

Micro Site Enhanced Technology How it Works

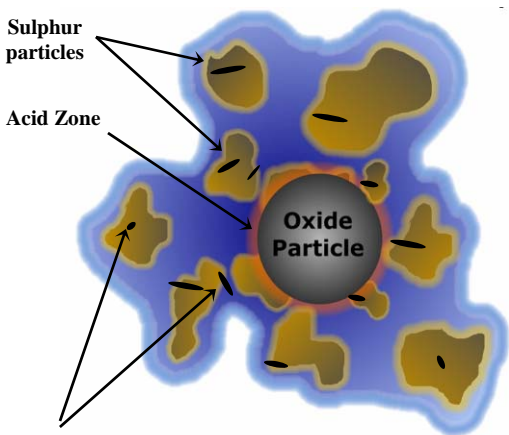


TIGER MICRONUTRIENTS® fertilizers began in the lab in Calgary, Canada, where Tiger-Sul Products tested the theory of taking extremely fine metal oxide particles, and incorporating them into a conversion matrix. This provides uniform distribution and quick conversion to the plant available sulphate form. The result - the development of **TIGER MICRONUTRIENTS® fertilizers** as a new class of micronutrients that produce sulphuric acid in the vicinity of the micronutrient sulphur matrix. “Micro Site Enhanced Technology” greatly improves the performance of granular micronutrient sources. **TIGER MICRONUTRIENTS® fertilizers** are granular fertilizers made from embedding a high analysis pure oxide micronutrient source into the **TIGER 90 CR®** sulphur matrix. Each pastille contains thousands of tiny metal oxide particles per pastille (split pea fertilizer granule). Swelling agents fracture the pastille and disperse the particles when it comes into contact with soil moisture. As the particles disperse, the micronutrients are exposed to the sulphuric acid that is formed by soil microbes converting the **TIGER 90 CR®** sulphur to sulphate (Sulphuric acid -H₂SO₄). The oxide micronutrient form is converted from the insoluble oxide form to the soluble, plant-available sulphate form during the growing season, minimizing the loss or tie up of the micronutrient typically associated with sulphate micronutrients.

The Benefits

- **Uniform distribution** of a finely divided metal oxide spread uniformly to provide optimum number of feeding sites for plant roots. *One of the greatest limiting factors is root - nutrient interception.*
- **Season long conversion** to the plant available sulphate form for optimum uptake, maximum yield and quality response.
- **Improved environmental benefits** with resistance to leaching and setting new standards minimizing the “heavy metal” content of the micronutrient.

Bentonite Sulphur Micronutrients “Micro Site Enhanced Technology”





Thiobacilli — soil microbes that exist naturally in our soils, feed off the **TIGER 90 CR® sulphur** and produce sulphuric acid.

Solubility - Enhanced by **TIGER 90 CR® Sulphur**

The matrix contains the micronutrient and **TIGER 90 CR®** sulphur matrix that not only quickly degrades and disperses, but also enhances the rate at which the soil microbes (thiobacilli) oxidize the sulphur to sulphuric acid. Since this sulphuric acid is produced in the immediate vicinity of the micronutrient oxides, they react together to convert to plant available metal sulphates — in a conversion that happens quickly and throughout the growing season.

| | | |
|-------------------------------------|---|-----------------------------|
| Sulphur + Air + Water + Thiobacilli | → | Sulphuric Acid |
| Metal oxide + Sulphuric Acid | → | Metal Sulphate |
| Insoluble | → | Soluble and Plant Available |

| | |
|--|---|
|  |  |
| Oxide Micronutrient 30 Days | Tiger Micronutrient 30 Days |

The presence of the **TIGER 90 CR® sulphur** in the **TIGER MICRONUTRIENTS® fertilizer formulation** is oxidized by the “Thiobacilli” which produces sulfuric acid and greatly improves the conversion of the oxide micronutrient. The above samples emerged in a water solution clearly shows the effects of the Sulphur on the **TIGER MICRONUTRIENTS® fertilizer** solution vs. the oxide formulation without the Sulphur.

