



Knowledge grows

YaraVita[®] PROCOTE[®]

The colors of yield.



The Technology



Stewardship, sustainability, and efficiency are essential to help feed the world. We must change how we grow a bushel of corn, a bale of cotton, a bag of potatoes, a ton of forage...

YaraVita PROCOTE offers three main benefits:

- Ensures even micronutrient supply with each fertilizer granule.
- Enhanced micronutrient efficiency, crop performance, and improves yield.
- Easily applied, saving time and resources.

Features:

- Liquid-based suspension - specific for this application
- High concentration of the element
- Color coating- visual
- Free flowing to prevent bridging in the planter

Benefits:

- Uniform coverage- even distribution
- Dust suppression
- Ease of handling- color identification
- Low application rates
- Agronomic efficiency- field crop response
- Better yield

YaraVita PROCOTE Overview

YaraVita PROCOTE is Yara's innovative range of liquid suspension fertilizer coatings. YaraVita PROCOTE ensures growers can reliably and accurately spread an even distribution of essential micronutrients on their growing crops; enhancing micronutrient efficiency, crop yield and quality. Fertilizer blenders will find YaraVita PROCOTE easy to use due to its benefits of significantly reduced dust and losses. 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 liquid suspension concentrates of essential micronutrients.



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.

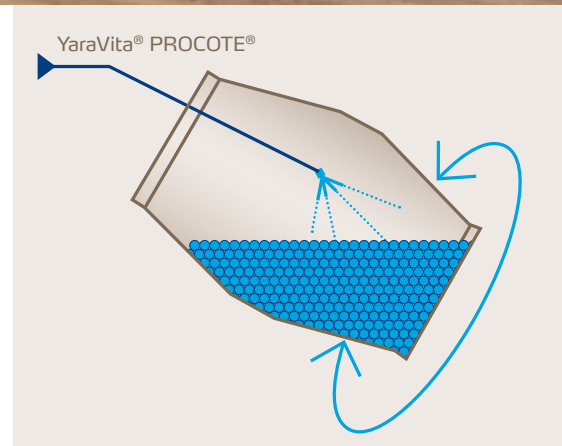


Illustration represents YaraVita PROCOTE micronutrient coating process.



For easy application, YaraVita PROCOTE is simply sprayed in the blender via a pumping system which requires no bags and is virtually dust-free. In fact, YaraVita PROCOTE reduces dust and associated losses by up to 32% compared to powder coatings; improving working conditions and ROI.

The Science

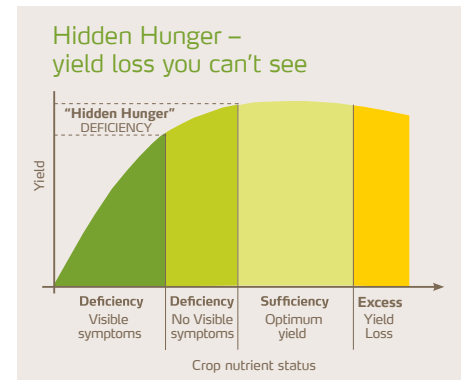
Hidden hunger

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

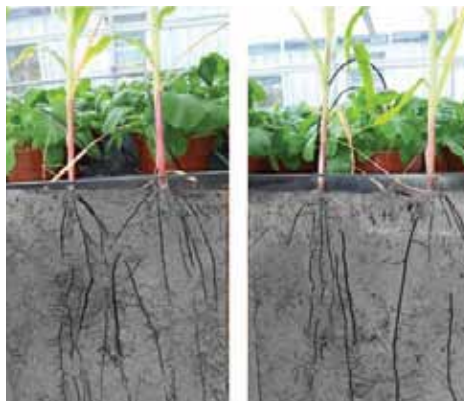
Crops require micronutrients in small quantities. Minor variations in blending and spreading accuracy, combined with variations in granule size and density, reduce the farmer's ability to spread micronutrients evenly and accurately to the growing crop. Micronutrient coating ensures even micronutrient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



YaraVita PROCOTE Zn Control - low Zn
1.12 lbs Zn/a



YaraVita PROCOTE Zn Control - low Zn
1.12 lbs Zn/a



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1.12 lbs Zn/a

Micronutrient coating

Micronutrient coating ensures every single fertilizer granule carries a thin coating of micronutrients. Procoated 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.

