product lines. Key areas where there is benefit in using this product line over amino acid chelates or liquid sulfates are in tank mixes with one of the following products or applications –

- Highly alkaline soils
- Soluble phosphates
 - Polyphosphate
 - Orthophosphate
- 24D Amine
- MCPA Amine (when zinc is required)
- Glyphosate



The Sentinel Range should not be used in tank mixes in the presence of free calcium or potassium.

EDTA chelate structure

The liquid solutions manufactured by Wilchem can be combined in tank mixes with a range of commonly used plant protection products. It should not be assumed that every product is compatible with every other fertiliser or chemical. If there is any doubt about the proposed mixture then a simple jar test should be done as a precaution.

IMPORTANT

The above description is a guide to the physical compatibility of the Wilchem Sentinel micronutrient solutions. We cannot guarantee the chemical compatibility of two or more products when mixed together. Many herbicides, insecticides and fungicides are produced by more than one manufacturer. The concentration of active ingredients, solvents and emulsifiers and other adjuvants may vary between manufacturers. There may also be changes from year to year by the same manufacturer. It is important that jar testing be done first to ensure compatibility.

Use the following steps to do a jar test.

1. Pour the correct ratio of water to be used per hectare into a clean glass graduated jar.
2. Add each intended fertiliser or chemical to the water. Always start by adding the least soluble products first (such as the powders, granules and suspensions) and the ending with the clear aqueous solutions.
3. If there is any immediate visual reaction, do not proceed with the mixture. These reactions may result in some precipitation, a curdling of the mixture or even resulting in mixture heating and bubbling. If no visual reactions occur then the mixture is generally regarded as physically compatible.
4. The appearance of physical compatibility is not a guarantee that the mixture is chemically compatible and safe to apply to foliage.

Always ensure that the micronutrient solution is added last to the tank mix and agitation is continued.

It is recommended that a small trial area be sprayed and observed for 24 hours before spraying a larger area.

Disclaimer: All technical data and recommendations, whilst based on our research and believed to be reliable, are given in good faith but without warranty. It is understood that users will independently determine the suitability of content for their individual requirements.

Product Analysis Summary

Product g/Kg	Zinc	Manganese	Copper	Potassium	Nitrogen
Sentinel Zinc	145	-	-	173	-
Sentinel Manganese	-	125	-	177	-
Sentinel Copper	-	-	155	-	68
Sentinel ZMC	40	80	15	161	12
Sentinel MC	-	100	33	140	14


SENTINEL RANGE
SENTINEL MANGANESE
 EDTA Chelate
 125 g/Kg Manganese : 177 g/Kg Potassium
 Wettable Micro Granule (WG)



Crop Type	Application	Rate Kg/ha	Timing	Water (L/ha)
Cereals Cotton, Maize, Summer Crops	Foliar	0.25 to 1	Apply from early tillering through to booting or when symptoms occur	60 - 80
	Soil	1 to 3		
Canola	Foliar	0.25 to 1	Apply at bolting	60 to 80
Lucerne and Legumes, Pasture	Foliar	0.25 to 1	10 to 14 days prior to flowering	60 to 80
Vegetables	Foliar	0.5 to 1.5	Apply as needed from 3 weeks after crop emergence	600
	Fertigation	3 to 7		
Grapevines	Foliar	0.5 to 1	Apply 2 to 3 times per season, flower bud visible and flower bud separated	250
	Fertigation	2 to 3		
Tree crops	Foliar	0.5 to 1	Apply as required. Citrus apply at bud burst. Apples apply at fruit set.	600
	Fertigation	2 to 3		

POISON - Keep out of reach of children.
 FIRST AID - Avoid contact with eyes and skin. If poisoning occurs contact a doctor or poisons information centre on 131 126.

Wilchem's Sentinel Range has been formulated to protect micronutrients in solution to allow for the correction of nutrient deficiencies.

Compatibility: It is compatible with a wide range of crop protection products. It is stable in alkaline soils and in the presence of soluble phosphates. A jar test should be performed and/or test application before preparing a full tank mix.

Directions for use: Do not apply during periods of crop stress, extreme weather, flowering or fruit colour change. Ensure all other products are mixed in the tank before adding. Do not apply as foliar to stone fruit.

Pack Size
20KG

Batch Number

Any recommendations are a guide and must be adapted to suit local conditions. Adjust rates based on tissue tests, soil tests, local knowledge and the recommendation of your agronomist. Do not exceed a solution of 0.1% on fruit crops and 1% on broadacre crops.