TIGER MICRONUTRIENTS[®] fertilizers vs. Conventional Oxy-Sulfate sources.

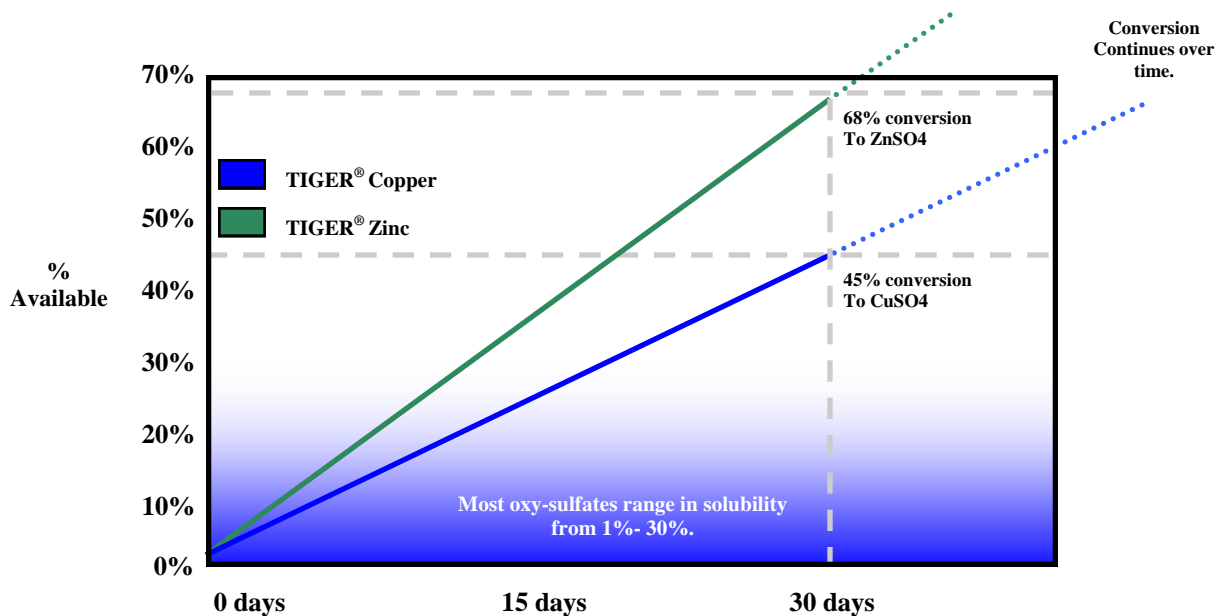
When comparing **TIGER MICRONUTRIENTS[®] fertilizers** performance to conventional oxy-sulphates, one must understand how oxy –sulphates are manufactured.

Oxy-Sulphates are formed by taking a *Oxide material* and grinding it into a *powder*. The powder is then granulated and placed into a *Sulphuric Acid* bath, and left for a period of time for the sulphuric acid to solubilize the oxide material. This achieves the maximum amount of available sulphate the oxy-sulphate material will contain.

Most oxy-sulphate micronutrients range in solubility (available sulphate form) *from 1% to 30%* based on how long the product was reacted for. Unfortunately this reaction process also *results in a granule that becomes hard and difficult to breakdown into a fine powder due to the sulphuric acid treatment.*

Other problems encountered with oxy-sulphate products that contain a large amount of available sulphate material is the reaction with other products when blended together. *The hygroscopic nature of the oxy-sulphate, reacts with such products as ammonium sulphate, urea and potassium and become difficult to handle as the fertilizer blend takes on moisture from the air.*

The graphs below will explain how **TIGER MICRONUTRIENTS[®] fertilizers** perform based on **lab results** from an independent Microbiological Consulting company and Tiger-Sul Products research staff.



