



## S-Chelate-O 12\*

### Complete Feed Water Soluble Powder

**NPK: 7:3:18**

**Nitrogen (N)– total – 7% (6% as Nitrate,1% as NH4)**

**Phosphorous (P)- 3%**

**Potassium (K) – 18%**

<b>Boron (B)</b>	<b>0.1%</b>
<b>Copper (Cu)</b>	<b>0.1%</b>
<b>Calcium</b>	<b>2.1%</b>
<b>Iron (Fe)</b>	<b>0.7%</b>
<b>Magnesium (Mg)</b>	<b>0.4%</b>
<b>Manganese (Mn)</b>	<b>0.4%</b>
<b>Molybdenum (Mo)</b>	<b>0.03%</b>
<b>Sulphur (S)</b>	<b>1.4%</b>
<b>Zinc (Zn)</b>	<b>0.2%</b>

These are the levels quoted as elements not as an oxide or any other compound.

All Cations (except Potassium) in their chelated form

**Complete plant nutrition with NPK and non-bio-accumulative chelated secondary, macro- and micronutrients  
pH of 1% solution – 3.9.**

Packing: 5kg PE lined steel pails

## Introduction

S-Chelate-O 12 Star has been developed as a complete feed for hobby and commercial growers as a way of applying and demonstrating the S-Chelate technology in a comprehensive package including the three main macronutrients. It is also a demonstration of our capacity to formulate custom blends.

We are running a small scale efficacy trial growing Avocado stones comparing it with two well known fertiliser feeds.

**The S-Chelate-O 12 Star was applied at the same NPK rate as the commercial products and it has been measurably more effective on every aspect of growth;**

- germination,
- development of roots,
- stem growth and
- leaf growth

Please see pictures below and our website for details.

## Application Guide Rates

### Home and Garden

2 level teaspoons of the powder (8.3grams) per 4.5 litres of tap water. Easily soluble by adding to watering can first and adding water under pressure. Feed young plants every two weeks increasing to once a week when plants reach fast growth, flowering or fruiting stage.

### Commercial Scale

As a micronutrient and NPK boost to your usual NPK sources:	
Maintenance rate	1 kg/ha, Moderate
Moderate Deficiency	1-3kg/ha
Severe Deficiency	> 3kg/ha

S-Chelate-O 12 Star has been developed as complete feed with the hobby garden in mind in the first instance, however, we believe it may also be used to provide a micronutrient, secondary nutrient, macronutrient and NPK boost to commercial crops in conjunction with your usual NPK source.

The application rate will vary depending on the crop and application regime and you may for example prefer fewer applications and apply up to double the guide amount for each application.

Due to the escalated uptake, we recommend you perform tissue tests to determine the optimum application rate and optimise your costs.

As a coating on NPK or for each foliar application:	
Maintenance rate	1 kg/ha
Moderate Deficiency	1-3kg/ha
Severe Deficiency	> 3kg/ha

**Foliar application** – as a guide dissolve the above amounts in 200 litres of water to apply over one hectare. However, the guide application quantities are easily soluble in smaller volumes of water or can be dissolved in larger volumes as long as there is sufficient stirring to ensure it has diffused evenly throughout the mixing tank in the greater volume (See below for more detail on foliar application).

### Application Timing

**Preventive:** apply at early stage after establishment of the seedlings, at 4-6 leaves stage.

**Remedial:** start at first sign of micronutrient deficiency; apply 2 additional sprays at 10-15 day intervals.

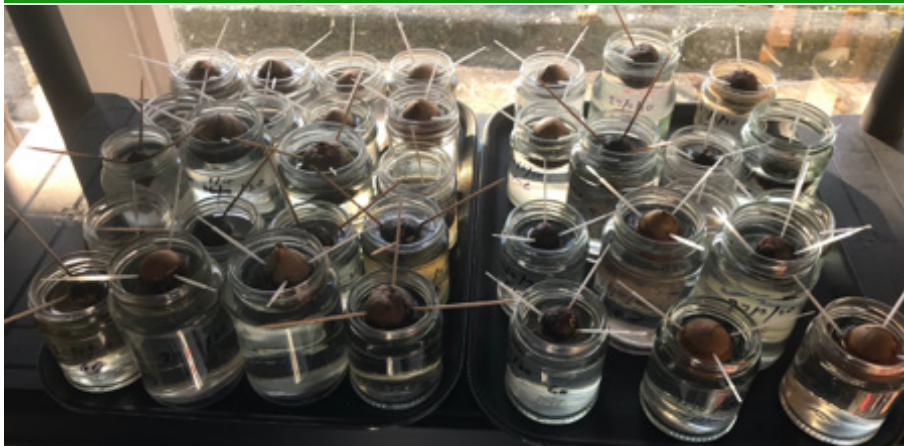
## Avocado Trial



Avocado plant at the end of May 2020, 8 months after starting at the beginning of October 2019



Avocado plant at the end of May 2020, 8 months after starting at the beginning of October 2019