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.

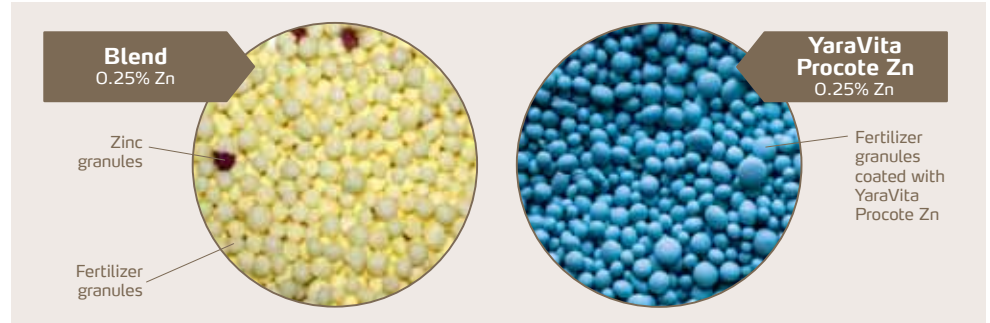
Micronutrient efficiency

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.

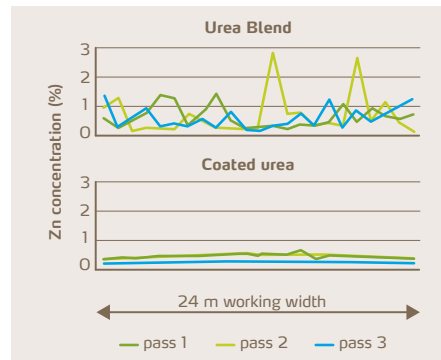
Higher uptake

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.

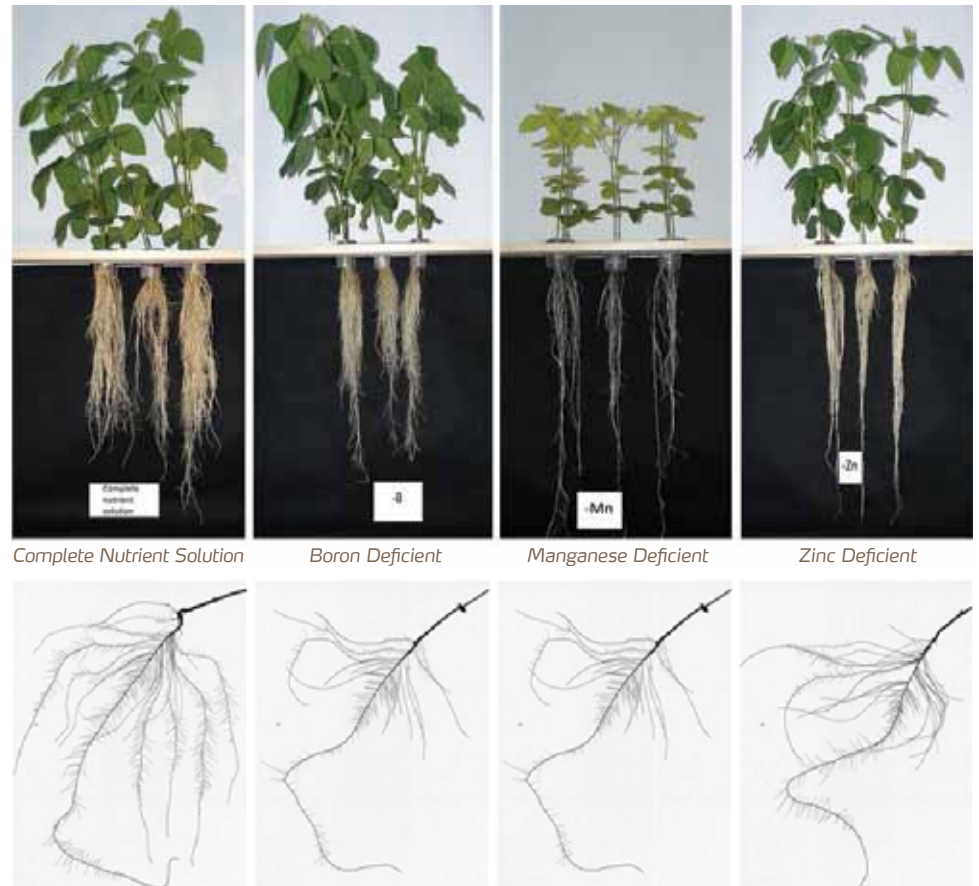
Field trials with spring wheat have consistently demonstrated superior performance of micronutrient coatings when compared to traditional blends of micronutrients. With 4 times less copper applied, the micronutrient coating significantly outperformed blends, providing a superior return on investment.



