

YaraVita<sup>®</sup> PROCOTE<sup>®</sup>



# The colours of yield.



Knowledge grows



# Micronutrient Coating

**YaraVita® Procote® is an innovative liquid technology developed by Yara for coating prilled and granular fertilizers with micronutrients. It allows growers to reliably and accurately spread essential micronutrients to their growing crop. The micronutrients zinc, boron, copper, manganese and their combinations are available.**

## Made to measure

YaraVita® Procote® is a complete product range for production of high-quality, custom-blended fertilizers. It can be applied to a broad variety of fertilizer types. Liquid-based micronutrient suspension is sprayed in small quantities into the blending vessel. It completely coats every fertilizer granule, resulting in a dry, dust-free end product, free-flowing and ready to use.

## Essential nutrients

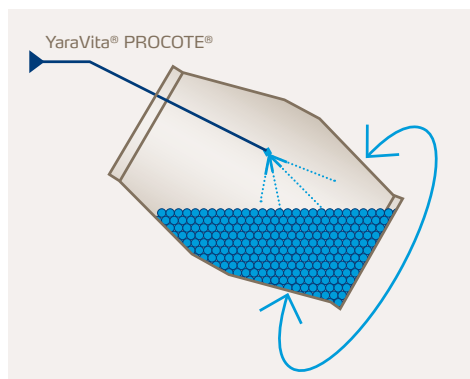
YaraVita® Procote® is a range of oil-based suspension concentrates of essential micronutrients.

-  **Zinc**
-  **Boron**
-  **Copper**
-  **Manganese**

These elements, as well as their combinations, are available.

## Low dust and micronutrient losses

Other coating technologies rely on micronutrient powders which can result in significant micronutrient loss due to dust off and segregation. YaraVita® Procote® offers a superior solution using Yara's proprietary, innovative liquid suspensions. Yara is able to eliminate micronutrient loss which ensures the farmer receives what he pays for.



*Figure 5: Illustration represents YaraVita® Procote® micronutrient coating process.*



## Hidden hunger

**Micronutrient deficiencies are widespread but remain mostly undetected. Steadily increasing crop yields further deplete soil micronutrient levels and can limit the growth and development of crops. This is often referred to as “hidden hunger”. Adequate micronutrient supply limits the effect of hidden hunger.**

### Essential micronutrients

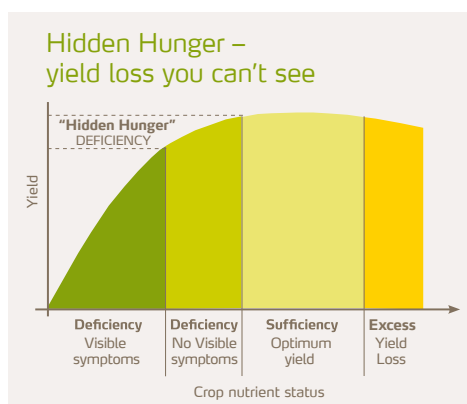
Micronutrients are essential for plant growth and health. Though these are required only in small quantities, they can make a big difference. Most farmers apply micronutrients only when symptoms appear. However, yields decrease long before symptoms appear.

- Zinc is the most important micronutrient, commonly limiting yield. Zinc influences chlorophyll formation and also activates

many enzymes. Symptoms of zinc deficiency include chlorosis and stunted growth.

- Boron affects cell membrane stability. It is involved in carbohydrate production and transport in plants and assists in metabolic regulation of other nutrients. Boron deficiency often results in inhibited growth.
- Manganese activates important enzymes involved in chlorophyll formation and photosynthesis. Manganese-deficient plants will develop chlorosis between the veins of their leaves. The availability of manganese is partially dependent on soil pH.
- Copper is a component of enzymes. Symptoms of copper deficiency include browning of leaf tips and chlorosis.

Since small quantities make a big difference, micronutrient deficiencies vary greatly, even within a single field.





## Even supply

Crops require micronutrients in small quantities. Minor variations in blending and spreading accuracy, combined with variations in granule size and density, reduce the farmer's ability to spread micronutrients evenly and accurately to the growing crop. Micronutrient coating ensures even micronutrient supply with each single fertilizer granule.

### The problems associated with micronutrient blends

Traditional micronutrient blends contain only a few micronutrient granules per thousand granules. Spreading a zinc sulfate/urea blend at a rate of 0.25 % zinc, for example, results in only 4 zinc granules per square yard on average. The micronutrients need to be accessible by all plants, but only some roots are reached. Segregation of granules during transportation and application further increase variations in spreading accuracy. Increased application rate cannot compensate for uneven spreading.

### Micronutrient coating

Micronutrient coating ensures every single fertilizer granule carries a thin coating of micronutrients. Procoted fertilizer provides an even supply of macro- and micronutrients over the whole field. Compared to the blend, all plants receive an equal supply of micronutrients resulting in significantly improved plant availability.