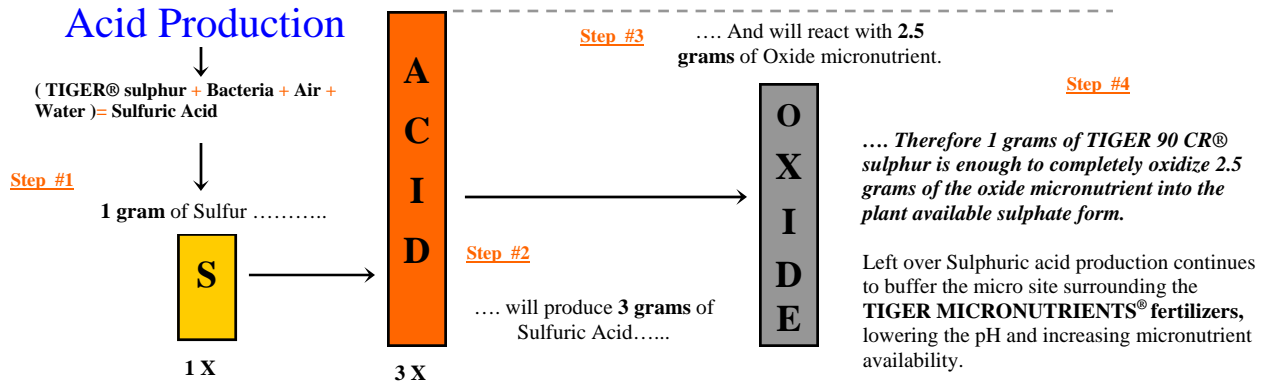
TIGER MICRONUTRIENTS[®] fertilizers testing conducted in lab with 25°c temperature in continuous water phase for a period of 30 days

This graph shows that **TIGER MICRONUTRIENTS[®] fertilizers** unique performance allows for greater availability of the applied micronutrient over a period of time so —

“How do TIGER MICRONUTRIENTS[®] fertilizers work?”

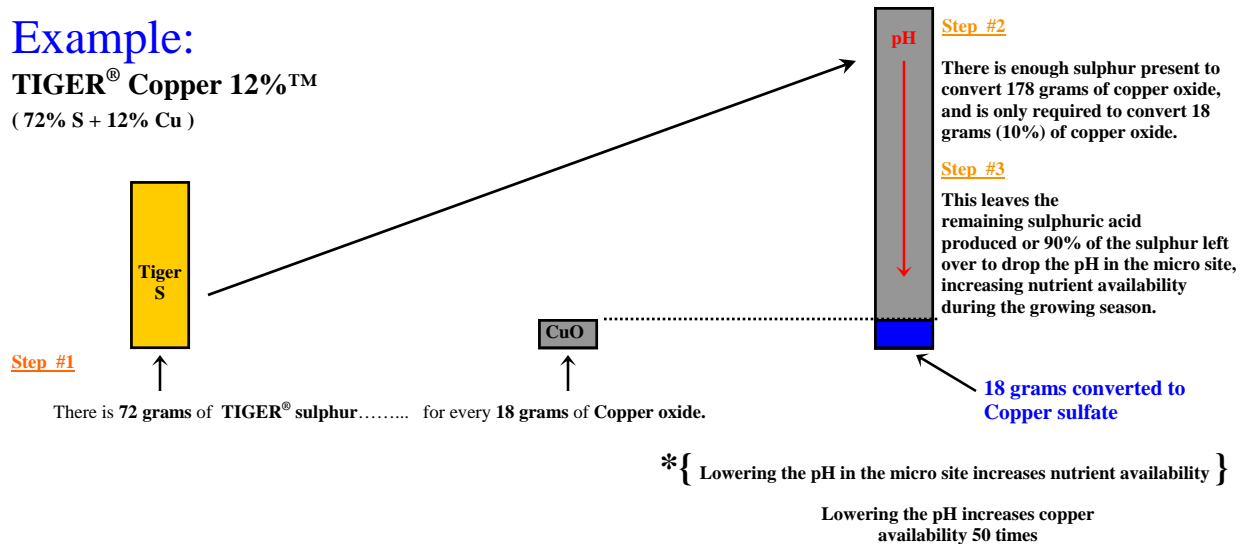
TIGER MICRONUTRIENTS® fertilizers & Thiobacilli - Sulphuric Acid Production

The TIGER MICRONUTRIENTS® fertilizers performance relies on Sulphur loving soil microbes called “*Thiobacilli*”. These natural soil bacteria are present in all our soils. The key behind the performance is Tiger’s technology to incorporate the micronutrient oxide and the TIGER 90 CR® sulphur in a matrix that can be easily oxidized by the soil Thiobacilli.

