PERFORMANCE NUTRITION™

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Worm Castings & Extracts

Krystal Klear®

chelated Micronutrients

for turf & ornamentals

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- *Excellent in Tank-Mixes*
- *Effective in a wide range of pH*
- *Formulated with Baypure®*

Krystal Klear® patented Chelated Micronutrient Solutions **Soil** and **Aerial** Application Information

Soil Applications: Krystal Klear patented chelated micronutrient solutions are recommended for use on all types of soils. Dilute before use to ensure uniform coverage. The product can be incorporated into liquid fertilizers or applied separately. Soil applications may be made by drip, sprinkler or band application.

Soil Application Rates

If you do not have a soil or leaf analysis then apply at the following rates

Maintenance Application	*1 quart per acre*
Moderate Deficiency Rate	*2-3 quarts per acre*
High Deficiency Rate	*4 quarts per acre*

Aerial Applications: Consult your local agronomist for aerial application rates and dilutions

GENERAL MIXING INSTUCTIONS

Tank Mixes: Do not mix with pesticides or other chemicals without a compatibility test. An adequate test for compatibility involves mixing in a small container the proper proportions of the product with water and the other ingredients. Agitate and let stand for one hour. If a precipitate forms, then apply the product separately.

Krystal Klear patented chelated micronutrient solutions will disperse in water with little or no agitation. Many pesticides can be applied with Krystal Klear. *Follow this mixing sequence: Water, Krystal Klear and pesticide.*

Tank Buffering: Water with a pH greater than 6 may diminish pesticide efficacy by way of alkaline hydrolysis. Nutol®, a registered buffer, may be used to lower and maintain the pH of a spray tank and improve application efficacy.

KRYSTAL KLEAR IS GREEN!

Krystal Klear patented chelated micronutrient solutions are formulated with biodegradable **Baypure**® from Lanxess Chemical.

- **Baypure** biodegrades within 72 hours….unlike others that persist in the soil and can mobilize heavy metals into water supplies.
- **Baypure** is a very effective chelating agent. This enables Krystal Klear micronutrients to work at much lower rates than many competitive products, and reduces the volume of chemical inputs entering the ecosystem.

We are not the only ones that feel this way. The US National Academy of Science acknowledged Baypure's contribution to a greener world by declaring it the **winner** of the **2001 Green Chemistry Challenge**!

Krystal Klear patented chelated micronutrient solutions are unique in composition, versatility and performance.

Krystal Klear patented chelated micronutrient solutions are **stable** in solutions and soils in a **wide range of pH**. They are very **effective at pH's normally encountered (5 - 8).**

Krystal Klear patented chelated micronutrient solutions are **orthophosphate and polyphosphate compatible** so they can be applied with water-soluble fertilizers.

Krystal Klear patented chelated micronutrient solutions **offer exceptional tank-mix compatibility** with other fertilizers and pesticides**, saving time and costs** of making separate applications.

Krystal Klear patented chelated micronutrients **are more available than other chelated metals** so they provide quick deficiency corrections. **Krystal Klear** patented chelated micronutrient solutions have a low affinity for calcium so they will not induce calcium deficiencies.

Krystal Klear patented chelated micronutrient solutions are ideal for use in fertility programs for crops grown from RoundUp™ Ready seeds.

KRYSTAL KLEAR IS VERSATILE!

- Blends easily with fertilizer solutions and pesticide tank mixes.
- Compatible with ortho- and poly- phosphates.
- Effective in water & soil pH of 3 through 11.
- Suitable for soil, foliar and hydroponic applications.

KRYSTAL KLEAR CONTAINS M.E.A. **as a surfactant, and more**

M.E.A. is a natural substance found in all living organisms. Also a surfactant, M.E.A. gently penetrates the cuticle of the leaf and accelerates nutrient uptake through the leaf.

M.E.A. compounds are part of the Systemic Acquired Resistance pathway in plants.

M.E.A. is part of the pathogen recognition response, and, helps regulate lesion formation (which naturally occurs when a plant is trying to contain infection in cells)

Micronutrients are essential for your growing needs.

Supply micronutrients when needed, as needed!

The Baypure Difference

Krystal Klear *patented chelated micronutrient solutions are custom formulated utilizing a "dual-chelation" system to maximize the strengths of both EDTA and Baypure.*

As a result, Krystal Klear patented chelated micronutrient solutions are stable in the jug, effective at lower rates, offer excellent tank mix capabilities and deliver optimal nutrient uptake.

Boron

Boron helps in cell synthesis—important for plant growth.

Boron mediates lignification – important in self-defense against pathogens and injury.

Boron mediates Phenol Metabolism.

