



# Technical Information Sheet

## Sulphate, Oxide & SJB Chelated Foliar Sprays

When looking at the best foliar nutrient option it is not a matter of comparing apples with apples (ie. choosing the product that has the lowest cost per unit of element). The three most commonly used types of foliar nutrients are: Soluble salts (eg. sulphates, chlorides, nitrates), Oxides & Chelates (eg. EDTA, lignosulphonates, amino acids).

Generally the soluble salts and oxides are high analysis products (>10% element) while chelates (liquids at least) have lower nutrient analysis (<10% element). It has been well established scientifically that chelates are more efficient at supplying nutrients to the crop and therefore can be applied at lower rates per hectare than sulphates or oxides. Independent scientific trials have shown that SJB's chelated zinc and manganese products are typically 5-8 times more available than sulphates or oxides with regard to yield response per gram of applied element.

While many growers place great importance on tissue analysis to determine the success of their foliar nutrient program, tissue analysis does not give any indication of availability (ie. how much of the nutrient is being utilized & how much is simply contamination on the leaf surface). Sulphates and oxides may produce higher leaf readings than chelated products however this does not mean they are 'better' than chelates, it may just simply reflect the fact that more nutrient has been applied per hectare. The key question is how much of this nutrient is available to the crop?

### Soluble salts (eg. sulphates)

#### PROS

- Usually the cheapest form in terms of cost per unit of element
- In solution these provide plant available forms (eg.  $Zn^{++}$  cations) that can be readily absorbed

#### CONS

- Tendency to be phytotoxic (eg. leaf burn)
- Limited compatibility with chemicals

### Oxides

#### PROS

- Highest analysis products
- Excellent compatibility

#### CONS

- Not readily plant available
- Slower release
- More expensive than sulphates

### Chelates

#### PROS

- Most efficient nutrient source
- Good chemical/nutrient compatibility (better than sulphates)
- High level of crop safety

#### CONS

- Low analysis
- Higher cost per unit of element



## Some advantages of SJB chelates over other nutrient forms

SJB uses an organic chelating agent (lignosulphonate) to protect or complex nutrients and this provides a number of additional benefits.

**Crop safety** – Leaf burn is a common problem when foliar spraying, particularly with sulphate formulations. This is because sulphates provide a large amount of available nutrient that cannot be fully utilized by the crop and therefore it accumulates (mostly on the leaf margins and tips) where it causes cell damage or breakdown. The advantage of SJB chelates is that they do not flood the leaves with excess nutrient and the nutrient is also in a protected form to provide more controlled foliar absorption. The organic nature of the chelating agent is also more crop friendly than synthetic chelating agents such as EDTA which can be phytotoxic.

**Prolonged foliar absorption** – As mentioned above, sulphates can be very quickly absorbed by the leaves, particularly under favourable weather conditions (eg. high humidity) and therefore usually give a quick initial response or 'greening' effect. However this also means that high demand crops can go back into deficiency fairly quickly when using sulphates. The end result is that sulphates need to be applied on a regular basis to keep on top of deficiencies in actively growing crops. SJB chelates on the other hand provide prolonged foliar absorption which means fewer applications are required during the growing period. Oxides can also provide extended release of nutrients however oxides are not readily plant available (they need to be broken down or metabolized by the plant first) and therefore they release nutrients much more slowly than sulphates or chelates and are usually less suitable for annual or faster growing crops.

There are several main reasons why the SJB chelate prolongs foliar uptake. Firstly the lignosulphonate chelate has excellent binding properties that help adhere nutrients to the leaves. This is particularly important with trace elements as they often take 2-5 days to achieve 50% absorption and even a dewy morning is enough to wash significant amounts of nutrient from the waxy leaf surface. Secondly, lignosulphonate has surfactant or leaf wetting properties that extend uptake through the cuticle. Thirdly, research has shown that nutrients applied in lignosulphonate form are readily transported within the plant and accumulate in the roots. This means the crop can store excess nutrient to be utilized as demand increases.

**Designed for foliar uptake** – The reason SJB uses low molecular weight lignosulphonate for its nutrient carrier is because it's beautifully designed for foliar absorption. As well as having excellent leaf binding properties, it also acts as an anionic surfactant enhancing leaf wettability & dispersion of nutrient over the leaf surface. Low molecular weight lignosulphonate is also able to penetrate or pass through the waxy leaf cuticle carrying nutrients into leaf. The chelating strength of our modified lignosulphonate is also ideally suited for foliar uptake, as opposed to stronger synthetic chelating agents like EDTA that bind nutrients so tightly they are not easily available to the plant.

So in summary – SJB chelates:

- Have higher nutrient efficiency than sulphates & oxides;
- Have excellent nutrient and chemical compatibility;
- Have a high level of crop safety;
- Provide prolonged foliar uptake meaning fewer sprays per season;
- Are perfectly designed for foliar application
- Compare favourably against other foliar options in terms of total cost per hectare.

This all means that SJB chelates deliver more consistent results under a variety of growing conditions, while providing flexibility & good value for growers.



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