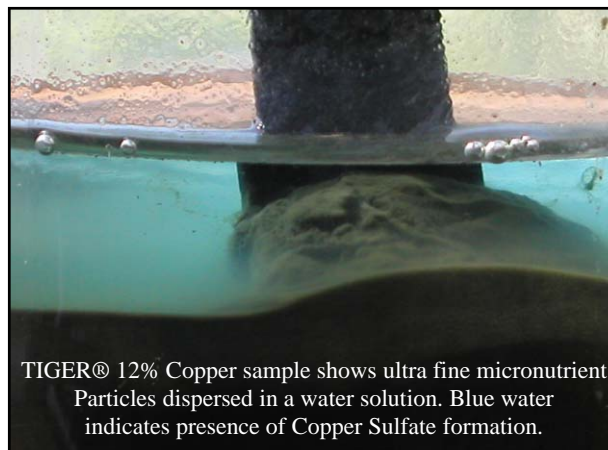


Example:

TIGER® Copper 12%™
(72% S + 12% Cu)



TIGER MICRONUTRIENTS® Fertilizers Performance



Arise Research and Discovery, Inc. Martinsville, IL

One of the many research locations conducting research on **TIGER MICRONUTRIENTS® fertilizers** was conducted by Dr. Roy M. Stephen. Research conducted at his research farm was done on corn and soybean crops, with **TIGER® Zinc 18%**, and **TIGER® Manganese 15%** fertilizers.

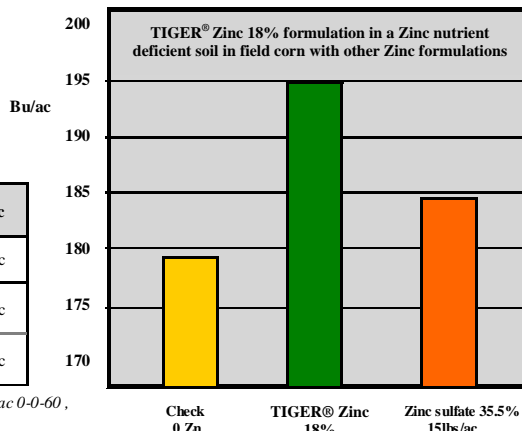
TIGER Zinc 18% Research

Crop : Corn

Variety : Gutwein 2515

| Treatment Name | Rate Lb/ac | Yield Bu/ac |
|--------------------|---------------|--------------|
| Check No Zn | 0 lbs / acre | 178.83 bu/ac |
| TIGER 18% | 30 lbs / acre | 195.33 bu/ac |
| Zinc Sulfate 35.5% | 15 lbs / acre | 185.97 bu/ac |

All treatments received: 200 lbs/ac 11-52-0, 200 lbs/ac 0-0-60, 150 lbs/ac Nitrogen



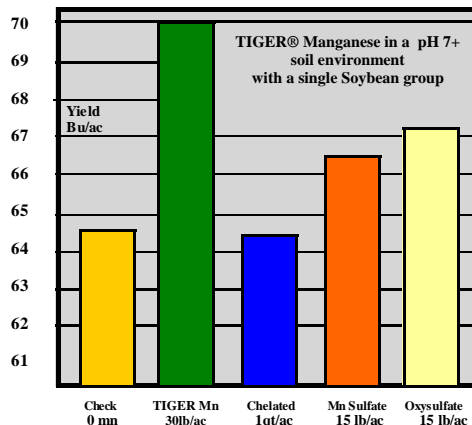
TIGER® Manganese Research Plot

Crop : Soybean

Variety : Beck's 402 RR

| Treatment Name | Rate Lb/ac | Yield Bu/ac |
|---------------------|---------------|-------------|
| Check No Mn | 0 lbs / acre | 64.67 bu/ac |
| TIGER Mn 15% | 30 lbs / acre | 70.07 bu/ac |
| Chelated Mn | 1 qt / acre | 64.53 bu/ac |
| Mn Sulfate 36% | 15 lbs/acre | 66.57 bu/ac |
| Mn OxySulfate 30% | 15 lbs/acre | 67.20 bu/ac |