Copper

Copper is essential for growth and activates many enzymes.

Copper detoxifies free radicals produced in photosynthesis.

Iron

Iron is essential for the synthesis of chlorophyll.

Iron enhances disease resistance in plants.

Manganese

Manganese activates enzymes for amino acid production.

Manganese protects against free radicals.

Manganese activates enzymes for hormone production.

Zinc

Zinc is essential for maintenance of protein synthesis.

Zinc is needed for the synthesis of auxin.

Zinc is required for membrane integrity.

Krystal Klear®

Arbor Mix

Krystal Klear Arbor Mix is a patented chelated micronutrient solution with **3% Fe, 1.0% Mn, 0.25% Cu, 0.25% B and 0.25% Zn.**

Trees, Shrubs & Ornamentals: Initial application should be made at rate of 1.0 gallon of Krystal Klear Arbor Mix per 100 gallons of spray solution.

Subsequent applications should be made at a rate of 0.5 gallon per 100 gallons of spray solution as needed.

Apply 0.5 gallons of spray solution per diameter inch.

When foliar spraying Krystal Klear Arbor Mix in low volume equipment, a maximum of 1 quart per acre is recommended.

The above amount can be split into several applications. Split applications are more beneficial than a single application.

WARNING: Some crops may be injured by the application of Boron. Contact your county agent or field representative before making application.

Krystal Klear®

ResQ

Krystal Klear ResQ 8-0-2 is a patented fertilizer with **2% Fe, 0.5% Mg, 0.5% Mn, 0.25% Cu, 0.25% B and 0.25% Zn chelated micronutrients** plus kelp extracts.

Turf: Apply 3 to 6 ounces per 1,000 ft^2 (1 - 2 gallons per acre) every 7 to 14 days throughout the growing season.

Trees, Shrubs & Ornamentals: Apply 1 gallon of Krystal Klear ResQ per 100 gallons of spray solution. Apply as needed throughout the growing season.

When foliar spraying Krystal Klear ResQ through a conventional sprayer, use a minimum of 20 gallons of water per acre, per quart of Krystal Klear.

For best results, spray when plants are in an active growing stage after irrigation or rainfall. Spray early mornings or late afternoons.

The above amount can be split into several applications. Split applications are more beneficial than a single application.

WARNING: Some crops may be injured by the application of Boron. Contact your county agent or field representative before making application.

Krystal Klear®

Turf Mix

Krystal Klear Turf Mix is a patented chelated micronutrient solution with **3% Fe, 1.0% Mn, 0.25% Cu, 0.25% B and 0.25% Zn.**

Turf: Apply 0.75 - 2 oz per 1,000 ft^2 (1 - 2.75 quarts per acre) every 2 weeks.

When foliar spraying Krystal Klear Turf Mix through a conventional sprayer, use a minimum of 20 gallons of water per acre, per quart of Krystal Klear Turf Mix.

When foliar spraying Krystal Klear Turf Mix in low volume equipment, a maximum of 1 quart per acre is recommended. In low volume sprays with little water, burning may occur.

The above amount can be split into several applications. Split applications are more beneficial than a single application.

WARNING: Some crops may be injured by the application of Boron. Contact your county agent or field representative before making application.

Krystal Klear B

Krystal Klear B is a patented chelated micronutrient solution containing **5% B.**

Turf: Apply 0.75 to 1.50 ounces per 1,000 ft^2 (1 - 2 quarts per acre) each spray.

Krystal Klear B can be incorporated into the normal spray program.

Start applications in early spring, and repeat every 14-21 days.

The above amount can be split into several applications. Split applications are more beneficial than a single application.

WARNING: Some crops may be injured by the application of Boron. Contact your county agent or field representative before making application.

Krystal Klear Cu

Krystal Klear Cu is a patented chelated micronutrient solution containing **5% Cu.**

Turf: Apply 0.35 to 0.75 ounces per 1,000 ft^2 (1/2 - 1 quart per acre) each spray.

Krystal Klear 5% Cu can be incorporated into the normal spray program.

Start applications in early spring, and repeat every 14-21 days.

The above amount can be split into several applications. Split applications are more beneficial than a single application.

Krystal Klear Fe

Krystal Klear Fe is a patented chelated micronutrient solution containing **4% Fe**.

Turf: Apply 0.75 to 2 ounces per 1,000 ft^2 (1 – 2.75 quarts per acre) each spray.

Krystal Klear Fe can be incorporated into the normal spray program.

Start applications in early spring, and repeat every 7-21 days.

The above amount can be split into several applications. Split applications are more beneficial than a single application.

Krystal Klear Mn

Krystal Klear Mn is a patented chelated micronutrient solution containing **5% Mn**.

