

diary from diachem's world

discover



ORGANIC LIGAND TECHNOLOGY

OLT AND ZINC
AGAINST NUTRITIONAL DEFICIENCIES

OLT INSIDE: THE FANTASTIC 4

 DIACHEM®

OLT & Zinc against nutritional deficiencies

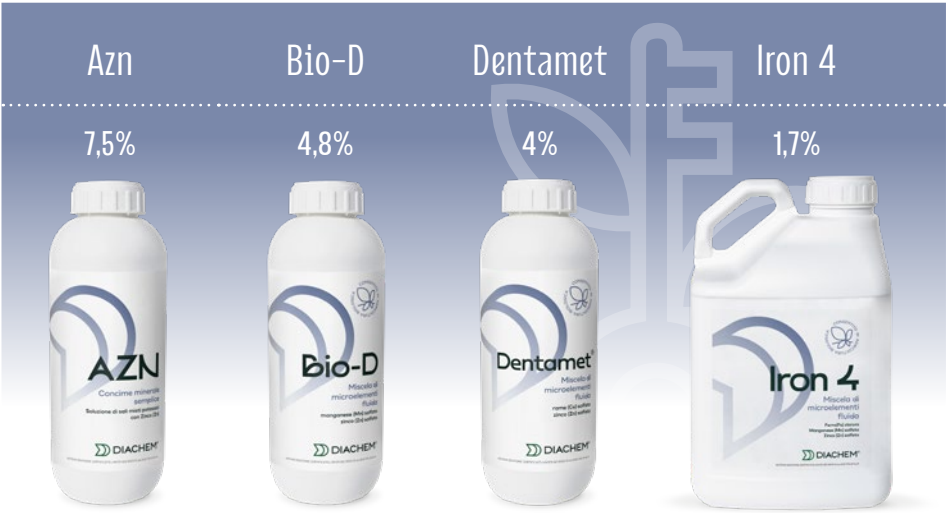
OLT namely Organic Ligand Technology. A proprietary formulation technology developed by Diachem that enables the complexation of micronutrients present in solution, ensuring a high level of biocompatibility and rapid assimilation into plant tissues

The Diachem integrated fertiliser line is based on this technology and includes Iron 4, Dentamet, AZN, and Bio-D.

In these products, micronutrients are carried by organic acids, which act as a “gateway” into the plant system and enhance high efficacy in the prevention and correction of nutritional deficiencies. In addition to OLT technology, all four formulations share the presence of zinc, albeit in different forms and concentrations (*Table 1*).

Roles of zinc in plants

The most important and well-known function of zinc in plants (*Table 2*) is the promotion of plant hormone synthesis, particularly auxins, thereby enhancing both vegetative growth and a balanced development of the root system. This results in an overall improvement of mineral and water nutrition, as well as the general health status of the plant. It also functions as a cofactor in a series of enzymatic reactions essen-



Tab. 1
Percentage zinc content in the four Diachem integrated fertilisers characterized by OLT technology.

tial for plant life. It is involved in both photosynthesis and respiration, exerting a positive effect on carbohydrate metabolism. It stimulates pigment biosynthesis. Furthermore, it promotes the synthesis of ascorbic acid (vitamin C), which protects cellular membranes against oxidative stress. When applied via foliar application, it may help mitigate phytotoxic effects induced by herbicide treatments. Foliar application can also alleviate the effects of water stress, as recently demonstrated in a study conducted by Indian researchers*.

*Shanker A.K. et al. (2024). Zinc nano and zinc ethylenediaminetetraacetic acid (EDTA) mediated water deficit stress alleviation in pearl millet (*Pennisetum glaucum* (L.) R. Br.): Photosystem II electron transport and pigment dynamics. *Plant Stress*, <https://doi.org/10.1016/j.stress.2024.100651>

Biochemical process	Function of Zinc
Auxin synthesis	Regulates cell growth and development
Enzymatic activity	Enzyme cofactor in metabolism
Chlorophyll synthesis	Indirectly involved
Membrane stabilization	Protects membranes from oxidative stress
Phytohormone metabolism	Regulates stress responses

Tab. 2
Main biochemical processes in which zinc is involved in plants.



Logo identifying the products OLT (Organic Ligand Technology).

When can zinc deficiency occur?

Although zinc is often present in cultivated soils in quantities sufficient to meet the requirements of most crops, under certain conditions its availability for root uptake is limited.

This occurs, for example:

- in alkaline pH soils
- in soils with low organic matter content
- in soils with a high montmorillonitic clay fraction
- due to antagonistic interactions with other nutrients, such as phosphorus



OLT inside: The Fantastic 4

Modern agriculture requires targeted and innovative solutions to ensure optimal crop development, satisfactory yields, and high-quality standards of harvested produce. Dentamet®, AZN, Iron 4, and Bio-D fully meet these requirements

The cropping context in which farmers operate today is increasingly difficult and challenging due to climate change and the unpredictable weather patterns characterising growing seasons. Springs that are often excessively rainy or marked by late cold spells are becoming almost the rule, with negative impacts on the onset or resumption of vegetative growth in both herbaceous and woody crops.