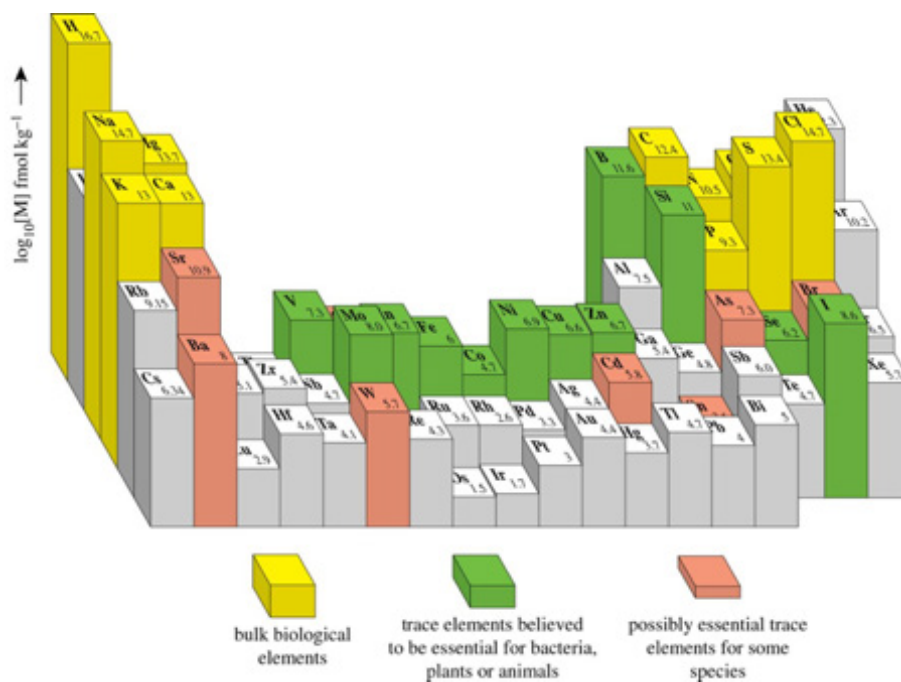


S-Chelate-O 12 Star vs competing fertilisers ready to use solutions with Avocado stones mounted in jars and as feed after germination and potting



## Product Features

S-Chelate -O 12 Star has a unique chelate chemistry that transports the cations of these important elements into the plant with remarkable effectiveness.



S-Chelate-O 12 Star reduces deficiencies through its optimum combination of essential micronutrients and macronutrients and provides a comprehensive package of major micronutrients essential to plant metabolism throughout the growth and development cycle.

**Manganese (Mn)** is an essential plant mineral nutrient, playing a key role in several physiological processes, particularly photosynthesis. Manganese deficiency is a widespread problem, most often occurring in sandy soils, organic soils with a pH above 6 and heavily weathered, tropical soils. It is typically worsened by cool and wet conditions (Alloway 2008). Numerous crop species have been reported to show high susceptibility to Mn deficiency in soils, or a very positive response to Mn fertilization, including cereal crops (wheat, barley and oats), legumes (common beans, peas and soybean), stone fruits (apples, cherries and peaches), palm crops, citrus, potatoes, sugar beets and canola, among others. The impact of Mn deficiencies on these crops includes reduced dry matter production and yield, weaker structural resistance against pathogens and a reduced tolerance to drought and heat stress.

**Manganese** has a relatively low phloem mobility in plants, and as a result, typical leaf symptoms of Mn deficiency first develop in younger leaves. The critical concentration for Mn deficiency is generally below 20 ppm dry weight in fully expanded, young leaves. In the case of dicots, Mn deficiency first results in pale mottled leaves, followed by typical interveinal chlorosis. Under severe Mn deficiency dicots may also develop a number of brownish spots. In cereals, Mn deficiency can cause pale green or yellow patches in younger leaves. This condition is known as grey speck, and is characterized by necrotic spots that form in older leaves (Figure 1).



Manganese deficiency symptoms in corn and wheat (Pictures: IPNI).

## Chlorosis

Chlorosis is commonly caused by an inability to synthesise sufficient chlorophyll which can be caused by poor nutrition including a deficiency of Iron, Magnesium and Zinc.



A Liquidambar leaf with interveinal chlorosis  
Karnataka J. Agric. Sci.,24 (1) : (106-109) 2011

**All of the elements in S-Chelate-O 12 Star have been identified as essential to photosynthesis.**

### References:

Interaction of micronutrients with major nutrients with special reference to potassium

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S-Chelate-O 12 Star is bioavailable in a much broader-than-normal range of pH and soil conditions such as in contact with clay, carbonates, phosphates, organic matter and other elements in the soil that seek to tie up and make secondary elements and micronutrients insoluble.

Chelation is defined as the capacity to hold the metal ion in solution above the precipitation point of the non-chelated ion and the Level of Chelation measurement is your assurance of the performance of our product which will stand up to independent verification.



This is the backbone of the performance of this technology resulting in markedly lower application rates than for non-chelated products because so much more of the metal ion will stay in solution and reach the plant tissues as has been shown convincingly by yield and quality improvements alongside parallel tissue analysis.

### There are two ways this works:

#### 1) In the soil

Protecting the vulnerable cationic metal ions from being tied up and allowing them to reach and be absorbed by the root hairs.

#### 2) In the plant

Carrying them in a more biologically compatible way to the regions of the plant where they are needed. Chlorophyll is a chelate structure so the plant's phloem system recognises S-Chelates as organic molecules with familiar structures, enabling them to be transported and assimilated more readily than traditional unchelated mineral salts.

**As a precaution please jar test before mixing with any agrichemicals.**

Guide application rates produce very dilute solutions of 1-3+% but due to using conditions varying widely we always recommend trialing before adopting widely and cannot accept liability for damage or underperformance.

**Please contact us or our agents for technical support.**

**Achieve greater yields with Super Bioavailable S-Chelate™ Technology**

**Chemistry not Mystery**

**Made in the UK**

## Get in touch

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