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## Choices with CALCIUM NITRATE

Hygrotech is currently offering two calcium nitrate products to its customers. The type of application will determine what product will be used. Calcium nitrate (refer to Table 1 for product specification) can be used in open field applications, where fertiliser applications are dominated by hand or machine application. Solu-Cal (refer to Table 2 for product specification) can be used when high solubility is required in drip and micro-jet irrigation systems, especially in hydroponic systems. Calcium nitrate can also be used in hydroponics due to its good solubility, but the preferred product remains Solu-Cal, due to the excellent solubility that is made possible by its crystal form.

**Table 1. Calcium nitrate analysis:**

Specification	Analysis
Calcium	18.80 %
Nitrate – Nitrogen	9.9 %
Ammonium nitrate - Nitrogen	4.5 %
Total Nitrogen	14.4 %
Insoluble in water	0.02 % Max

**Table 2. Solu-Cal analysis:**

Specification	Analysis
Calcium	16.60 %
Nitrate – Nitrogen	11.7 %
Ammonium nitrate - Nitrogen	0 %
Insoluble in water	0.01 % Max

**Table 3. Summary of comparison between Solu-Cal and Calcium nitrate:**

	Solu-Cal	Calcium Nitrate
Water Insoluble:	0.01% Max	0.02% Max
Ability to dissolve, especially in stock solutions:	Very high	High
Form:	Soluble crystal	Soluble granule
Positive characteristics	Easy to apply in hydroponics systems	Easy to apply by hand or machine in open field application
Negative characteristics	Difficult to apply by hand or machine	Can be applied in hydroponics systems, but ammonium levels should be managed, especially in production systems with saw dust or inert mediums such as sand etc.



Aiming for quality and yield in hydroponic systems?



**Use Solu-Cal!**

### Calcium requirements in fertiliser mixes:

Optimal calcium requirement during various stages of plant growth can generally be summarised as follows:

1. Seedlings: 96 ppm (Morgan, L.L. 2000)
2. Optimum for mature plants: 150 ppm (Harris, D. 1994) – 170 ppm (Cooper, A. 1996).

With 160 g/kg Calcium in Solu-Cal, 1 kg per 1000 L water will result in 160 ppm calcium, which is within the ideal recommended concentration of calcium above. This along with Hygrotech's Hydroponic will result in an ideally balanced nutrient mixture.

### Nitrate nitrogen for fruit quality:

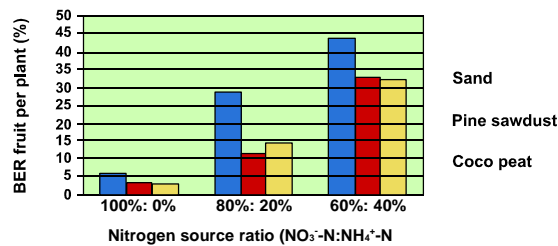
Optimum fruit quality with hydroponic vegetables, especially those grown in a growing medium, is obtained when the ammonium nitrogen ( $\text{NH}_4^+ - \text{N}$ ) is a maximum of 20% of the total nitrogen supply (Langenhoven, P. 2004). Solu-Cal with only nitrate nitrogen ( $\text{NO}_3 - \text{N}$ ) is therefore perfectly suited for hydroponic systems. The following results were obtained on tomato hydroponic production in coco peat and saw dust, when the ammonium nitrogen exceeded 20% of the total nitrogen supply:

- Stem diameter decreased.
- The number of marketable fruit decreased with an increase in  $\text{NH}_4^+ - \text{N}$  content in the nutrient solution during production in warmer, summer conditions. The major contributor to unmarketable fruit was blossom-end rot (Refer to Graph 1).
- Decrease in fruit mass.
- Yield decreased (Refer to Graph 2).

The results of research done at Welgevallen Experimental Station in Stellenbosch by Dr Petrus Langenhoven showed clearly the potential negative effects of excessive ammonium nitrogen in hydroponic systems. Amongst other results, it was showed that the highest yields in tomato was realised when the crop was irrigated by 100%  $\text{NO}_3 - \text{N}$  (refer to Graph 2). Furthermore, yield declined with increased  $\text{NH}_4^+ - \text{N}$  use. Blossom end rot (BER) was also clearly shown to be related to increased ammonium levels (refer to Graph 1).

It should therefore be clear that ammonium containing fertilizers should be limited in hydroponic culture – with Solu-Cal containing zero of this potentially production limiting nutrient!

**GRAPH 1: Incidence and increase of BER in hydroponic tomatoes can be correlated to an increase of  $\text{NH}_4^+$  - N content**



**GRAPH 2: Tomato yield increase in hydroponics can be correlated with decreasing  $\text{NH}_4^+$  - N content**

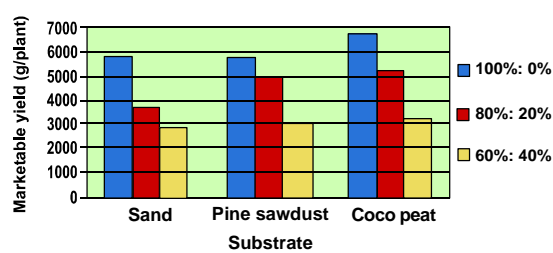


Photo 1: Solu-Cal and Calcium Nitrate

**Calcium nitrate for Open field systems – aim for practical application and yield:**

Refer to Photo 1 (photo of Calcium Nitrate, on the right and Solu-Cal, on the left). Calcium Nitrate can be applied by hand or machine due to its granular characteristics, which will be a problem with the crystal characteristics of Solu-Cal.




**References:**

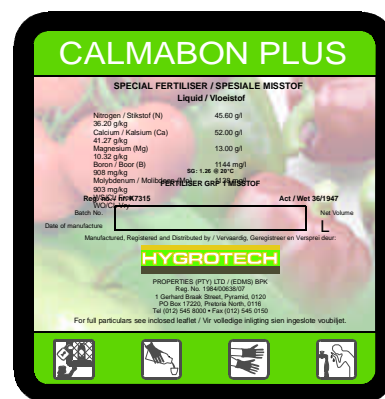
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**BREAK THROUGH THE HEAT AND BLOSSOM-END-ROT WITH HYGROTECH'S NEW CALMABON PLUS**

*Calmabon is Hygrotech's highly successful supplement foliar spray product that is currently used to reduce calcium, magnesium, boron and molybdenum shortages. Hygrotech is proud to announce the release of Calmabon Plus that can do the same job as Calmabon, and more, and more...*

**WHAT ARE THE ADDITIONAL ADVANTAGES OF CALMABON PLUS ABOVE CALMABON?**

-  Calcium and magnesium in **CALMABON PLUS** are 100% chelated. Organic chelates ensure quick uptake of minerals that guarantee a local increase of each mineral in the specific leaf cells. **CALMABON PLUS** can be applied when quick uptake of minerals (especially calcium) is required. For example, like in a heat wave where calcium supply to the leaves is temporarily stopped, or during fruit ripening where quick uptake is necessary.
-  **CALMABON PLUS** contains a plant activator, some carbohydrates from natural plant sources and a multi-vitamin complement, which will help the plant to cope with stress.
-  An ion transporter will further ensure that minerals (especially calcium) will be transported and delivered to its destination, quickly and effectively.



*For more information regarding Calmabon Plus on your tomatoes and other crops - contact Pieter Peacock on 082 552 8848, Paddy de Vries on 083 633 1222, or Neil Kruger on 082 451 8262 (South).*

**CAN YOU AFFORD NOT TO USE CALMABON PLUS IN THE COMING SEASON?**