High temperatures, excessive radiation intensity, and abnormal rainfall distribution are the main components of the so-called summer multiple stress conditions, which can have significant negative impacts on both yield quantity and quality. More than ever, modern agriculture requires targeted and innovative solutions to ensure optimal crop development, satisfactory yields, and high-quality standards of harvested produce.

The integrated fertilisers Dentamet®, AZN, Iron 4, and Bio-D by Diachem, characterized by OLT technology and the presence of zinc in their formulations, fully meet these requirements.



AZN with Zinc and Potassium

AZN is a simple liquid mineral fertiliser for foliar applications, containing mixed potassium salts and zinc. Its specific formulation ensures high nutrient availability and rapid assimilation into plant tissues, enabling fast correction of deficiencies.

Potassium acts as a regulator of carbohydrate and protein metabolism, carbohydrate transport, and water balance, while also promoting anthocyanin synthesis. Zinc supports the development of young tissues and bud differentiation. AZN improves both the qualitative and quantitative characteristics of yields and enhances the physiological status of the plant, inducing greater tolerance to stress conditions.

Bio-D with Zinc and Manganese

It is a mixture of the micronutrients zinc and manganese, capable of rapidly correcting deficiency conditions, even in the most severe cases. Its efficacy is due to a specific formulation that enables fast translocation of the product and its micronutrients within the plant.

The dedicated formulation process ensures that the micronutrients are readily available. Approved for use in organic agriculture, it can be applied via foliar and/or soil application, remaining in the root zone for approximately two weeks.

This formulation ensures a high level of compatibility and rapid assimilation into plant tissues, thanks to its low molecular weight.



Dentamet with Zinc and Copper

Dentamet® is a product designed to improve the physiological status of crops and indirectly enhance plant performance, increasing resistance to environmental stresses. It contains a specific blend of micronutrients, including zinc and copper, complexed with organic acids. This ensures high micronutrient availability, together with excellent compatibility and rapid assimilation into plant tissues, also due to its low molecular weight. This results in a more effective and longer-lasting nutritional action. Approved for use in organic agriculture, it can be applied in combination with copper and sulfur.



Iron 4 with Zinc, Iron and Manganese

Iron 4 is a soil-applied fertiliser containing iron from chloride, zinc from sulphate and Manganese from sulphate, with a significant acidifying effect. It increases the availability of micronutrients that are poorly assimilated in alkaline soils and enhances their root uptake.

Although with different dynamics in herbaceous and woody crops, deficiencies of iron, manganese, and zinc-either individually or in combination-can impair vegetative growth, with negative consequences on both yield quantity and quality. Simultaneous deficiencies of the three elements are possible due to common predisposing factors, such as sub-alkaline or alkaline soil pH. In plants, iron is involved in chlorophyll synthesis and is essential for maintaining chloroplast function, where solar light energy is captured and converted into chemical energy. However, its role is not limited to this, as it is also fundamental for the functioning of a range of enzymatic systems, some of which are involved in respiration and therefore in energy production.





It is a highly abundant element in the lithosphere and is generally present in large amounts in cultivated soils; however, its bioavailability under sub-alkaline or alkaline pH conditions and in oxidative environments is limited. In such situations, iron is predominantly found in the Fe^{3+} form, which is characterised by extremely low solubility and is therefore unable to meet plant nutritional requirements, as plants preferentially absorb iron in the Fe^{2+} form.

The main visual symptom of iron deficiency in plants is iron chlorosis, i.e. interveinal leaf yellowing.

Manganese, which is essential for amino acid and chlorophyll synthesis, also plays a role as an electron carrier during photosynthesis.

For effective plant nutrition

Providing adequate nutrition to crops throughout all stages of the vegetative and reproductive cycle, and not only during periods of higher environmental stress risk, means not only ensuring the availability of nutrients at the precise moment when peak uptake occurs, but also biostimulating plants and enhancing their capacity to autonomously respond to extreme conditions.

For more information:

AZN

Always read the label and product information before use.
Pay attention to hazard statements.



BIO-D

Always read the label and product information before use.
Pay attention to hazard statements.



DENTAMET

Always read the label and product information before use.
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IRON 4

Always read the label and product information before use.
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we embrace agriculture

For over 70 years, we have been an Italian, family-owned company evolving alongside agriculture. Our mission is to create sustainable solutions for today's and tomorrow's agriculture. For this reason, we support farmers in their daily challenges, promoting more productive crops while respecting nature, and contributing to food security through continuous investment in research and innovation.

Improving and growing stronger, together, every day.



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