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).



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



Complete Nutrient Solution

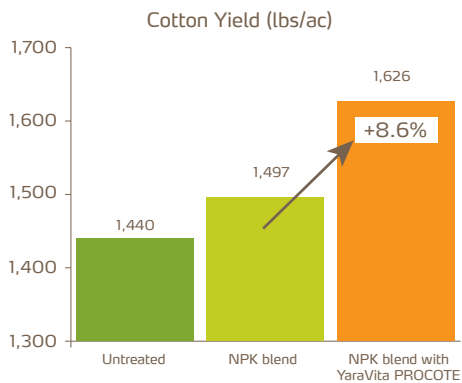
Boron Deficient

Manganese Deficient

Zinc Deficient

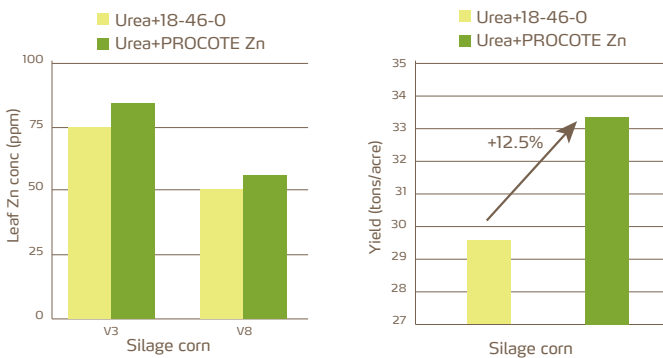
The Research

Better distribution means better crop response and yield



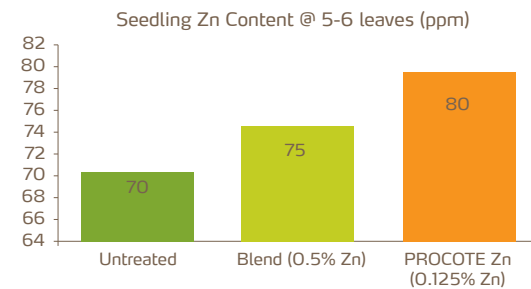
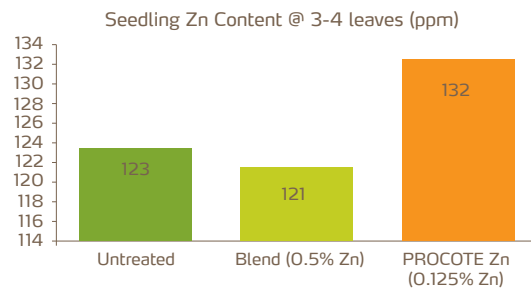
Independent replicated field trial conducted at the University of Georgia, USA

YaraVita PROCOTE Zn corn study Washington, 2013



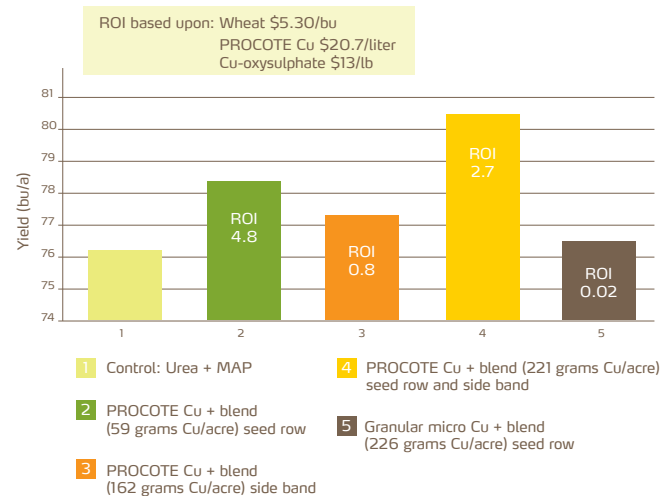
For the latest trial results and research, visit:
www.nachurs.com/research

