

# English





### Technical Information Chelal® Zn: A high performant Zinc Chelate

From its creation, in 1979, BMS Micro-Nutrients always distinguished itself in the way it chelates micro-nutrients, or trace elements (B, Zn, Mn, Fe, Mo, Zn, Co). Although the product range has been changed and improved over the years, the products of BMS Micro-Nutrients maintained their competitive advantages in comparison with a lot of other products on the market. The chelated micro-nutrients range of BMS Micro-Nutrients, commercialized mainly under the Trade Mark, CHELAL, is still the most effective solution on the market to treat or avoid nutritional deficiencies of these essential nutrients in the plant.

In this document we will indicate the most important advantages of the our product range CHELAL. These will almost all apply to all the products within the Chelal range, but we use the product Chelal Zn as an example to demonstrate the different characteristics.

CHELAL the best performing micro-nutrient range on the market.

The products where this logo is indicated are authorized in organic production in accordance with EC-regulations 2018/848 and 2021/1165. Please check also national legislation.



# The Basics of plant nutrition

Most agricultural soils in the world contain sufficient total amounts of micro-nutrients. The most important reason, that deficiencies appear **IS NOT, the lack of the element in the soil, but the fact that it is NOT AVAILABLE.** 

Because plants can only absorb nutrients which are soluble in water, in order to increase the availability of a nutrient to the plant, we need to increase the solubility. This is exactly the reason why chelates are used. If we chelate for example Zinc, the chelated Zinc, will have completely different chemical characteristics, reducing the precipitation reactions which the "naked (not chelated) zinc" can have, keeping it soluble and thus plant available. In the drawing in this box it is represented schematically.





**Chelal® Zn** the most efficient solution & practical in use

### Advantages of the product

#### 1. Completely chelated product(s):

All the trace-elements (including Boron and Molybdenum) of the Chelal range of products of BMS Micro-Nutrients are completely chelated. In the case of **Chelal® Zn** this assures that all the applied Zinc can benefit from the advantages the protection of the chelating agents brings. Not chelated Zinc is not so stable and does not stay soluble for a long period of time, and is therefore not plant available. The complete chelatation of the product is clearly reflected in the specification mentioned on the label (cfr page 4 of this document).

#### 2. Chelated with 3 chelating agents:

As shown in the box below, all chelating agents have specific properties, each of them with specific advantages. By using the 3 chelating agents, we obtain a product stable in a very wide pH range. This has very important consequences on the way the product can be used:

- Soil applications: on almost all types of soils Chelal<sup>®</sup>Zn will stay available independently of the pH
- Foliar applications: independently of the pH of the xylem (acid) or the phloem (alkaline) it will stay soluble within these 2 main distribution systems of the plant. That is why it has a systemic effect on plant nutrition. The Zinc will be translocated to all parts of the plant in need of this element.

#### 3. Only synthetic chelating agents:

A lot of products based on organic materials are on the market as chelates. It is true that fulvic- and humic- acid, but also other organic materials can form chelates with trace elements. It has to be indicated though that the stability of these chelates in comparison to the synthetic ones is a lot lower and therefore not always sufficient

## Stability constants (log K) for some chelating agents with micro-nutrients

	Fulvic acids	Citric acid	Glycine	EDTA	DTPA
Co	4.1	5.8	5.3	17.3	20.4
Cu	4.3	6.7	8.2	19.7	22.6
Mn	3.7	4.5	3.9	14.8	16.8
Zn	3.7	5.6	5.2	17.5	19.5
Fe	-	12.3	-	26.5	29.9

#### 4. Miscibility:

Because of the high stability of the BMS Micro-Nutrients chelates, the products can often be applied together with most pesticides. This means that no extra or separate applications are necessary to apply for example Chelal<sup>®</sup> Zn, thus saving time and costs. However we recommend checking our compatibility list on our website: http://www.chelal.com/produkten.php:Mixability List. All the products of BMS Micro-Nutrients are compatible between them and can be mixed.



#### 5. Flexibility in the application:

BMS Micro-Nutrients developed all his products for foliar applications. But because of the stability of the chelates in Chelal<sup>®</sup> Zn, this product can be used also in early applications to the soil (for example in corn: Chelal Zn can be applied together with the herbicides in post emergence. At that moment a high percentage of the product reaches the soil, but will stay plant available).

Let me just remind you that **foliar treatment are always more efficient**, and that soil applications require a little bit higher dosage.