All treatments received: 200 lbs/ac 11-52-0, 200 lbs/ac 0-0-60



| Treatment | N Content % | S Content % | N-S Ratio | P Content % | K Content % | Mg Content % | Ca Content % | Na Content % | B Content ppm | Zn Content ppm | Mn Content ppm | Fe Content ppm | Cu Content ppm | Al Content ppm |
|---------------------|-------------|-------------|-----------|-------------|-------------|--------------|--------------|--------------|---------------|----------------|----------------|----------------|----------------|----------------|
| TIGER Mn 15% | 4.627 | 0.300 | 15.4-1 | 0.300 | 2.107 | 0.410 | 1.543 | .027 | 44.67 | 115.7 | 514.3 | 868.0 | 26.0 | 1181.3 |
| Chelated Mn | 4.810 | 0.267 | 18.0-1 | 0.260 | 2.087 | 0.373 | 1.553 | 0.013 | 38.00 | 88.7 | 435.7 | 895.3 | 17.3 | 1215.7 |
| Check | 5.157 | 0.283 | 18.2-1 | 0.293 | 2.030 | 0.383 | 1.590 | 0.010 | 34.33 | 89.0 | 341.7 | 800.3 | 15.3 | 1054.0 |
| Sulfate Mn | 4.797 | 0.263 | 18.2-1 | 0.280 | 1.740 | 0.310 | 1.330 | 0.010 | 23.80 | 53.3 | 110.7 | 1073.7 | 14.0 | 1306.3 |
| OxySulfate Mn | 4.647 | 0.247 | 18.8-1 | 0.250 | 1.437 | 0.347 | 1.360 | 0.010 | 37.67 | 62.3 | 193.0 | 858.7 | 12.3 | 1077.0 |

Tissue analysis of Manganese trial— Growth Stage V-4

Results

Many research projects in North America and Europe continue as Tiger-Sul Products demonstrates the performance of TIGER MICRONUTRIENTS[®] fertilizers line of products.

TIGER MICRONUTRIENTS[®] fertilizers benefits:

- Season long release of plant available sulphate forms
- Optimum availability throughout the growing season
- Acid environment for greater availability
- Reduce risk of overdosing
- Resists leaching
- Dual nutrient value—TIGER 90 CR[®] sulphur + Micronutrients
- Premium quality & uniformity
- Low analysis for maximum site distributuin



*TIGER MICRONUTRIENTS[®] fertilizers
premium uniformity
and quality vs. conventional micronutrients.*

TIGER MICRONUTRIENTS[®] fertilizers

The most efficient and environmentally friendly micronutrient available.

- TIGER[®] COPPER
- TIGER[®] IRON
- TIGER[®] ZINC
- TIGER[®] MANGANESE

TIGER[®] CROP Mixes

- TIGER[®] CANE Mix
- TIGER[®] POTATO Mix
- TIGER[®] COTTON Mix
- TIGER[®] GRAINS Mix
- TIGER[®] MELON Mix
- TIGER[®] CITRUS Mix
- TIGER[®] CORN Mix
- TIGER[®] RICE Mix
- Other Mixes can be customized to meet your needs



*TIGER[®] Turf Mix
homogeneous blend of
Iron & Manganese*

For more information on TIGER MICRONUTRIENTS[®] fertilizers, call your local retail outlet or Tiger-Sul toll free at:

**Tiger-Sul Products (Canada) Co., Calgary, AB, Canada
1-877-299-3399**

**Tiger-Sul Products LLC, Stockton, CA, USA
1-877-299-3399**

**Tiger-Sul Products LLC, Atmore, AL, USA
1-800- 239-3647**

