

# Lignosulfonates

By WINFIELD UNITED

Plant Nutrition & Performance  
Micronutrient



## Why Lignosulfonates?

*Help Reduce Nutrient Interactions in the Soil with LS Micronutrients*

How can you be sure that your fields are getting the most from soil-applied nutrients? Nutrients act differently in the soil based on their net charge, and some nutrients are easily tied-up in the soil. This means that you may be applying fertilizer that can't be taken up by plants, because it is held too tightly by the soil.

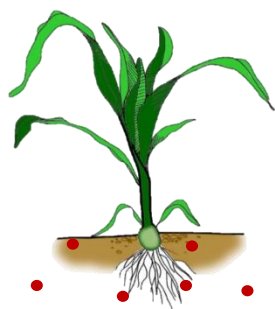
Lignosulfonates (LS) help to reduce soil tie-up and ensure nutrients are available for plant uptake. Lignosulfonates are naturally occurring compounds derived from plant material. Micronutrients are complexed with lignosulfonates to create a granular product for soil application that improves mobilization and nutrient utilization in plants.

What is the Ultimate Goal of LS products? To get a uniform spread of micronutrient granules across the field. Granules then dissolve in water and move to the root to be taken up by the plant! LS products are compatible with other fertilizer products to provide a complete plant nutrient package.

## Mobility of Various Granular Zinc Sources

*Zinc 10% LS is protected from soil tie-up due to complexing of micronutrients.*

Zinc Oxide



Insoluble and immobile. **Must be converted to a soluble form AND the root must seek out the nutrient** so more is required to correct a deficiency.

Zinc Sulfate



Soluble but immobile. **Ties up rapidly** and still relies heavily on root interception.

Zinc Lignosulfonate



Soluble and mobile. Protected from tie-up. **Moves with the soil solution to the root** to increase plant availability and uptake.

Similar bulk density to other granular fertilizers for reduced segregation in the tank

Complexed LS granules have improved efficiency so less product is needed to cover the same acres

Water-soluble granules are more mobile in the soil for improved uptake



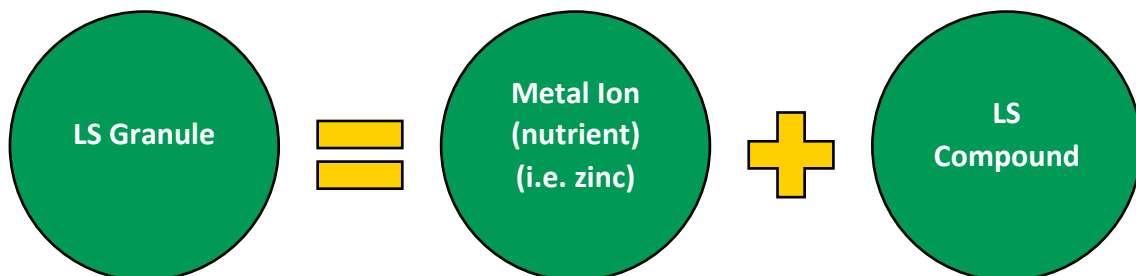
# Lignosulfonates

By WINFIELD UNITED

Plant Nutrition & Performance  
Micronutrient



## Complexed Lignosulfonate Compound



Lignosulfonate clamps onto ions (nutrients) in solution to protect from interaction, keeping nutrients plant available.

### Efficiency Ratio

The increased water solubility and dispersion of lignosulfonate micronutrients means less product is needed when compared to traditional granular micronutrient sources.

Zn Rate Desired	Zinc Sulfate 35.5%	Zn 10% LS (7:1 ratio)
3 lb/A Zn	8.6	4.3
5 lb/A Zn	14.3	7.1
10 lb/A Zn	28.6	14.3

Note: Use Rate of LS products vary depending on formulation. Refer to specific product label for suggested use rate.

## Features & Benefits of LS:

LS Products:	This Means Nutrients:
Are mobile in the soil profile	Are available for plant use longer because they do not tie up with soil.
Are complexed with lignosulfonate	Are available for root uptake and translocation.
Can be applied with the seed at planting	Are immediately available for plant uptake in the root zone.
100% water-soluble granules	Dissolve easily with soil moisture to improve plant availability and uptake.
Have a bulk density similar to other granular fertilizers (52-56 lb./ft <sup>3</sup> )	Provide more uniform blending and reduced segregation for preferred compatibility with dry N-P-K fertilizers.
Spread more acres	Are more efficient than standard granular fertilizers so less is needed per acre. This also saves on storage space!
Come in many different formulations and contain nutrients in each granule	Are uniformly spread and are more likely to be taken up by the plant after application.