Turf: Apply 0.35 to 0.75 ounces per 1,000 ft^2 (1/2 - 1 quart per acre) each spray.

Krystal Klear Mn can be incorporated into the normal spray program.

Start applications in early spring, and repeat every 14-21 days.

The above amount can be split into several applications. Split applications are more beneficial than a single application.

Krystal Klear Zn

Krystal Klear Zn is a patented chelated micronutrient solution containing **9% Zn**.

Turf: Apply 0.35 to 0.75 ounces per 1,000 ft^2 (1/2 - 1 quart per acre) each spray.

Krystal Klear Zn can be incorporated into the normal spray program. Start applications in early spring, and repeat every 14-21 days.

The above amount can be split into several applications. Split applications are more beneficial than a single application.

Only Krystal Klear with Baypure says Yes! to all your chelated micronutrients needs!

Baypure vs. Other Chelating Agents					
Options	**Baypure**	**EDTA**	**DTPA • HeEDTA EDDHA**	**Citric Acid**	**Glucoheptonate**
Stable at pH =/< 6	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Effective at pH > 6	**Yes**	**No**	**Yes**	**No**	**No**
Can be soil applied	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Can be foliar applied	**Yes**	**Yes**	**No**	**Yes**	**Yes**
Biodegradable	**Yes**	**No**	**No**	**Yes**	**Yes**
Ortho-Phosphate Compatible	**Yes**	**Yes**	**Yes**	**No**	**No**
Economical	**Yes**	**Yes**	**No**	**Yes**	**Yes**

Stability Constants Comparisons		
Cation	**EDTA**	**Baypure**
Cu^{+2}	18.9	18.8
Mn^{+2}	14	8.11
Fe^{+3}	25.1	16.1
Fe^{+2}	14.3	15.5
Ca^{+2}	10.7	6.7
Mg^{+2}	8.8	6.0
Zn^{+2}	16.5	15.41

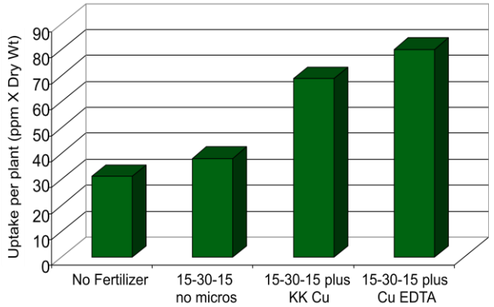
Table Above: ***Krystal Klear*** *patented chelated micronutrient solutions are custom formulated utilizing a* ***"dual-chelation"*** *system to maximize the strengths of both EDTA and Baypure.*

As a result, Krystal Klear patented chelated micronutrient solutions are stable in the jug, effective at lower rates, offer excellent tank mix capabilities and deliver optimal nutrient uptake.

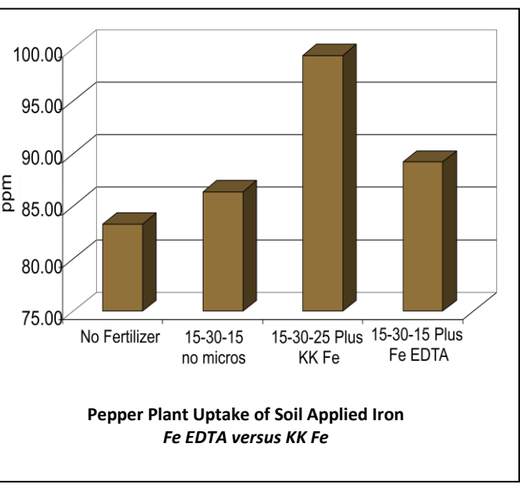
Case Study 1, Root Uptake by Pepper Plants (*as indicator crop*):

In this case study, we compared the root absorption of Cu, Fe, Mn and Zn when applied to the soil with a standard water-soluble 15-30-15. We also compared the difference between using EDTA chelated micronutrients vs. using Krystal Klear micronutrients chelated with our patented ***dual-chelation system***.

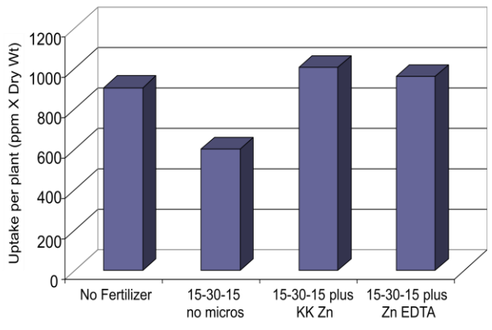
This study confirmed similar performance by EDTA chelated micronutrients vs. Krystal Klear dual chelated micronutrients with one major exception. The uptake of Krystal Klear Fe by the roots was significantly higher than Fe EDTA.