Chelal<sup>®</sup> Zn can be applied on its own as a treatment to control Zn-deficiency, or as part of a complete nutritional program.

The products of BMS Micro-Nutrients can be applied using any type of machine usually used for spraying fields, including airplanes and ultra-modern spraying equipment which recycles some of the spraying solution.

#### 6. Systemic efect of the application:

The complete chelatation, with 3 chelalting agents, assures that Chelal<sup>®</sup> Zn is completely absorbed and translocated inside the plant as well upwards in the xylem as downwards in phloem, making it a systemic product nourishing the whole plant. This makes the product a lot more efficient compared to not or partially chelated products. These traditionally only have effect on the nutrition of the leaves.

#### 7. Purity of the product and quality control:

BMS Micro-Nutrients, produces Chelal<sup>®</sup> Zn itself. This means that we have complete control over the way the product is made and which raw materials are used. We always try to make our products as pure as possible, avoiding as much as possible contaminations of Na, Cl and/or heavy metals. The "in-house" control of raw materials as well as the analysis of the finished product is done in our own lab in order to guaranty the highest possible quality. As part of our quality control we also implemented a system of traceability so that any problem can be detected early and rectified immediately.

#### 8. Bio production:

In general we can state that all EC Fertilizers made by BMS Micro-Nutrients and containing only micro-nutritients (as for example Chelal<sup>®</sup> Zn) are permitted in organic production. Other products containing also macro- and/or meso-nutrients are not permitted under these regulations. Please consult us if more information is needed.







# **ZINC CHELATES**

The definitions of chelates according to Morgan & Drew (1920) and Mellor (1964) are

- A chelate contains at least one heterocyclic ring formed by a "metallic or metalloid" atom and a bifunctional organic molecule
- A chelating molecule must have a minimum of two "hooks" oriented in such a way that heterocyclic ring-structures are formed.

Many different chelating agents exist, and all of them have their specific characteristics and properties. Here beside we find a graph with the evolution of the stability of the different Zinc chelates at different pHs. It is clear that some of them perform better at a certain pH then others. The use of different chelating agents in 1 single product Chelal<sup>®</sup> Zn will bring the advantage of these different chelating agent together creating a product with high stability in a very wide pH range (from acid to alkaline conditions).





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# **SPECIFICATIONS**

### Composition

STRAIGHT INORGANIC MICRONUTRIENT FERTILISER, Micronutrient chelate fertiliser, 7,0 % Zn (DTPA, EDTA, HEEDTA) Declared content: Micro-nutrient expressed as percentage by weight: 7,0 % zinc (Zn), as chelate (DTPA, EDTA, HEEDTA), water soluble of which chelated by DTPA, 1,3 % chelated by EDTA, 3,9 % chelated by HEEDTA, 1,8 % pH range guaranteeing acceptable stability of the chelate: between pH=4 and pH=10. Product low in chloride. To be used only where there is a recognised need. Do not exceed the appropriate dose rates.

### **Recomendations**

# The dosage of Chelal<sup>®</sup> Zn varies between 0,33 L/ha (as maintenance application) up to a maximum of 4 L per ha per crop cycle.

On most crops an application of 1-1,5 L per ha per crop cycle will be sufficient. For the recommendations on specific crops, please consult our nutritional programs.

Concentrations: Do not exceed the maximum concentration of 1 % (= 1 L  $^{\circ}$  Chelal $^{\circ}$  Zn in 100 L water). Maximum concentration in greenhouse : 0,5 % (= 500 cc in 100 L water).

For foliar applications avoid high temperatures and bright sunshine. Treat preferably during early morning or late evening.







### **Chelal® Zn High performing Zn chelate**

#### **Product Benefits**

- Highly stable product assuring high plant availability
- Flexibility at the moment of use: product if preferably used foliar but can also be used to the soil, in the drip irrigation.
- Because of its fast foliar absorption, the effect of the application is immediate.
- Thanks to its systemic effect it controls the Zinc deficiency in the whole plant and not only in the leaves.
- Effective in all type of circumstances
- Very good miscibility with pesticide: no supplementary costs to apply the product
- Liquid product easy to use and mix (completely soluble)
- Allowed in Bio-production (according to EU legislation)
  - Low Dosage
  - Highly Effective Production
  - Better Results
  - **Higher Yields**
  - Healthier plants