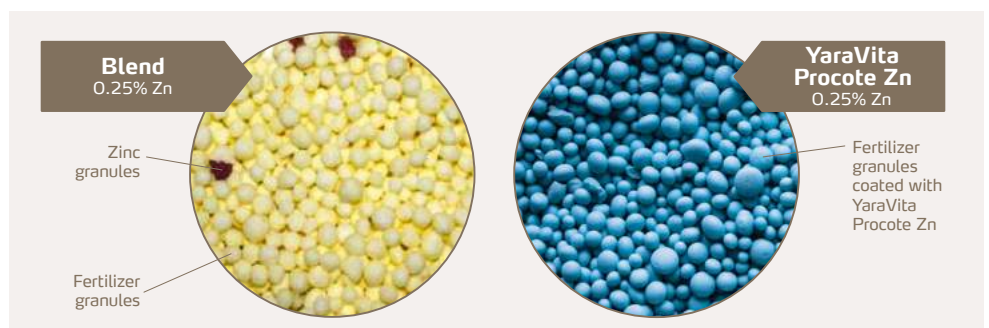


Figure 1: A blend contains only a few micronutrient granules (left). At identical concentration, micronutrient coating covers each individual granule with a thin layer of micronutrients (right).



# Micronutrient efficiency

The more even the supply of micronutrients, the easier it is for plant roots to reach these nutrients. Micronutrient uptake is therefore more efficient with even supply.

## Even application – improved performance

Spreading fertilizer with a micronutrient coating guarantees accurate application of the micronutrient and reduces uneven distribution across the field. Coating ensures that every plant receives adequate micronutrients, which ensures optimum plant efficiency.

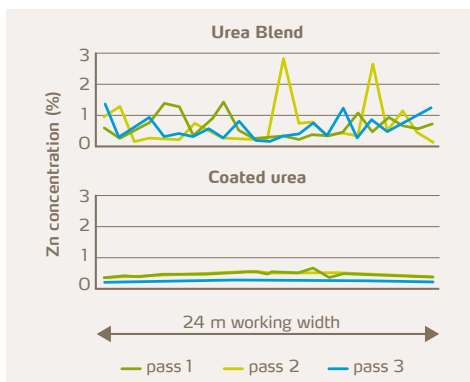


Figure 2: Spreading of micronutrient-coated fertilizer ensures a steady concentration of micronutrients across the entire working width of the spreader.

## Higher uptake

Plant roots need to reach available micronutrients. Micronutrient coating enhances plant availability and lower concentrations are required to cover plant needs.

Better uptake efficiency leads to higher yield.

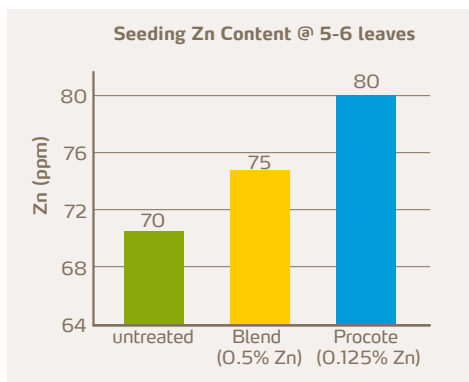


Figure 3: The zinc uptake of corn leaves is 7% higher when zinc is applied as a coating than with traditional blends, despite a much lower zinc concentration.

Field trials with spring wheat have consistently demonstrated superior performance of micronutrient coatings when compared to traditional blends of micronutrients. With 4 times less copper applied, the micronutrient coating significantly outperformed blends, providing a superior return on investment.

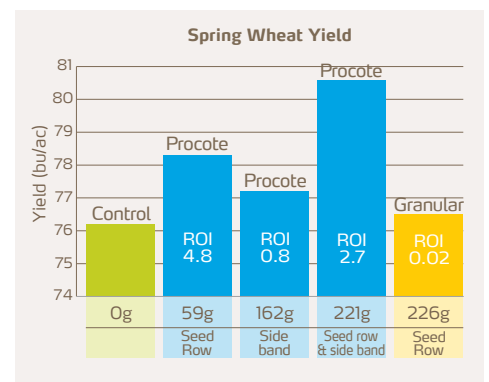


Figure 4: Wheat yield varies considerably depending on how copper was applied. Procote outperformed blended copper application, even with four times lower copper concentrations.



## Knowledge grows

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# YaraVita<sup>®</sup> PROCOTE<sup>®</sup>

## Yara's new micronutrient coating technology:

- ✓ ensures even micronutrient supply with each fertilizer granule
- ✓ enhances micronutrient efficiency and crop performance
- ✓ reduces dust and losses compared to powder coatings
- ✓ provides high-efficiency micronutrients including Zn, B, Mn, Cu and their combinations.
- ✓ prevents micronutrient deficiencies and improves yield

**YaraVita<sup>®</sup> PROCOTE<sup>®</sup> is produced by Yara, the world's leading fertilizer brand.**



## About Yara

Yara's knowledge, products and solutions grow farmers', distributors' and industrial customers' businesses profitably and responsibly while nurturing and protecting the earth's resources, food, and environment.

Founded in 1905 to solve emerging famine in Europe, Yara has a worldwide presence with more than 12,000 employees and sales to more than 150 countries.