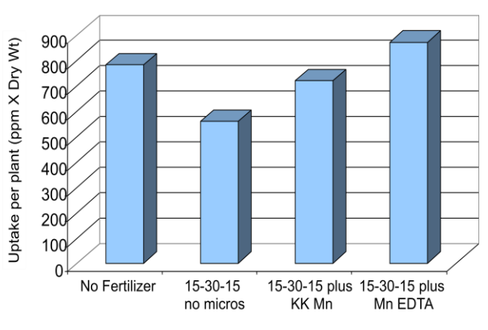
Pepper Plant Uptake of Soil Applied Copper
Cu EDTA versus KK Cu



Pepper Plant Uptake of Soil Applied Iron
Fe EDTA versus KK Fe



Pepper Plant Uptake of Soil Applied Zinc
Zn EDTA versus KK Zn



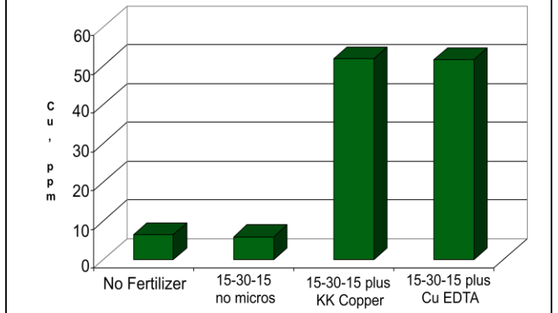
Pepper Plant Uptake of Soil Applied Manganese
Mn EDTA versus KK Mn

Case Study 2, Foliar Uptake by Tomato Plants (*as indicator crop*):

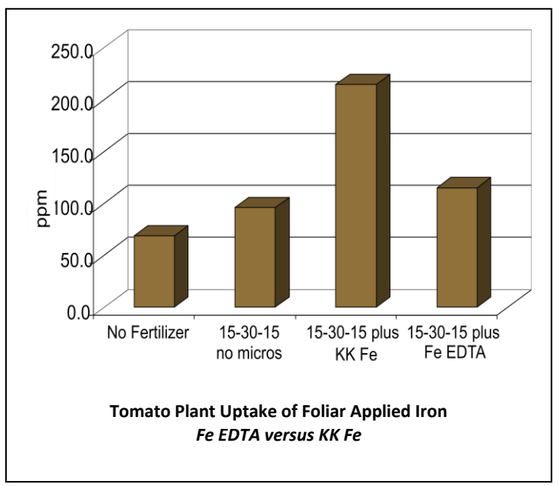
In this case study, we compared the foliar uptake of Cu, Fe, Mn and Zn when foliar applied with a standard water-soluble 15-30-15.

We also compared the difference between using EDTA chelated micronutrients vs. using Krystal Klear micronutrients chelated with our patented ***dual-chelation system***.

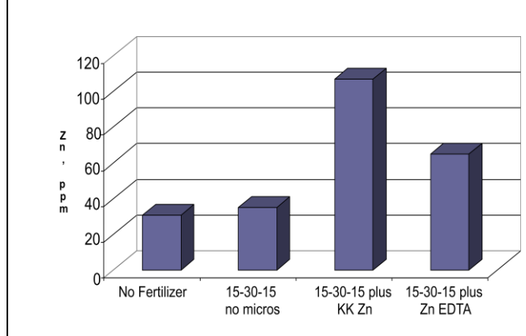
This study confirmed that Krystal Klear patented chelated micronutrients performed better than EDTA chelated micronutrients. Foliar uptake of Krystal Klear Fe was significantly higher than Fe EDTA.



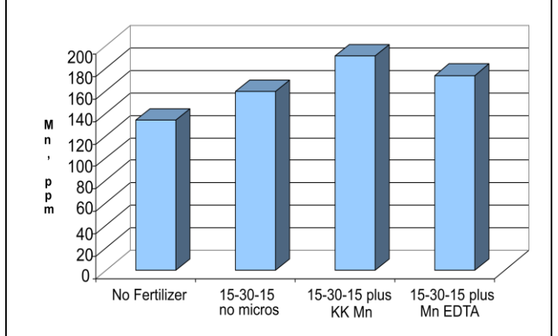
Tomato Plant Uptake of Foliar Applied Copper
Cu EDTA versus KK Cu



Tomato Plant Uptake of Foliar Applied Iron
Fe EDTA versus KK Fe



Tomato Plant Uptake of Foliar Applied Zinc
Zn EDTA versus KK Zn



Tomato Plant Uptake of Foliar Applied Manganese
Mn EDTA versus KK Mn