Better efficiency means less active ingredient is required



Field trial conducted by Yara at the Hannigh of Research Station, Germany on corn

Spring wheat study - Minto, Manitoba, 2013



Urea applied @ 185 lb/acre • MAP applied @ 85 lb/acre

YaraVita[®] PROCOTE[™] BCMZ

Liquid-based suspension concentrate with B, Cu, Mn and Zn for fertilizer coating.

Typical Analysis	
Boron (B)	3.6% (nutrient content per gallon = 8 oz B)
Copper (Cu)	6.0% (nutrient content per gallon = 13 oz Cu)
Manganese (Mn)	6.0% (nutrient content per gallon = 13 oz Mn)
Zinc (Zn)	12.0% (nutrient content per gallon = 27 oz Zn)
Appearance	Brown oil based suspension concentrate
Solubility	Insoluble in water
Typical pH	7
Typical Density	223 oz per gallon
Freezing Point	< 18 °F
Viscosity	4500 - 5500 cps.

YaraVita[®] PROCOTE[™] B

Liquid-based suspension concentrate with boron for fertilizer coating.

Typical Analysis	
Boron (B)	7.1% (nutrient content per gallon = 13 oz)
Appearance	Blue oil based suspension concentrate
Solubility	Insoluble in water
Typical pH	7-8
Typical Density	189 oz per gallon
Freezing Point	< 18 °F
Viscosity	1700 - 2700 cps at 68 °F.

YaraVita[®] PROCOTE[™] Mn

Liquid-based suspension concentrate with Mn for fertilizer coating.

Typical Analysis	
Manganese (Mn)	29% (nutrient content per gallon = 4 lb 2 oz)
Appearance	Green-Blue oil based suspension concentrate
Solubility	Insoluble in water
Typical pH	7
Typical Density	230 oz per gallon
Freezing Point	< 18 °F
Viscosity	5000 - 6000 cps.

YaraVita[®] PROCOTE[™] BMZ

Liquid-based suspension concentrate with B, Mn and Zn for fertilizer coating.

Typical Analysis	
Boron (B)	3.8% (nutrient content per gallon = 8 oz B)
Manganese (Mn)	6.3% (nutrient content per gallon = 13 oz Mn)
Zinc (Zn)	12.7% (nutrient content per gallon = 1 lb 10 oz Zn)
Appearance	Off-White oil based suspension concentrate
Solubility	Insoluble in water
Typical pH	7
Typical Density	211 oz per gallon
Freezing Point	< 18 °F
Viscosity	4500 - 5500 cps at 68 °F.

YaraVita[®] PROCOTE[™] Cu

Liquid-based suspension concentrate with Cu for fertilizer coating.

Typical Analysis	
Copper (Cu)	31.3% (nutrient content per gallon = 60 oz Cu)
Appearance	Red-Brown oil based suspension concentrate
Solubility	Insoluble in water
Typical pH	7
Typical Density	213 oz per gallon
Freezing Point	< 18 °F
Viscosity	3500 - 4500 cps.

YaraVita[®] PROCOTE[™] Zn

Liquid-based suspension concentrate with zinc for fertilizer coating.

Typical Analysis	
Zinc (Zn)	42.6% (nutrient content per gallon = 5 lb 13 oz)
Appearance	Blue oil based suspension concentrate
Solubility	Insoluble in water
Typical pH	8-9
Typical Density	219 oz per gallon
Freezing Point	< 18 °F
Viscosity	2000 - 3000 cps at 68 °F



Knowledge grows

Contact us today to learn about how to maximize yield and increase profitability with the best fertilizer technologies on the market.

What if your crops could communicate?

They would ask for YaraVita PROCOTE

- Innovative range of oil suspension micronutrient coatings for dry fertilizer.
- Provides even distribution of the micronutrient while virtually eliminating fertilizer dust.
- Most efficient form of micronutrients versus granular or powder coatings.

Visit us online: www.nachurs.com/procote
or call: 800.622.4877 x 255

